

BUILDING HEALTHY, HIGH PERFORMANCE SCHOOLS:

A Review of Selected State and Local Initiatives



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EXECUTIVE SUMMARY

Over the past several years, an impressive array of technologies, information, and other resources have been developed to improve the way school buildings are designed and constructed. These tools can be used to change the traditional approach to school building in the United States—an approach that has a considerable negative impact on the natural environment and has produced many facilities that are costly to operate, difficult to maintain, and in some cases, unhealthy for children and staff. With tens of billions of dollars to be invested in school building programs in the coming years, states and school districts have a unique opportunity to use the wealth of information and other resources now available to maximize their investment in school facilities.

A new approach to school planning, design, and construction aims to create “high performance” schools—buildings that support the learning process and are healthier, more environmentally responsible, and less expensive to operate. In the best cases, the buildings themselves are interactive tools for learning. Across the country, there are currently many examples of high performance school facilities. This report focuses on state-wide and school-district-wide initiatives that establish a framework for the early, integrated consideration of a wide range of health and environmental goals in new school building projects. These initiatives do not require a specific set of building features, but rather they create a *decision-making process* to identify design strategies in areas ranging from site planning and resource efficiency to ventilation, daylighting, and material selection.

The report describes in detail the high performance school building initiatives of three states and four school districts that have developed innovative and ambitious policies, programs, and practices to change the way they develop school facilities: California; Massachusetts; New Jersey; the Los Angeles Unified School District; the Wake County Public School System (NC); the Elk River Area School District (MN); and the Edmonds School District (WA). For each jurisdiction, the report discusses how the initiative was developed, its main components, the challenges faced by the state or district, and the key implementation issues for the future. Although the report does not capture all of the important work being carried out by states and school districts across the country, the seven jurisdictions included here are at the forefront in achiev-

ing institutional change to advance high performance school design and construction.

In California, the CHPS initiative has marshaled the resources and talents of a variety of governmental and non-governmental parties to produce a new model for building high performance schools and to assist local districts in adopting that model. The Los Angeles Unified School Districts, with one of the largest local school building programs in the country, has formally adopted the CHPS model for all of its new construction projects and has put in place an institutional framework for its implementation. Massachusetts, which is carrying out one of the largest green schools pilot programs, is also adapting the CHPS model and exploring regulatory changes to implement high performance goals and incentives. In New Jersey, the governor has made sustainable school design state policy, and the state is implementing that policy throughout its very large state-managed school construction program for urban school districts around the state.

The other school districts profiled in the report also have achieved impressive results using a variety of strategies. In Wake County, North Carolina, the district helped create a regional high performance building manual and has mandated the use of the manual in all new school building projects. The Elk River Area School District in Minnesota collaborated with local sustainable design experts on a high performance school guide and worked with those experts to incorporate numerous high performance goals into its building program. In Washington, the Edmonds School District created a comprehensive community planning process to guide the development of goals for its new school building program. This community planning process has yielded an increased emphasis on sustainability that is evident in several new school buildings.

THE CHALLENGES TO CREATING HIGH PERFORMANCE SCHOOL BUILDING PROGRAMS

The initiatives examined here successfully addressed a variety of challenges to pursuing a high performance approach. The experiences of these jurisdictions suggest that one of the greatest challenges is a lack of awareness

and understanding of the high performance approach on the part of school officials and staff, private firms and community residents. It is vital to communicate both the benefits of high performance schools and the availability of an increasing variety of resources to help achieve those benefits. The school districts examined here have addressed this challenge directly by educating key constituencies within and outside the district. The states profiled have developed an array of programs and partnerships to provide outreach and education.

A related challenge is that of disseminating technical information through written materials, training, and direct assistance. The technical resources created over the past few years can greatly assist district officials—including project managers, maintenance staff, principals, and teachers—as well as the design and construction professionals with whom they work. The districts studied here have been successful at obtaining this information and using it effectively in their programs, and some states have aided districts substantially in this regard.

The financial integrity of the school building program was a top concern for all of the districts described in the report. Although a high performance school need not cost more than a conventionally-designed school, some projects may involve higher initial costs for design and analysis or for building materials and systems. School districts addressed these financial considerations by emphasizing an integrated design approach that optimizes building components to achieve better performance and efficiency. Districts also embraced the concept of life cycle cost analysis, recognizing that higher initial investments in building design and construction will be recouped quickly in lower operating and maintenance costs.

State governments also face serious financial constraints. Some states are developing and carrying out ambitious programs to advance high performance design and construction, while others—even those with promising policies in place—lack the staff and resources to take an active role. The financial difficulties facing state education agencies today are exacerbated by the historically limited role of these agencies in overseeing school design and construction.

SCHOOL DISTRICT STRATEGIES FOR INCORPORATING A HIGH PERFORMANCE APPROACH

The report identifies and analyzes policies, programs, and practices that have been used by a number of school districts to create a framework for building healthy, high performance schools. The strategies discussed in the report can be adapted to the constraints and opportunities presented in other districts. Although the specific strate-

gies differ somewhat, the local initiatives profiled here followed some of the same basic steps in institutionalizing a high performance approach.

Build Support for the Initiative. A key factor in the success of the school district initiatives included in the report was the leadership of a district “champion”—a facilities manager or other official who believed in the importance of a high performance approach and worked to change the district’s school building practices. In some cases, area sustainable design experts were instrumental in cultivating this district leadership. In most cases the poor health, energy and financial performance of existing facilities heightened the desire for a new approach. The district officials who spearheaded the initiatives recognized the importance of raising the awareness and involvement of other parties within and outside the district. In particular, district officials sought *school board support* by informing school board members and, in some cases, helping the board develop policies affirming high performance school building goals. Districts also worked to build *community support* by informing the community about the initiative and strengthening community participation in the decision-making process.

Develop Partnerships to Leverage Resources. Most school districts do not have the expertise or resources to develop a high performance initiative without outside assistance. A common strategy among districts is to leverage outside expertise by creating formal working relationships with other public and private entities. A number of districts hired *sustainable design consultants* to help develop high performance goals and communicate those goals to the project team. Districts also formed *public-private working groups* with private firms and non-governmental organizations (NGO) to provide a vehicle for obtaining advice and assistance in developing the initiative. Some districts have benefitted from the expertise of public universities, local agencies or state offices by developing formal or informal *inter-governmental partnerships*.

Establish a Framework for Incorporating High Performance Design Strategies. There are many ways to ensure that new and modernized schools reflect health and environmental goals. Critical to the high performance approach, however, is the emphasis on *early, integrated* consideration of a broad range of design goals. Districts have used a number of different tools to put in place a decision-making framework applicable to all of their school building projects. A number of districts created a high performance schools *guidance document or manual* to provide a technical resource for project teams and to promote consistency among projects. In combina-

tion with a guidance document, some school districts have adopted a *checklist or other metric* for determining the extent to which school projects incorporate high performance design strategies. Districts also have adopted *performance standards or mandatory practices* that address individual health or environmental issues, such as site assessment, energy efficiency, ventilation or building commissioning.

Evaluate the Results. Most of the initiatives examined here are in the early stages of implementation. Some programs have affirmed the importance of *assessing building projects* following completion to determine whether adjustments should be made to the high performance design and construction process. A number of districts have required *building commissioning* throughout the building process and beyond to ensure that building systems are operating as intended. Districts can also use commissioning and other programs to educate school staff on how to use the building, so that the energy, health, environmental, and educational goals of the design are fulfilled.

STATE STRATEGIES FOR ADVANCING HIGH PERFORMANCE SCHOOL BUILDING INITIATIVES

Although school districts are the front line in school planning, design, and construction, state governments have a potentially significant role to play in supporting local high performance school building efforts. Despite the uncertainty posed by state budget deficits, the states included in this report used a variety of strategies to advance high performance school design and construction.

Increase State Capacity to Provide Assistance and Oversight. State capacity to assist school districts is affected by limited resources and by the often ill-defined role of the state education agency. One key step taken by some states is to improve *inter-agency coordination* among the various state offices—*e.g.*, education, health, environment, energy, and building—that have expertise in one or more aspects of sustainable design and construction. In one state, the creation of a separate *public-private entity* to house and direct the initiative was highly effective in pooling the resources of several agencies and in sharpening the state's focus on this issue. Some state agencies have created *high performance school building staff positions* to strengthen their work in this area.

Build Local Capacity. States have an important role to play in providing education and outreach and in dis-

seminating technical information to school districts, private building professionals, and local communities. The development of *state-specific information and materials*—*e.g.*, manuals, compilations of available state resources, and web sites focused on high performance schools—has helped local building programs apply existing knowledge to individual building projects. A number of states have sponsored *training* sessions on high performance building for district officials and private design professionals. Some state education, energy, and building agencies have provided direct *technical assistance* to school district officials, although these programs typically have been limited by a lack of staff resources.

Establish Regulatory Requirements. States have used existing statutory authorities and developed new legal authorities to create laws and regulations that promote a high performance approach. Some states have adopted regulatory provisions that require the consideration of *broad high performance goals* in new school construction projects. A more common approach is to establish specific *health or environmental standards and practices* to address issues such as: energy efficiency, siting, indoor air quality, commissioning, life cycle cost analysis, and maintenance.

Provide Financial Support. Although the report does not address the general subject of school finance, the case studies point to some promising state strategies for targeting funding to advance high performance school building programs. For example, some states have created or are considering *financial incentives* that increase the state's share of school construction costs for projects that incorporate high performance goals. Another common state strategy for providing financial incentives is to require that utilities establish or strengthen energy efficiency incentive programs, which can link energy efficiency with other high performance design goals. In addition, some states have created *pilot programs* to fund the added costs of developing model high performance schools. Finally, a variety of existing *state grant programs*, particularly in the areas of environment and energy, could be used to support various components of a local high performance school building program.

FEDERAL AND NON-GOVERNMENTAL ACTION TO SUPPORT STATE AND LOCAL INITIATIVES

The state and school district strategies discussed in this report suggest opportunities for other sectors to advance high performance school building initiatives. Federal agencies and NGOs have a vital role to play in supporting the work of states and school districts, and the

experiences of the jurisdictions examined here illuminate some key areas for federal and non-governmental action. One of the central challenges will be to rethink strict programmatic categories in supporting current work at the intersection of health, environment, and education.

One of the critical areas for action at the national level is an *outreach campaign* to raise awareness of the benefits of high performance school building and the tools that exist for implementing this approach. Federal agencies and private foundations already have begun to target resources in the area of sustainable design, but a much more concerted and coordinated effort is needed. Federal and non-governmental organizations, including the private foundation community, can also help *develop and disseminate technical resources* by: supporting state programs

to tailor technical information to local school districts; developing new research on key technical issues for advancing high performance design and construction; and sponsoring training that is strategically targeted to key constituencies or to school districts working to develop building programs. Additionally, *technical assistance to school districts* can be bolstered through the continuation and expansion of federal programs such as Rebuild America, as well as through support for NGOs and academic institutions that can create new approaches to delivering technical assistance. Finally, federal programs that provide *grants to states* in the areas of environment, energy and education could be used to support the development of state-wide strategies for advancing high performance school building initiatives.

CHAPTER I

INTRODUCTION

BACKGROUND: SCHOOL BUILDING IN THE UNITED STATES

In the years following World War II, shifting demographic and social trends dramatically changed the face of U.S. cities and towns. During the middle and late decades of the 20th Century, population growth and the mass movement of people from cities and rural areas to new suburban communities, and from region to region within the country, necessitated the building of thousands of new schools. The conventional approach to school planning, design and construction during this period, however, produced many facilities that are difficult to maintain, costly to operate, and unpleasant or unhealthy for students and staff.

School districts around the country are struggling to cope with inadequate facilities. In a recent rating of the country's infrastructure, the American Society of Civil Engineers (ASCE) gave schools a "D-" and stated that "75% of our nation's school buildings remain inadequate to meet the needs of school children." See ASCE, Report Card for America's Infrastructure: 2003 Progress Report, available at <http://www.asce.org/reportcard/index.cfm?reaction=full&page=6> (last visited: Sept. 18, 2003). A 1999 federal study reported that two-thirds of schools needed repairs, renovations, or modernization, and an estimated \$127 billion was required to address those problems. See U.S. Department of Education, National Center for Education Statistics, Conditions of America's Public School Facilities: 1999 at iii, available at <http://nces.ed.gov/pubs2000/2000032.pdf> (last visited: September 18, 2003). At least one environmental factor, such as lighting, heating, ventilation, acoustics, or indoor air quality, was reported to be in unsatisfactory condition in 43 percent of schools, and about one-third of schools reported dissatisfaction with their building's energy efficiency. *Id.* at iv-v. These problems are occurring not only in aging, deteriorating facilities, but in newly-constructed schools as well. A recent article reported, for example, that all but one of the 78 new schools built by the Miami-Dade County Public Schools have leaks and that nearly half have developed mold problems. See Debbie Cenziper,

Water Leaks Plague Schools: Problems Found in New Buildings, The Miami Herald (April 13, 2003).

There has been a substantial amount of school renovation over the past several years. School districts have also constructed many new buildings to relieve overcrowding and accommodate increasing enrollments. Between 1990 and 1998, about \$58 billion was spent on new school construction, \$45 billion on additions to existing facilities, and \$21 billion on renovations. See U.S. General Accounting Office, Construction Expenditures Have Grown Significantly in Recent Years (2000), available at <http://www.gao.gov/new.items/he00041.pdf> (last visited: September 18, 2003). In each of the last three years, public school districts nationwide have spent over \$20 billion on school building projects, and spending levels are expected to remain at or near these levels for the next few years. See 2003 Construction Report, School Planning and Management (2003), available at <http://www.peterli.com/global/pdfs/SPMConstruction2003.pdf> (last visited: September 26, 2003).

The massive amount of construction and modernization taking place creates a tremendous opportunity to improve the quality of school facilities in the United States. Despite the pressures to meet the demand for new and modernized schools while keeping design and construction costs low, some communities are beginning to explore different approaches to building schools. Facing mounting energy and maintenance costs, public concern over indoor environmental problems, new research about the effect of the built environment on student achievement, and public support for efforts to protect the environment, state and local leaders have begun to consider a broader set of goals and strategies for planning and designing school facilities.

AN OPPORTUNITY: BUILDING HEALTHY, HIGH PERFORMANCE SCHOOLS

Over the past several years, the "green building" movement has gained momentum in the United States and internationally. The federal government and many state and local governments have taken a leading role in promoting this new approach in the development of their

own facilities. In addition, federal agencies such as the Department of Energy and the Environmental Protection Agency have established programs to provide research, education, and assistance in this area. Numerous non-governmental organizations (NGOs) also have contributed significantly to advancing green building. For example, the U.S. Green Building Council created the Leadership in Energy and Environmental Design (LEED) Green Building Rating System as a voluntary, consensus-based standard for creating green buildings. The Sustainable Buildings Industry Council (SBIC) has developed numerous educational and informational resources to assist building industry professionals. Many other agencies, organizations, and private firms are helping to move high performance building practices into the mainstream.

While the first modern green buildings in the United States were primarily government and commercial office buildings, this new approach has begun to take hold in school building programs around the country. As these design and construction practices have become more widespread, many terms have been applied to describe them. The terms “green” or “sustainable” building are still used widely, but “high performance” building has become a common phrase describing building practices whose goals extend beyond environmental considerations. High performance school design and construction integrates a wide range of health, environmental, economic, and educational goals into the school building process from a project’s earliest planning stages to the post-occupancy evaluation and operation of the facility.

High performance school buildings advance the core mission of school facilities—to provide the best possible education for students. The Sustainable Buildings Industry Council characterizes high performance schools as “healthy and productive,” “cost effective to operate and maintain,” and environmentally “sustainable.” SBIC, *High Performance School Buildings: Resource and Strategy Guide* (2001). The end result of a high performance approach is a building that supports the educational process generally and may also be used as a tool for teaching about science, math, the environment, and other subjects. *See generally* Robert Kobet, *Empowering Learning Through Natural, Human and Building Ecologies* (2003), *available at* http://www.designshare.com/Research/Kobet/learning_ecology_2.htm (last visited: September 18, 2003); NEETF, *Environment-based Education: Creating High Performance Schools and Students* (2000), *available at* <http://www.neetf.org/pubs/NEETF8400.pdf> (last visited: Sept. 18, 2003).

SBIC lists numerous “building blocks” of a high performance school—the goals and strategies that are considered during the planning, design, and construction process:

- acoustical, thermal, and visual comfort;
- superior indoor air quality;
- environmentally responsive site planning;
- energy efficient building shell;
- high performance lighting and HVAC (heating, ventilation, and air conditioning) systems;
- daylighting;
- renewable energy;
- environmentally preferable materials and products;
- water efficiency;
- life cycle cost analysis and energy analysis;
- safety and security; and
- building commissioning.

Id. These criteria are echoed by the Collaborative for High Performance Schools (CHPS), a California-based initiative discussed in Chapter 2. *See generally* CHPS, *What is a High Performance School?* *available at* <http://www.chps.net/overview/overviewWhatIs.htm> (last visited: September 18, 2003).

The central feature of a high performance design process is the *integrated* consideration of these wide-ranging goals. Integrated design “evaluates all building components and subsystems collectively, through a process that brings together the entire building team.” California Sustainable Buildings Task Force, *Building Better Buildings: A Blueprint for Sustainable State Facilities* (2001), *available at* <http://www.ciwbm.ca.gov/Green-Building/Blueprint/> (last visited September 18, 2003). Beginning at the earliest stages of design, an integrated, “whole-building” approach seeks to avoid redundancies or conflicts, thereby optimizing building components to achieve better performance and efficiency. *See* CHPS, *Best Practices Manual: Volume I - Planning* at 14, *available at* <http://www.chps.net/manual/index.htm> (last visited: June 2, 2003). Shifting from the traditional linear, system-by-system approach that has dominated school design for generations poses a considerable challenge to building healthier, more sustainable and efficient facilities. A whole-building approach requires more planning and time on the part of members of a design team, but the investment in integrated design can pay off by reducing the long-term costs of public education facilities while creating better, healthier, and more environmentally sound learning environments.

High performance building is linked to other school construction issues that have gained public attention in recent years. In particular, there is growing interest in creating schools as “centers of community” that reflect the educational and social needs and aspirations of the community. Many states, local governments and citizen groups are seeking to leverage the investment in public schools by linking new school construction with other

neighborhood development activities, or by including in new school projects “joint-use” or “community-use” facilities, such as health clinics or adult learning centers. The active involvement of community residents in making these decisions is also vital in considering how best to achieve environmental and health goals in the design and construction of new schools.

PURPOSE AND SCOPE OF THE REPORT

This report illustrates policies, programs and practices that have been adopted by states and school districts to incorporate a high performance approach in school planning, design, and construction. The report discusses in detail three states and four school districts that have developed innovative and ambitious high performance school building initiatives:

- California;
- Massachusetts;
- New Jersey;
- Los Angeles Unified School District;
- Wake County Public School System (North Carolina);
- Elk River Area School District (Minnesota); and
- Edmonds School District (Washington).

There are many states and school districts throughout the country that have worked to improve new and existing school facilities by addressing individual environmental or health issues, such as energy conservation, recycling, and indoor air quality. School communities are building outdoor learning gardens, incorporating solar energy systems, and preserving historic schools. While these diverse efforts are important, they are not the subject of this report. The initiatives studied here vary in their approach, but they all share a common purpose that reflects the focus of the report: they put in place a framework for the early, integrated consideration of a wide range of environmental and health goals in the school building process.

The emphasis in the following chapters is on strategies for changing the *decision-making process* throughout a school building program. The report does not posit a specific set of design features that should be included in all high performance schools, but rather seeks to encourage the development of policies and programs that ensure consideration of many different high performance design strategies given the constraints and opportunities presented by individual school building projects. Within the broad definition of high performance schools, the report focuses on addressing health and environmental goals.

The key decisions affecting how schools are designed and built are made at the local level. The school districts

discussed in the report differ in size and climate, as well as social, economic, and political characteristics. Their school building programs vary in scope from a few projects to over a hundred. In all cases, however, school district officials recognize the critical importance of maximizing this investment to produce durable facilities that enhance the learning process and reduce maintenance and operating expenses. The following chapters provide a snapshot of these initiatives—the policies created, the practices institutionalized, and the educational and financial resources utilized—as the districts continue to develop and refine their programs. Though some of the districts recently completed school building projects using the new high performance approach, for the most part it is too early to evaluate the results of the initiatives in terms how well the facilities perform.

The report emphasizes the important role of state governments in supporting healthy, high performance school building programs. States typically establish some minimum requirements for school construction, through a combination of building codes, environmental and health laws, and other state standards governing public buildings. Many states also provide funding for school construction and require some level of state review of local school building plans through the state education agency. The three state initiatives discussed in this report—and, to a lesser extent, the three other states described here—have used existing authorities and created new policies and programs to advance health and environmental goals in the school building process. The report illustrates a number of state-level requirements, incentives, information resources, and other strategies.

While the report demonstrates a variety of approaches that may be adapted to meet the unique set of challenges and opportunities in other jurisdictions, it does not purport to capture all of the strategies and programs that have been developed at the state and local level to promote high performance school building. For example, in Greenville, South Carolina, the school board has earmarked \$2 million for “green thinking” in a major school construction program. See <http://www.upstateforever.org/Upstate-Update24.pdf> (last visited September 23, 2003). The McKinney Independent School District, in suburban Dallas, Texas, has built a number of model high performance schools in recent years. States such as Texas, Oregon and Pennsylvania also have taken steps to assist local school districts in developing comprehensive, high performance school building programs. The Oregon High Performance School Program, run by the state’s energy office, provides technical assistance, design guidelines, and financial support for high performance school construction. See <http://www.energy.state.or.us/school/HPSPProgram.htm> (last visited: Sept. 18, 2003).

In a time of federal and state budget deficits, many communities across the country have less money available to build or renovate schools. The lack of sufficient funds devoted to school construction, modernization, and repair, while perhaps the greatest challenge facing school districts, is not the subject of this report. The report takes as a starting point the existence or anticipation of a local school building program and discusses strategies for integrating high performance goals in the creation of new and modernized facilities. Through an in-depth discussion of several successful initiatives—how they came into being, what strategies they used, and what challenges they faced—this study aims to support the work of states and school districts around the United States that are interested in exploring a broad-based, high performance approach to school design and construction.

REPORT METHODOLOGY AND STRUCTURE

The local jurisdictions included in this report were selected because they have established formal initiatives to develop a high performance approach throughout their school building programs. The three states profiled were chosen because they also have developed formal initiatives that aim to advance high performance design and construction on a broad scale throughout the state. The research for each of the initiatives included was carried out in two overlapping phases. First, ELI collected and analyzed state and local policies, guidance documents, reports, and other existing materials. Second, ELI conducted interviews with representatives from state agencies, school districts, private design and other firms, academic institutions and non-governmental organizations in the jurisdictions profiled. Unless otherwise indicated, these

interviews are the source of the information presented about the development and implementation of the individual initiatives.

Chapters Two through Eight of the report each presents one of the selected initiatives. These chapters contain:

- a review of the policies that govern school design and construction in the state or local jurisdiction;
- an overview of general sustainable building activities taking place at the state or local level;
- a discussion of the high performance school building initiative, including the steps leading up to the initiative and its core elements;
- a description of the key barriers to advancing high performance school building in the jurisdiction; and
- a summary of the strategies used, the reasons for the success of the initiative, and the challenges ahead in continuing the initiative.

Some chapters also include brief descriptions of other notable programs within the state. Throughout the report, use of different terms—“green,” “sustainable,” or “high performance”—is not intended to signal different types of approaches to building schools. Rather, the use of the different terms reflects the fact that the jurisdictions studied make use of these terms in describing their activities.

Chapter Nine synthesizes the information contained in the case studies and presents key areas for consideration by other states and school districts seeking to develop their own high performance initiatives. That chapter also highlights challenges to pursuing this approach and suggests opportunities for federal agencies and non-governmental organizations to target their actions to address these challenges.

CHAPTER 2

STATE OF CALIFORNIA

California has been at the forefront in developing policies and programs to promote energy efficiency and to protect the environment, including activities to advance environmental and health goals in the public building arena. In 2000, state agencies launched an innovative partnership with utility companies to facilitate a high performance approach to local school design and construction. The partnership led to the formation of the Collaborative for High Performance Schools (CHPS), a public-private entity that has brought together the expertise and resources of numerous agencies, organizations and individuals. In a relatively short period of time, CHPS has developed an extensive set of technical materials and tools for incorporating a wide range of environmental and health goals into the school building process, and has assisted school officials and design professionals around the state in using the CHPS approach. CHPS has also begun to work with other states to help advance similar high performance schools initiatives.

This chapter discusses how CHPS came into being and the strategies it has used to promote high performance schools. Section I provides background on the state laws and regulations that govern funding and oversight of school construction in California, including a number of policies that address individual environmental or health issues. Section II describes the high level of sustainable building activity in California with respect to state facilities. Many of the agencies involved in those activities have also played an important role in the CHPS initiative. Section III presents the principal components of the CHPS initiative, while Section IV describes a number of related activities being undertaken by individual state agencies. Section V discusses the central financial and other barriers to promoting high performance design and construction in California. The chapter concludes by identifying the key factors in the success of CHPS, as well as the challenges to expanding implementation of the initiative in the future.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

A. STATE SCHOOL CONSTRUCTION FUNDING SCHEME

General framework. Both state and local funding sources contribute to school construction in California. The state's school construction program is funded through state-wide general obligation bonds.

The legal framework for financing and overseeing school construction and modernization changed significantly in 1998 with the passage of Senate Bill 50 (SB50). *See* Statutes of 1998, chapter 407 (The Leroy Greene Act). SB50, approved by voters as Proposition 1A, provided additional funding for school construction and changed both the criteria for allocating the funds and the state's procedures for making allocation decisions. SB50 emphasizes greater local responsibility and oversight for school projects. According to a recent report, the legislation "accelerated the trend toward deregulation by streamlining eligibility requirements and replacing rules with financial incentives." California Little Hoover Commission, *To Build a Better School* (2000) at 8, *available at* <http://www.lhc.ca.gov/lhcdir/153/schoolfacil.pdf> (last visited: June 3, 2003).

The State Allocation Board (SAB) decides how state construction funds will be allocated within the framework of SB50. The SAB is staffed by the Office of Public School Construction (OPSC), part of the state's building agency, the Department of General Services. The legislative formula for determining eligibility for state funds is based on the district's need to house students, considering such factors as school facility capacity, enrollment, and age of existing structures. *See* California Legislative Analyst Office, *A New Blueprint for California School Facility Finance* (2001) at 3, *available at* http://www.lao.ca.gov/pub_index/laosearch.asp (last visited: May 30, 2003) [hereinafter "California Facility Finance"]. The state provides partial funding for approved projects. If the district constructs or renovates a school for less than the approved cost, the district keeps the money

for “other high priority capital outlay purposes;” if the actual costs are higher than the approved cost, the district is responsible for the additional costs. Cal. Education Code § 17070.63.

The state generally funds 50 percent of the cost of new construction projects (and local districts must provide a 50 percent match). See California Facility Finance at 7. The 50 percent share is derived from statutorily prescribed dollar amounts per unhoused pupil. *Id.* at 8. SAB regulations provide for supplemental grants for site acquisition and site development in some cases. SAB Regulations § 1859.74. For districts that cannot provide matching local funds, the state makes available additional “financial hardship” funds to cover part or all of the local share. See State Allocation Board, 2001-2002 Annual Report at 10-12, available at http://www.documents.dgs.ca.gov/OPSC/pdf-resrs_info/AnnualReport_2001-02.pdf (last visited: May 28, 2003) [hereinafter “SAB Annual Report”].

For modernization projects, the state in recent years provided 80 percent of the funding “based on a district’s need to house pupils in an existing safe, well-maintained, and modern facility.” California Facility Finance at 9. In 2002, emergency regulations issued by the SAB changed this to 60 percent state funding. Cal. Code of Regulations (C.C.R.), tit. 2, §1859.79.

Until recently, state construction and modernization funds were made available mainly on a first come, first served basis. SB50 reserved some funds for schools with the greatest facility needs, as determined by a statutory priority ranking system based mainly on the percentage of unhoused pupils. Cal. Education Code §17072.25; California Facility Finance at 6. In 2001, following litigation, the SAB began implementing emergency regulations that required projects to be funded in priority order, based on severity of overcrowding. See SAB Annual Report at 7.

School districts in California raise funds for their share of school construction costs mainly through general obligation bonds that are paid off by taxes on real property located within the district. State law also authorizes local governments to impose developer fees on new construction to help fund new school construction. See generally California Facility Finance at 2. In 2000, Proposition 39 amended the state Constitution to lower voter approval requirements—from two-thirds to 55 percent of residents—for the passage of property tax overrides for local school construction bonds. *Id.* at 14.

Recent bond measures. In 1998, Proposition 1A approved \$6.7 billion for K-12 new construction and modernization projects state-wide over a four-year period: \$2.9 billion for new construction, \$2.1 billion for rehabilitation of older schools; \$700 million for class size reduction; and \$1 billion for financial hardship projects. See

League of Women Voters of California, Non-partisan Pros and Cons of Proposition 1A, available at <http://ca.lwv.org/lwvc.files/nov98/pc/prop1a.html> (last visited: June 2, 2003).

In November 2002, the voters passed another bond measure, the largest in the state’s history. Proposition 47 provided over \$11.4 billion in matching funds for K-12 school construction and renovation. The funds include \$6.3 billion for new construction, \$3.3 billion for modernization, \$1.7 billion for critically overcrowded schools, \$50 million for joint or community use projects, and \$20 million for energy efficiency. See League of Women Voters of California, Education Facilities: Public Education Facilities Bond Act of 2002, available at <http://ca.lwv.org/lwvc/edfund/elections/2002nov/pc/prop47.html> (last visited: May 30, 2003). Following this state bond measure, many local school districts passed their own bond referenda, for a total of over \$9 billion in local funds. See Taxpayers for Accountability and Better Schools, November 2002 Bond Measures, available at http://www.betterschoolsforca.org/pdf/11_05_02_election.pdf (last visited: June 2, 2003).

In March 2004, California voters will be presented with a \$12.3 billion school construction bond referendum for K-12 and university facilities, the “second half” of Proposition 47. See Cal. Assembly Bill 16.

B. STATE REGULATORY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

As noted above, recent state legislation aimed to decrease the state’s role in overseeing school construction projects and to streamline the approval process. Nevertheless, school building projects must comply with a variety of state requirements related to planning, design and construction. Several different agencies in California play a role in ensuring that individual projects meet these requirements.

1. State education law

The California Department of Education reviews building plans for all schools renovated or constructed using state funds. Although this review focuses mainly on educational adequacy, state regulations also establish certain general environmental criteria. In addition, the department reviews all new school sites, regardless of the source of funding for the construction project.

General standards. State law authorizes the Department of Education to develop standards to ensure that school facilities are “educationally appropriate and promote school safety.” Cal. Education Code § 17251.

The department has adopted regulations setting forth standards for the planning and development of school facilities. The regulations establish a number of general goals that are consistent with a high performance schools approach—*e.g.*, requiring that educational facilities are designed “for the environmental comfort and work efficiency of the occupants. . . [d]esigned to require a practical minimum of maintenance. . . [and] [d]esigned and engineered with flexibility to accommodate future needs.” 15 C.C.R. 14001. The regulations require master planning of facilities and development of facilities that meet the school district’s educational goals. *Id.*

The department’s regulations also contain a number of specific standards that relate mostly to educational adequacy. These standards are provided for the use of all school districts, although only projects funded by the state require the department’s approval of preliminary and final design plans. 5 C.C.R. 14030, 14031. The standards contain a few items related to environmental and health goals, such as general design goals for lighting and acoustics. 5 C.C.R. 14030(l),(m). The standards also urge the consideration of joint-use features and the placement of buildings to achieve a “favorable orientation to wind, sun, rain and natural light.” 5 C.C.R. 14030(c),(f).

Siting. The main area of department review of environmental and health issues is in the siting of facilities. The state education law gives the Department of Education authority to establish school site standards that consider health, safety, and educational factors. Cal. Education Code, §§ 17251, 17268(a). In 2000, following widespread public concern and advocacy over the siting of schools on contaminated land, particularly in the Los Angeles area, a new state law took effect, which significantly changed the procedures and standards for determining whether school sites pose a danger to health and safety. The law establishes detailed requirements for determining whether a new school site is contaminated and for remediating contaminated sites to ensure that they do not pose a health threat.

Under the law, school districts must obtain a Phase I environmental assessment to determine whether there may have been any release of hazardous materials onto the proposed site, or whether naturally occurring hazardous materials may exist. Districts send the Phase I to the Department of Education, which forwards the document to the state Department of Toxic Substance Control (DTSC) for review. If any potential environmental hazards are identified in the Phase I, a Preliminary Endangerment Assessment (PEA) is required. The DTSC reviews the PEA and determines either that no further action is required on the site, or that the site must be

cleaned up with DTSC oversight. *See* California Education Law §§17213-17213.3; *see also* Department of Toxic Substances Control, Fact Sheet: New Environmental Requirements for Proposed Schoolsites, *available at* <http://www.dtsc.ca.gov/PolicyAndProcedures/Schools/Schfsr.pdf> (last visited: June 3, 2003). The law also requires districts to identify any facilities within 1/4 mile that emit hazardous air pollutants. Cal. Education Code § 17213(b).

California law also addresses the siting of schools in certain protected areas. Under the California Land Conservation Act, for example, school districts are discouraged from siting schools within protected agricultural preserves, and must follow certain procedures if they seek to do so. *See* Cal. Government Code §§ 51290 *et seq.* Schools that are sited within a coastal zone must obtain a coastal zone development permit from the California Coastal Commission and must comply with the California Coastal Act. *See* Cal. Public Resources Code §§ 30000 *et seq.*

Another state law addresses the coordination of school siting and local planning decisions. In order to promote “comprehensive community planning,” school districts must notify the planning commission in writing 30 days prior to site acquisition, and must allow 30 days for consideration of planning commission reports that oppose the site. Cal. Public Resources Code § 21151.2. State law does, however, give school districts authority to site a school in contravention of a city or county zoning ordinance if the district votes to do so. *See* Cal. Government Code § 53094.

Lead-containing building materials. Recent legislation requires that, beginning in 2004, districts applying for state modernization funding must certify that they have considered the potential for lead-containing building materials. Education Code §§ 17074.27, .30. Districts must also agree to follow all relevant federal, state and local standards for the management of any identified lead. The code authorizes districts to use modernization appropriations for the control, management or abatement of lead.

Maintenance. As a condition of receiving state school construction funding, applicants must agree to deposit annually into a restricted maintenance account a minimum of three percent of the school district’s total general fund expenditures for 20 years following the new construction. Cal. Education Code § 17070.75. The district must also have an approved maintenance plan that outlines the use of the funds deposited. *Id.*

2. California Building Standards Code (Title 24)

All public school construction projects in California must comply with the state Building Standards Code, including the energy efficiency standards contained in the California Energy Code. *See* California Energy Commission, Nonresidential Manual for Compliance with California's 2001 Energy Efficiency Standards at 2-1, *available at* http://www.energy.ca.gov/title24/nonresidential_manual/index.html (last visited: June 2, 2003). The energy efficiency standards, recognized as the most stringent in the nation, were established in 1978 in response to a legislative mandate to reduce California's energy consumption. They are updated periodically, including the most recent updates which took effect in 2001 in the wake of the state's recent energy crisis. *Id.* at 1-3. The commission is currently undertaking revisions to the energy code that would go into effect in 2005 and that would further strengthen the state's standards. *See generally* http://www.energy.ca.gov/2005_standards/ (last visited: Aug. 8, 2003).

The Division of the State Architect (DSA) plays an important role in overseeing school design and construction, and is also the state's "policy leader" for building design and construction. *See* <http://www.dsa.dgs.ca.gov/default.htm> (last visited: May 30, 2003). The DSA reviews and approves all new school plans to verify compliance with the state's building codes and "to ensure that the work of construction has been performed in accordance with the approved plans and specifications, for the protection of life and property." Cal. Education Code § 17280. Currently, the DSA review focuses on structural, fire/life safety, and accessibility requirements, however the agency plans to augment its review of projects in the future to include mechanical, plumbing, electrical, energy compliance, sustainability and other issues. *See* DSA, The DSA Project Submittal and Plan Review Process, *available at* http://www.dsa.dgs.ca.gov/ProjectSubmittalProcess/plan_rev.htm (last visited: May 30, 2003). The DSA recently circulated a memo to school districts summarizing the state energy code requirements and the documentation of compliance that districts must submit to the DSA when seeking project approval. *See* Division of the State Architect, DSA Bulletin (February 6, 2003), *available at* <http://www.documents.dgs.ca.gov/dsa/bulletins/2-6-03bulletinSchoolEnergy.pdf> (last visited: June 2, 2003).

State law requires that the Department of General Services and school districts inspect school construction projects, and the law provides that school district inspectors are to be accountable to the department for ensuring that construction crews build according to design plans. Cal. Education Code § 17311. The law further requires the department to conduct training and certification pro-

grams for all inspectors for school projects under the jurisdiction of DSA. *Id.* The DSA implements this requirement by requiring that inspectors first pass the agency's examination to become certified and then obtain approval from the DSA regional office for work on each specific project. *See generally* <http://www.dsa.dgs.ca.gov/InspectorInfo/default.htm> (last visited: May 30, 2003).

3. Environmental impact review

The California Environmental Quality Act (CEQA) requires public agencies, including local agencies, to prepare an environmental impact report on any project they propose to carry out or approve that may have a significant effect on the environment. Public Resources Code §§ 21100, 21150. State agencies that allocate state funds to local agencies (such as school districts) must require that the local agency comply with this process. Public Resources Code § 21151. The Department of Education requires that school districts certify, for all projects subject to CEQA, that the district has completed either a Negative Declaration or a Final Environmental Impact Report. *See* Department of Education, SFPD Form 4.07B: District Certifications for New Construction, *available at* <http://www.cde.ca.gov/facilities/field/forms/sfpd407.pdf> (last visited: May 30, 2003).

4. Procurement laws

Contracts for design and other professional services must be awarded using a competitive, qualifications-based process. *See* Office of Public School Construction, School Facility Program Guidebook at 9, *available at* http://www.documents.dgs.ca.gov/opsc/pdf-handbooks/sfp_gdbk.pdf (last visited June 3, 2003); Cal. Government Code § 4526. The state Public Contracts Code establishes requirements for school districts in awarding construction contracts for public projects. The law provides for the pre-qualification of bidders and requires that contracts be awarded to the lowest responsible bidder. Cal. Public Contracts Code §§ 20111, 20115.

Until recently, school districts were required to build schools using the traditional design-bid-build process or the less common lease-lease back process. *See* Cal. Education Code § 17406. In 2002, a new state law took effect that allows school districts to use design-build as a project delivery method for projects with total costs exceeding \$10 million. *See* Cal. Education Code §§ 17250.10 *et seq.* Under the law, school districts evaluate design-build and other procurement methods in a public hearing before deciding to use the design-build process.

Cal. Education Code § 17250.20. Districts opting to use design-build must pre-qualify candidates and must use a selection process based either on the lowest responsible bid or on performance and other criteria. Cal. Education Code § 17250.25(c). Districts that use the more flexible performance approach must ensure that at least 50 percent of the total weight given to performance criteria consist of price, technical expertise, 15-year life cycle costs, available skilled labor, and safety record. *Id.* The law also requires the Department of Education to produce non-binding guidelines on using the design-build process, and those guidelines were published in 2002. *See* Dep't of Education, AB 1402 Design-Build Project Guidelines, available at <http://www.cde.ca.gov/cdepress/dbpguidelines.pdf> (last visited: May 30, 2003). The guidelines assist districts in using design-build effectively and point out opportunities for school districts to use this process to address certain high performance design and construction goals—*e.g.*, by using selection criteria that include use of recycled materials and energy efficiency measures. *Id.* at 24.

The 1998 education legislation also changed certain project delivery constraints imposed by state law. For example, SB50 eliminated restrictions on fees that school districts could pay construction managers and design consultants. Cal. Education Code § 17070.35(a)(1). The law also eliminated specific requirements that the state approve a district's bidding process and review change orders. *See* California Little Hoover Commission, *To Build a Better School* (2000) at 9, available at <http://www.lhc.ca.gov/lhcdir/153/school-facil.pdf> (last visited: June 3, 2003). Other aspects of state procurement law may affect high performance building projects. For example, state law prohibits "sole source" specifications and requires that school districts list at least two acceptable brands and allow the bidder to propose substitutions of equal quality. *See* Cal. Public Contracts Code § 3400.

II. CONTEXT FOR THE COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS: Sustainable Building Activities at the State Level

A. AGENCY ACTIVITIES

Driven largely by concerns over energy supplies, California state agencies have been engaged for several years in a variety of efforts to promote sustainable building practices. These activities are notable for their scope

and for the wide range of agencies, resources and expertise involved. They have had a direct impact on advancing the state's high performance school initiative.

1. *Inter-agency activities*

Following are highlights of the state's considerable efforts over the past few years to create a framework for broad inter-agency collaboration on sustainable building.

Executive Order. In 2000, Governor Davis issued an executive order establishing a state sustainable building goal:

To site, design, deconstruct, construct, renovate, operate and maintain state buildings that are models of energy, water and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians.

Cal. Executive Order No. D-16-00 (August 2000). The order explicitly called for incorporating sustainable building practices—using a life cycle costing, integrated systems approach—into the planning, operations, policymaking and regulatory functions of state entities. The order called on the Secretary for State and Consumer Services to issue a recommended strategy for achieving this goal.

California state agencies have been engaged for several years in a variety of efforts to promote sustainable building practices.

State Sustainable Buildings Task Force. Following issuance of the executive order, the State and Consumer Services Agency convened a task force comprising over 30 state offices, including building, environmental, health and finance officials. The Sustainable Buildings Task Force has begun to identify and carry out sustainable building activities and has developed recommendations for achieving this goal. A number of agencies participating in the task force formed a Sustainable Building Technical Group to work on some of these projects.

Blueprint for Sustainable State Facilities. The Sustainable Buildings Task Force created a report containing a comprehensive set of recommendations that address areas such as policies, standards, resources, training and partnerships, with specific action items and time frameworks for each area. *See* Sustainable Buildings Task Force, *Building Better Buildings: A Blueprint for Sustainable State Facilities* (2001), available at <http://www.ciww>

mb.ca.gov/GreenBuilding/Blueprint/ (last visited: May 30, 2003) [hereinafter “Blueprint”].

Model sustainable building project. In early 1999, even before the issuance of the executive order, the State and Consumer Services Agency convened a task force to address sustainability in the design of the Capital Area East End Office Complex, the largest building project in the state’s history. The collaboration of numerous state agencies on the project has resulted in a variety of sustainable design strategies, including energy efficiency (30 percent beyond code), daylighting, indoor air quality, recycled materials, water efficiency and commissioning. Notably, the state health agency took the lead in developing new indoor air quality standards and testing protocols for materials used in the project, and these standards (known as “Section 01350”) are now being used in other state projects. See California Integrated Waste Management Board, Capital Area East End Office Complex: A New Standard, available at <http://www.ciwmb.ca.gov/GreenBuilding/CaseStudies/GovtOffice/Block225.pdf> (last visited: May 30, 2003).

Sustainable building checklists. The Sustainable Building Technical Group developed two sets of checklists of sustainability strategies for use in state projects. The checklists are updated annually and are attached to the Department of General Services’ Standard Contract for Architectural and Engineering Services. The “Tier 1” checklist includes items that are already determined to be “cost effective” and that must be incorporated into the scope of a project. The items on “Tier 2” are to be considered for inclusion, depending on a project-specific analysis. The checklists include a few performance standards, but are largely prescriptive in nature. See Department of General Services, Tier 1 and Tier 2 Energy Efficiency and Sustainable Building Measures Checklists, available at <http://www.ciwmb.ca.gov/GreenBuilding/Design/Tiers.pdf> (last visited: May 30, 2003). According to the state, about 125 active capital projects have received the checklists. See Blueprint at III.

Sustainable building toolkit. The Sustainable Building Task Force also created a tool kit for project managers, including case studies, publications, sample construction documents, and information on financing, training and standards. See <http://www.ciwmb.ca.gov/GreenBuilding/Toolkit.htm> (last visited: May 30, 2003).

Funding for sustainable design. The Sustainable Building Technical Group has worked with the state Department of Finance to provide additional funding for up-front design costs to address sustainability on a case-by-case basis. See Blueprint at 32.

2. Individual agency activities

The inter-agency effort described above has drawn on the experience of several state offices. Following is a brief description of a few particularly noteworthy agency activities that are separate from or predate the recent state sustainable building initiative. The activities of these agencies that relate directly to high performance school building are discussed in Section IV of this chapter.

Public Utilities Commission. The California Public Utilities Commission regulates privately-owned electric, telecommunications, natural gas, water, and transportation companies. Pursuant to state law, the commission also oversees statewide energy efficiency programs that provide education and financial incentives to encourage consumers to save energy. The programs are administered primarily by the state’s major investor-owned utilities and are funded by the state through a Public Goods Charge—a ratepayer charge established at the time the utility industry was restructured in 1997. See Public Utilities Code §§ 381-384. For 2003, the commission allocated over \$205 million for energy efficiency programs to be administered by the major utilities. See Public Utilities Rulemaking 01-08-028 (Decision 03-04-055, April 17, 2003).

One of the utility-administered programs, Savings by Design, received about \$29 million in state funding for 2003. Limited to new construction projects, the program encourages high-performance nonresidential building design and construction by providing design assistance and financial incentives. See Savings By Design, Overview, available at <http://www.savingsbydesign.com/overview.htm> (last visited: June 2, 2003). The program emphasizes a whole-building approach, in which the design team considers “integrated, optimized energy efficiency solutions.” *Id.*

California Energy Commission (CEC). The CEC, which establishes building energy standards, has administered energy efficiency programs for many years. One of these, the Bright Schools program, provides technical assistance (through contractors) to school districts that are in the early design phase of a new construction or modernization project. The program offers design consultation, development of specifications, review of construction plans and other services designed to identify energy efficient and cost-effective systems. See <http://www.energy.ca.gov/efficiency/brightschoools/> (last visited: June 3, 2003). The program has also incorporated materials efficiency and waste reduction issues through an interagency agreement with the California Integrated Waste Management Board. CEC staff seek to bring other issues to the table as well, though energy efficiency is the main focus of the program contractors working with school districts. The number of

schools participating in the program has been relatively steady over the past years, but CEC officials expect this to change with the new infusion of bond funding for school construction.

The CEC also provides cash rebates on eligible renewable energy systems through its Emerging Renewables Program, which was created in 2003 in response to legislation addressing the state's renewable energy programs. *See* Cal. Senate Bill 1038 (2002). The program provides funding to end users, including schools, to help offset the cost of purchasing qualifying renewable energy systems such as photovoltaics, small wind turbines, and fuel cells. *See* CEC, Emerging Renewables Program Guidebook at 1 (2003), available at <http://www.energy.ca.gov/renewables/guidebooks/500-03-001F.PDF> (last visited: June 2, 2003); *see also* Cal. Public Utilities Code § 383.5(h). The rebates vary by system size, technology, and type of installation.

California Integrated Waste Management Board (CIWMB). One of the original parties to the state's sustainable building program, the CIWMB initiated a green building program in 1996. The agency oversees the work of the Sustainable Buildings Technical Group and manages the state's sustainable buildings web site. The CIWMB's work focuses on diversion of construction and demolition waste, as well as on selection of environmentally preferable products. The agency hosts a recycled products database and an annual recycled products show. *See* Blueprint at 13. The CIWMB sponsored a Department of Health Services study to measure emissions of building materials with a high level of recycled content compared to standard products. The recently completed study found that recycled products performed about as well as standard products on the emissions tests. The study also found that low-emitting, sustainable building materials are available in each of the product categories tested. *See* California Dept of Health Services, Building Material Emissions Study (2003) at 34-35, available at <http://www.ciwmb.ca.gov/GreenBuilding/Specs/Section01350/METStudy.pdf> (last visited: August 8, 2003).

B. NON-GOVERNMENTAL ACTIVITIES

Non-governmental organizations (NGOs) have played an important role in advancing health, environmental protection, and education goals in California. Although only a small number of NGOs have been involved directly in the state's high performance building efforts, others have been active in promoting individual aspects of high performance design, such as energy efficiency, school siting and joint-use features. A number of organizations also have undertaken significant work relating to general school finance and construction issues, to

ensure that the state provides an effective school facilities program. In addition to the work of advocacy organizations, the considerable experience and involvement in sustainable design on the part of design professionals has been an important factor in advancing state programs in this area, as discussed in the following section.

III. THE COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS (CHPS)

A. BACKGROUND AND CREATION OF CHPS

The high level of state activity around sustainable building was an important factor in the development of the CHPS initiative. In late 1999, one of the commissioners of the CEC convened a series of meetings among state agencies and electric utilities to discuss their individual programs addressing high performance schools and to identify opportunities for coordinating and maximizing those efforts. As CHPS developed, it built upon the existing commitment, knowledge and programs in this area.

The initial meetings focused on the work of the CEC and the utilities' energy efficiency programs, with later meetings expanding to include other agencies, such as the California Integrated Waste Management Board. *See* CHPS Best Practices Manual Vol. I, at iv. According to officials involved, the focus of the discussions quickly broadened beyond energy to include other high performance issues, such as recycled materials and indoor air quality. The overt purpose of the meetings was not only to address overlap and duplication of programs, but also to pool resources and coordinate efforts to bring about change. Over the course of these initial meetings the participants decided that a facilitator was needed to guide the efforts of the *ad hoc* group, since none of the agencies involved had the time to take on this role. The group hired Eley Associates, a recognized leader in sustainable design that had worked with state agencies in the past.

Initial structure of CHPS. With the hiring of a facilitator, the "Collaborative for High Performance Schools" was established as a formal undertaking, though it remained somewhat loose in structure. There was no legal mandate for CHPS, either through legislation or executive order, and no formal charter had been developed. The collaborative established a goal of "facilitat[ing] 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." *See* CHPS Overview, available at <http://www.chps.net/overview/index.htm> (last visited: June 2, 2003). The activities of the collaborative, discussed in Section IIIB, have focused on information services

and incentive programs aimed primarily at school districts and designers.

The groups participating in CHPS included mainly representatives of state agencies and utility companies, though a small number of non-governmental organizations (the Natural Resources Defense Council, the Coalition for Adequate School Housing) took part as well. In addition to the CEC and CIWMB, state agency participants included the Department of Health Services, the Department of Education, and the Department of General Services (Division of the State Architect and Office of Public School Construction). The state's three largest utilities—Pacific Gas and Electric (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Electric (SCE)—as well as some smaller utilities were involved from the outset.

To fund CHPS, some of the agencies involved hired Eley Associates as a contractor, through individual work orders. While agencies also contributed money or in-kind services for the individual activities of the collaborative, funding came mainly from the utilities, through their Public Goods Charge programs described earlier. The particular utility funds available were restricted by law to energy-related issues, and state agency members of the collaborative took the lead in addressing other areas (though many issues could be, and were, deemed to be related to energy, such as materials selection and indoor air quality).

Incorporation of CHPS. According to CHPS members, a number of strategy sessions were held in late 2001 to discuss the future of the collaborative, in light of the success achieved to that point and the continuing commitment of those involved. The members decided to incorporate CHPS as a non-profit entity. Agency officials involved have suggested a number of reasons for this change. In particular, incorporation would enable the group to license and protect the integrity of its informational products, and would facilitate raising and receiving funds for the group's activities.

As part of the re-structuring of CHPS, certain state agencies (CEC, Department of General Services and Department of Education) and utility companies, in addition to a local school district and a private architectural firm, were designated as voting members of the board of directors. See CHPS Overview, available at <http://www.chps.net/overview/overviewWhoWeAre.htm> (last visited: June 3, 2003). (Two of these agencies, the OPSC and the Department of Education, recently decided to be re-designated as non-voting members in order to avoid potential conflicts with their decisionmaking on allocating state school construction funds.) According to officials participating in CHPS, member-

ship resides in the agencies, but the participating individuals vote on their own behalf. CHPS holds regular board meetings, and has also established a number of committees to address particular areas of activity. CHPS has created a formula for contributions from each board member to cover its operating costs. In addition, considerable resources (both dollars and in-kind services) are contributed by the members directly to individual projects.

B. COMPONENTS OF THE INITIATIVE

A defining characteristic of CHPS is the convening of various state agencies, along with utilities, to promote high performance schools. Although coordination of diverse agencies in a state as large as California is a difficult undertaking at best, CHPS has served an important function in bringing together many different offices with expertise and interest in this area. In addition to avoiding duplication and overlap, state officials note that the formal CHPS structure has helped to strengthen the commitment of state agencies to the goal of high performance schools and to sharpen the state's focus in this area. Importantly, it has also ensured that a broad range of issues in addition to energy—*e.g.*, materials, indoor environment, and water conservation—have been incorporated into CHPS' vision of a high performance school and its activities to further that vision.

CHPS is foremost a vehicle for communicating to school districts and architects the reasons why they should build high performance schools and for increasing their capacity to do so. It has done this chiefly by connecting districts and designers with the technical and other resources needed to create high performance schools. To achieve its broad goals, CHPS has developed a substantial body of technical resources that comprise the CHPS system for developing high performance schools.

1. *Best Practices Manual*

The centerpiece of the CHPS initiative is the CHPS Best Practices Manual, a three-volume guidance document. Volume I covers planning and is directed to school district officials. Volume II addresses design, and is written primarily for design professionals and project managers. Volume III, described below in Section III.B.2., sets forth criteria for qualifying as a CHPS school, in accordance with the Manual's design guidelines. See CHPS Best Practices Manual, available at <http://www.chps.net/manual/index.htm> (last visited: June 2, 2003) [hereinafter "Best Practices Manual"]. The development of a fourth volume on Maintenance and Operations is underway. The Manual is the result of contributions from a large number of experts in the field, including the CHPS member agen-

cies. For example, both the CIWMB and the Department of Health Services were directly involved in the portion of the manual addressing materials and interior finishes.

The CHPS Best Practices Manual became the first document to provide extensive guidance for building high performance schools, tailored to a particular state. The manual's planning volume discusses what high performance schools are, why they are important, and the school construction processes that California school districts must navigate to achieve high performance goals. The 2002 update of the planning volume added a new section on considerations for developing construction contract documents. The design volume of the manual is organized mainly by individual high performance design topics—site planning, interior surfaces and furnishings, electric lighting and controls, daylighting and fenestration design, building enclosure and insulation, HVAC, other equipment, and commissioning and maintenance. Within each section is a series of guidelines for individual design strategies. Each guideline includes: a recommended practice; a short description of the practice (including integrated design considerations); references to additional materials or resources on the topic; and cross references to the number of points achieved (using the CHPS criteria) for incorporating the particular practice. The 2002 update of the design volume added a new chapter on commissioning practices, and expanded the manual's discussion of indoor air quality and materials efficiency.

The Best Practices Manual is specific to California and its institutional, legal, and climatic characteristics. CHPS officials consider the manual to be readily adaptable to other jurisdictions, and CHPS is currently working to help states such as Massachusetts and Washington develop their own CHPS manuals through licensing arrangements with CHPS. (See Chapters 3 and 7.) Additionally, CHPS has licensed a national version of the manual, produced by the Department of Energy. See U.S. Dep't of Energy, National Best Practices for Building High Performance Schools, available at <http://www.eere.energy.gov/energysmart-schools/pdfs/31545.pdf> (last visited: June 3, 2003). Based on these experiences, CHPS is working to develop guidelines addressing the kinds of modifications that may be made to the manual in future licensing agreements with other states.

2. CHPS Criteria

Volume III of the CHPS manual is a set of criteria that define a high performance school. The criteria are

organized as a listing of different design features or strategies that can be included in the design of a school, with a certain number of points awarded for each feature incorporated. The design strategies included in the criteria fall under the following general categories, with associated point totals: site (14), water (5), energy (24), materials (11), indoor environmental quality (17), and district resolutions (10). See Best Practices Manual at 5. Each category except "district resolutions" also contains certain prerequisites that must be met by all projects. For example, projects must exceed the 2001 California energy efficiency standards (Title 24) by 10 percent. (As an alternative to performing detailed energy modeling, projects may use listed prescriptive measures that CHPS has determined

will achieve more than 10 percent savings beyond Title 24.) See CHPS Best Practices Manual, Vol. III at 20-22.

The CHPS criteria are wholly distinct from the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) Green

Building Rating System™, although both systems use a similar approach emphasizing flexibility at the project level. CHPS officials note that they used LEED as a starting point, but made a number of changes in creating the CHPS criteria. For example, California has more stringent energy requirements than those contained in LEED, and the CHPS criteria needed to reflect these higher standards in the development of prerequisites and credits. (The CHPS energy efficiency criteria may need to be further modified following adoption of revisions to the state's energy code in 2005). Additionally, where LEED has different levels of certification, CHPS is structured as a pass/fail system, requiring a minimum of 28 (out of 81 possible) points. The CHPS criteria also include a greater number of "prerequisites" in the area of indoor air quality. CHPS is also largely a self-certification system; school districts and architects evaluate their own projects and send documentation to CHPS showing how a project meets the criteria. CHPS makes "spot checks" of this documentation—reviewing some, but not all projects submitted—and then posts the school information on the CHPS web site. See CHPS Best Practices Manual, Volume III at 2. CHPS officials note that the organization is considering developing a recognition program in which plaques or other awards will be given to schools meeting the CHPS criteria.

According to CHPS officials, the criteria are intended to provide a benchmark that can be used in a variety of contexts—for example, school districts might require that all new school building projects incorporate high perfor-

The CHPS Best Practices Manual became the first document to provide extensive guidance for building high performance schools, tailored to a particular state.

LOCAL BOARD OF EDUCATION RESOLUTIONS PROMOTING CHPS

At least four California school districts have adopted resolutions to integrate the CHPS guidelines into the construction and renovation of school facilities:

- Los Angeles Unified School District—High Performance Schools Resolution (Feb. 2001)
- Santa Ana Unified School District—Resolution # 02/03-2471 (Nov. 2002)
- San Rafael City Schools Board of Education—Resolution #1088 (May 2003)
- Dry Creek Joint Elem. School District—Resolution 2003-20 (June 2003)

The first three of these board resolutions are very similar in scope and approach, directing the districts to develop more resource-efficient design criteria for the construction and renovation of schools. The resolutions specifically require the use of design criteria that are developed in consultation with CHPS and that include measures relating to a broad range of environmental and health goals. The Dry Creek District resolution states simply that the district adopts the CHPS criteria to be using in designing, building, renovating and operating its schools.

mance features. (See box below.) The Los Angeles Unified School District has incorporated CHPS in its school building program, and has developed a “scorecard” to keep track of the CHPS criteria in each project. (See Chapter 3.) The CHPS initiative has adopted the LAUSD scorecard for use by other school districts.

3. *Training sessions*

Part of CHPS’ regular activities over the past few years has been the presentation of day-long training sessions to school officials and design professionals throughout the state. According to CHPS officials, priority for recent training sessions has been given to large districts with active local bond measures. The workshops, which use the Best Practices Manual as a framework, aim to train architects in districts that are trying to incorporate high performance school principles, as well as those who are interested but not yet committed to a high performance approach. The sessions provide the central vehicle for CHPS to promote the importance of integrated, early planning and design. CHPS members have contributed substantial in-kind support for these training courses—*e.g.*, providing the venue, advertising, registration, food, etc. The recent trainings have received considerable financial and other support from the Division of the State Architect.

CHPS recently began conducting another type of training: two-hour sessions for school administrators at school district offices, designed to communicate the information on planning contained in Volume II of the manual. In addition, CHPS has developed a School Planning Kit, which is designed to introduce school districts and other interested parties to the CHPS initiative and to help them initiate a high performance approach. The kit packages a number of different pieces of information already

developed by CHPS and its members. *See* www.chps.net (last visited: June 2, 2003).

4. *Demonstration schools*

CHPS members are sponsoring eight to 10 demonstration schools throughout the state in order to provide school districts with models for achieving high performance design. The member agencies are providing funding for the added costs of the projects. CEC officials note that the agency is funding two projects through a grant obtained from the Department of Energy’s Rebuild America Program. Because the agencies are providing supplemental funding for the projects, the focus of the demonstration projects is more on showcasing various technologies and design approaches than on providing a model that all school districts will be able to replicate. For example, a project sponsored by Southern California Edison highlighted energy efficiency features, while the CIWMB-sponsored project focused on materials. *See generally* CHPS Demonstration Schools, *available at* http://www.chps.net/chps_schools/index.htm (last visited: June 3, 2003).

In a separate project, Southern California Edison has developed a model high performance portable classroom. According to SCE officials, the utility convened a design charrette and held a design competition to develop the concept design. SCE is also helping to develop and subsidize the design of two high performance portable classrooms that will be purchased by the Pomona Unified School District and that will undergo expedited plan review by the Division of the State Architect.

5. *Technical assistance*

In 2003, CHPS began a new program of technical assistance. In partnership with PG&E, SDG&E, and

SCE, CHPS will be identifying school projects that are in the planning stages and would benefit from direct consultation. CHPS will work with the school district and the design team to provide mini-charrettes and other technical assistance, and will coordinate with local area consultants that may also be involved in the project.

IV. RELATED STATE AGENCY ACTIVITIES

Since CHPS is fundamentally a collaborative effort among different agencies, it is sometimes difficult to draw a clear line between the activities of CHPS and the activities of its member agencies. This is evident in the school demonstration program that is coordinated by CHPS, but undertaken by individual members. This section describes state agency activities that are independent of CHPS, but are an important part of the state's overall work in this area. This section does not attempt to capture all of the activities of state agencies that relate to individual health or environmental issues that impact school design and construction. There have been a number of significant projects recently, such as a study of the indoor air quality impacts of recycled-content materials (undertaken by the Department of Health Services and commissioned by the CIWMB), as well as a study on the indoor air quality of portable classrooms (undertaken by the Air Resources Board and the Department of Health Services). The activities described below focus more broadly on high performance design and construction.

State Allocation Board. The 2002 bond measure, which provided over \$11 billion in state funding, made \$50 million available to fund joint-use projects. The new legislation allows school districts to apply for joint-use funds as part of their new construction funding application, provided the project meets certain criteria detailed in the statute. Cal. Education Code § 17077.40, 17077.42. The law directs the State Allocation Board to establish standards for determining the amount of the grants awarded. Cal. Education Code § 17077.45; *see generally* Office of Public School Construction, School Facility Program Guidebook at 41-47, *available at* http://www.documents.dgs.ca.gov/opsc/pdf-handbooks/sfp_gdbk.pdf (last visited: June 3, 2003).

The 2002 bond measure also included \$20 million to create a new supplemental energy efficiency grant program. State law now directs the SAB to increase a new construction or modernization grant by up to 5 percent to cover additional design and other costs related to school facility energy efficiency, as outlined in the statute. *See* Cal. Education Code §§ 17073.0, 17073.5. Prior to applying for a grant from the SAB, school districts must obtain verification from the State Architect's office of

compliance with energy efficiency standards. The documentation must demonstrate compliance using an approach approved by the CEC. The amount allocated to a school project depends on the extent to which Title 24 energy efficiency requirements are exceeded. To meet the minimum requirements for receiving a grant, "new construction must surpass Part 6 of Title 24 with the calculated source of energy at least 15 percent less than the energy budget," while modernization projects must achieve 10 percent less than the energy budget. *See* DSA, DSA Bulletin (December 4, 2002), *available at* http://www.documents.dgs.ca.gov/dsa/other/Prop47_EnergyCompliance12-04-02.pdf (last visited: June 3, 2003).

The state legislature is currently considering a bill that would encourage school projects to be designed according to the standards established by CHPS. An earlier version of the bill would have established financial incentives relating to high performance school construction by increasing the state's share of construction costs for qualified projects. The current version of the bill states the "intent of the Legislature" to create such incentives in the future through separate legislation, using funds from bonds approved by the voters after 2004. *See* Cal. Assembly Bill 736.

Division of the State Architect. As noted earlier, the DSA oversees building design and construction, and provides guidance on design and construction issues. Thus, in the schools context, the DSA plays both an informational and a regulatory role. These roles expanded significantly beginning in 2002 under the leadership of the State Architect and following the hiring of a staff person to oversee a newly created environmental affairs office dedicated to advancing the agency's sustainable design work. According to DSA officials, the agency is in the process of developing a strategic plan to formally state its goals and future plans in this area.

Informational activities. The DSA has created a new Sustainable Schools web site that provides a wide range of information and links to other resources. *See* <http://www.sustainableschools.dgs.ca.gov/sustainableschools/> (last visited: June 2, 2003). The site, which is well-organized and covers a broad range of topics, is particularly noteworthy for its discussion of the community's role in sustainable design and its inclusion of information for community members.

The DSA has also been very active in developing new informational resources. For example, the agency created a comprehensive listing of financial incentives potentially available to school districts and designers. *See* DSA, Monetary Resources for K-12 Sustainable School and Public Building Construction in California, *available at*

<http://www.sustainableschools.dgs.ca.gov/SustainableSchools/financing/incentives.html> (last visited: June 2, 2003). The list is organized by environmental issue (energy, water, etc.) and includes federal, state, local, utility, and private sources.

Another important resource being developed by the DSA is a database of environmentally preferable products for schools. The database will include life cycle information on products, and will cover numerous product categories applicable to school construction, such as carpet, wallboard, casement, particle board, ceiling tiles and lighting equipment. The agency is in the process of developing the criteria and documentation required for listing products in the database, and expects to begin listing products in 2004.

Finally, state regulations direct the DSA to provide training for architects, and the agency has sponsored numerous CHPS training sessions. It has also taken the lead in developing a series of videos on different topics relating to high performance design. See <http://www.chpsvideos.com> (last visited: June 2, 2003).

Regulatory activities. The DSA is considering a number of policy and program changes related to its review of school plans, building on its regulatory mandate to protect the health, safety, and welfare of school building occupants. For example, as part of its 2004 code review process, the DSA has created a working group to identify possible code changes to promote sustainability. According to officials, this group will work throughout 2003 to develop proposals for the state's Building Standards Committee. In addition, the DSA is considering developing a scorecard based on the CHPS model that would be required for all school project submissions to the DSA. Such a scorecard would not impose mandatory design features or a minimum number of points, but rather would serve as an educational tool.

California Energy Commission. In 2002, a new state law amended the education code to require the development of best design practices that include energy efficiency measures for all new public schools. Cal. Education Code, Sec 17255. The law charges the Energy Commission with developing these best design practices by October 2003, in consultation with the Department of Education, the Division of the State Architect, and the Office of Public School Construction. The practices must aim to incorporate energy efficiency design and technologies that would provide the greatest amount of energy efficiency savings within a cost recapture period of seven years. The commission is also authorized to recommend practices that would be cost effective taking into consideration life cycle costs. *Id.* According to state officials, the

best practices recommended by the agencies will likely be based on the CHPS manual.

V. BARRIERS TO HIGH PERFORMANCE SCHOOL DESIGN AND CONSTRUCTION IN CALIFORNIA

A. FINANCIAL CONSIDERATIONS

Concern over higher design costs is one of the most significant barriers to advancing high performance design and construction, according to a number of people associated with the CHPS initiative. Because school construction budgets are tight, districts are not inclined toward innovation, and architects do not generally feel that they can afford to spend the time on the additional analysis that is required. CHPS members also note the problem of separation between capital and operating budgets. Even where school districts consider life cycle costs, there is a lack of life cycle information for non-energy-related features. Additionally, state law provides a potential disincentive for increasing the cost of construction to build a school that costs less to operate—the state provides a fixed portion of the cost to build the school, and school districts are allowed to keep any money they save if the project comes in under budget.

CHPS officials estimate that the added design and construction costs of meeting the CHPS criteria total about 1-2 percent of a typical project's budget. CHPS addresses these added costs through education (emphasizing the quick payback if schools consider the financial and other benefits of high performance design) and through linking school districts with existing financial incentives. CHPS materials and workshops seek to communicate to districts that a school project does not have to cost significantly more overall if there is early and integrated consideration of high performance goals. Some CHPS members acknowledge, though, that it would help if there were additional funds to pay for some of the up-front costs for design, modeling, etc. Indeed, some of these agencies have been working with the state Department of Finance to increase the design costs for sustainable state building projects on a case-by-case basis.

The recent state bond measure provides some funding for these added costs by establishing a 5 percent increase in the state's new construction grant to cover energy efficiency-related costs. State officials note that this program gives the State Allocation Board a mandate to address high performance goals directly for the first time. Legislation establishing an even broader financial incentive program for high performance schools has been considered by the legislature in 2003, but recent changes to

the bill suggest that it is uncertain when such a program will be enacted.

B. TIME PRESSURE

In California, as in other states, school districts are on tight schedules and are reluctant to slow down the planning, design and construction processes. Time pressure is created both by the need to build new classrooms for un-housed students, and by the first come, first served framework used in the past for allocating funds. Districts have sought to get in line for funding as soon as possible and then to build the schools on schedule.

One goal of CHPS is to help school districts understand high performance goals from the beginning and to provide design information and assistance in order to streamline the process of incorporating those goals in the planning and early design process. In addition, the state has begun allocating funds based on priority needs rather than on which districts apply first.

C. EDUCATION AND AWARENESS

Several of those participating in the CHPS initiative cite lack of awareness of high performance design opportunities as a significant barrier. Many feel that if decision-makers within the school districts were aware of the benefits of and the opportunities for incorporating high performance features, district practices would change considerably.

CHPS addresses this barrier directly through its Best Practices Manual and through the various other materials that CHPS and member agencies make available, such as the School Planning Kit and the video series produced by the State Architect's office. CHPS is trying to reach school boards in particular, communicating the benefits of a high performance approach and highlighting districts that have adopted board resolutions supporting such an approach. CHPS is also seeking to change institutional practices within school districts through its mini-training sessions that focus on early planning.

D. TECHNICAL ASSISTANCE AND INFORMATION

Many people associated with the CHPS initiative note the significant challenge posed by the lack of technical skills and tools needed to plan, design and construct a high performance school. These needs exist within private firms and within the school district overseeing a project. A related issue is the need to demonstrate the value of certain technologies that are relatively new, such as thermal displacement ventilation. These information needs are a core focus of CHPS, and the initiative has addressed the

need in numerous ways—from creating technical materials to providing mini-charrettes and sponsoring demonstration schools.

VI. SUMMARY AND OBSERVATIONS

The CHPS initiative has succeeded in harnessing a tremendous amount of human and financial resources to develop a multi-faceted information and training infrastructure to facilitate the development of high performance schools in California. At the same time, CHPS has helped advance the high performance schools work of the individual agencies and utilities who form the collaborative. With the organization formally incorporated as an independent entity, CHPS will likely continue to play an important role in the future, though its activities will evolve as school districts begin designing and building CHPS schools and as the state considers integrating the CHPS approach into its policies and programs. CHPS has also begun to assist other states in developing similar strategies.

A. PRINCIPAL STRATEGIES USED

Inter-agency collaboration. CHPS provides a forum for collaboration among diverse state agencies and a formalization of the state's commitment to sustainable school building. This collaboration enables the state agencies to achieve together more than individual programs could achieve alone. CHPS is notable for recognizing that environmental and health agencies need to work with the agencies that oversee school construction. Giving structure to this inter-agency effort has helped to advance the commitment of individual agencies in this area and has helped to ensure that the state's high performance schools activities include a broad range of health and environmental issues. This is particularly true with respect to indoor air quality issues, which are discussed at some length in the CHPS manual. State agencies have had a history of formal interaction on indoor air quality issues through quarterly meetings of the Inter-agency Working Group on Indoor Air Quality, facilitated by the Department of Health Services' Indoor Air Quality program.

Use of utility incentive programs. Another hallmark of the CHPS initiative is its integration with the energy efficiency incentive programs of the state's major utilities. The utility companies have played a leading role in funding and developing CHPS and have been integrally involved in the CHPS activities through financial incentives programs, as well as through training, education, and demonstration projects.

Best Practices Manual. The CHPS Best Practices Manual, which describes how to design a high performance school, is the substantive core of the CHPS initiative and provides the basis for most other CHPS activities and materials. The manual is similar to the LEED system in scope and in approach, but is geared to schools and to California in particular. It covers a broad range of topics, and will be expanded in coming years to include a volume on maintenance and operations. The CHPS manual can be adapted to other jurisdictions through a licensing arrangement with CHPS, so that others interested in this approach need not begin from scratch.

Metric. The CHPS criteria were created as a benchmarking tool to determine the extent to which a project is incorporating high performance features and to set a minimum level for qualifying as a “CHPS school.” The criteria are intended to be used in conjunction with the CHPS manual and the training sessions, which emphasize integrated design rather than a point-gathering approach. The criteria are adaptable to other jurisdictions, and CHPS has approved a “scorecard” for use by school districts in keeping track of the points attained in a particular project.

Other informational materials. The focus of CHPS is on education, and the initiative has developed a number of products that are designed to create awareness of the high performance approach. These materials—*e.g.*, the School Planning Kit and the CHPS videos—speak directly to California school stakeholders, but can be used by people in other states.

Training/technical assistance. One of the key components of CHPS is the provision of technical assistance. The initiative offers CHPS-sponsored mini-charrettes and connects school districts with existing programs that provide technical assistance resources, such as the utility and CEC energy efficiency programs.

State policies. Over the past year, the state has enacted a number of laws that address certain aspects of high performance building. Energy efficiency is a particular focus of state policy. In addition to requiring stringent energy efficiency standards in all school construction, state law recently established a financial incentive for school building projects that meet certain heightened energy efficiency requirements. Recent legislation required the Energy Commission to develop best practices for school construction that incorporate energy efficiency and other facility efficiency goals. State law also addresses certain other specific issues, such as joint use (allocating funding specifically for joint use projects) and siting (adopting stringent site assessment requirements to ensure that

schools are not built on contaminated sites that pose health threats).

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

Focus on energy conservation. Concern over energy supplies and the need for energy efficiency measures has been an important driver for California’s activities in this area. The state is known for its energy code and for its varied programs aimed at reducing energy use. Energy efficiency has been at the core of the state’s policies and programs promoting sustainable building practices, although those efforts have gone beyond energy in their scope.

Extensive state sustainable building activities. The recent executive order promoting sustainable building solidified and advanced the already considerable amount of state agency activity around sustainable building practices. The Sustainable Buildings Task Force created by the order helped to move these issues to the forefront and bring many different agencies and areas of expertise to the table. The work of this Task Force was gaining momentum as CHPS was formed. Although not a product of the state building initiative, CHPS was informed by it, and many of the same people were involved. With many of the programs and technical expertise in place, a key impetus for CHPS was a desire to pool resources and work together. CHPS members—for the most part already active on one or more facets of sustainable building—seized the opportunity to create a greater state presence and remained open to incorporating new ideas along the way.

Private sector expertise and resources. The private sector played a central role in the creation and implementation of CHPS. From the beginning, the state agencies involved in the effort saw the need for an outside entity—a private firm with extensive sustainable design expertise—to facilitate the group and manage its activities. Additionally, the electric utility companies have played a key role in developing the CHPS initiative and in contributing both financial and in-kind resources through their administration of ratepayer-funded energy efficiency programs.

C. IMPLEMENTATION CHALLENGES

Oversight. CHPS is currently set up as a self-certification system, with relatively little oversight by the CHPS organization itself. To maintain the integrity of the CHPS system, there should be some mechanism for ensuring that schools are designed and subsequently constructed according to the minimum CHPS standards. This mechanism could be a function of the CHPS orga-

nization itself, or it could be developed by a state agency if CHPS is incorporated into state policy in the future.

Evaluation and tracking. CHPS materials and activities have reached many large school districts with substantial building programs. CHPS could play an important role in evaluating the results of the program, both in terms of tracking building outcomes and identifying institutional barriers to implementation. Currently, CHPS is not set up for such activities. One beneficial short-term step would be to strengthen tracking of school projects that use the criteria and encourage those schools to submit information that can be disseminated on the CHPS web site. CHPS could also develop a formal process for obtaining feedback from participating school districts, and could use that information to revise the CHPS program and to inform other jurisdictions considering adopting a high performance approach. For example, initial feedback from the Los Angeles Unified School District's experience with CHPS suggests that the organization should focus future activities on simplifying CHPS guidance and providing tools (such as model specifications) so that districts and designers without sustainable design experience can use the information effectively.

Promoting community involvement. The focus of CHPS is on educating and training the architects and school district officials charged with designing and building public schools. Most of those involved in developing and carrying out the program are thus technical experts.

Nevertheless, greater NGO and community involvement in CHPS could strengthen the initiative by bringing in new perspectives and concerns, much as the initiative has been enhanced thus far by the participation of numerous state agencies with various interests. CHPS generally has not sought to address the role of school communities in the local planning, design, and construction process. Providing guidance and emphasis in this area could serve an important need because community participation is ultimately vital to making the trade-offs necessary in an integrated, high performance design process.

Integrating the high performance approach with state school facilities policy. Given the information resources contributed by CHPS, an important next step would be to strengthen state policies to promote the use of CHPS and the attainment of high performance goals. While some changes have been made in this direction—both to eliminate certain regulatory barriers and to provide limited financial incentives—existing policy does not directly advance broad, high performance planning, design and construction. The creation of a financial incentive for integrating high performance criteria, as well as the inclusion of additional minimum design requirements related to health and environmental goals, would further institutionalize high performance school design throughout the state. Another opportunity to strengthen existing policies and programs is to incorporate high performance issues into the State Architect's training, certification, and oversight of construction inspectors.

CHAPTER 3

LOS ANGELES UNIFIED SCHOOL DISTRICT

The Los Angeles Unified School District (LAUSD) covers over 700 square miles, including the city of Los Angeles, several municipalities and some unincorporated areas of Los Angeles County. See LAUSD, *Fingertip Facts: 2002-2003*, available at http://www.lausd.k12.ca.us/lausd/offices/Office_of_Communications/ (last visited: July 30, 2003). With an enrollment of over 900,000 (of which about 747,000 are K-12 students), LAUSD is the second largest district in the country after New York City. The district's 689 K-12 schools and 270 other learning centers are served by over 80,000 employees. The district is severely overcrowded—with many schools operating on year-round calendars and many students bused out of neighborhood schools that are already filled to capacity—and student enrollment is expected to grow. See LAUSD, *New Construction Strategic Executive Plan (Program)* at 6, available at <http://www.laschools.org/sep/05-program.pdf> (last visited: July 30, 2003).

Beginning in the late 1990s, LAUSD embarked on the largest school building program in its history. The district developed a multi-billion dollar program that would result in over 100 new schools and dozens of additions. The scope of the program is particularly significant in light of the district's poor track record for building schools. This history, and the magnitude of the public's investment in the new facilities program, helped sharpen the district's focus on changing institutional practices in order to ensure high quality educational facilities.

A prominent feature of LAUSD's new building program is its high performance schools initiative, which aims to build healthier and more efficient facilities that enhance the learning experience of students and staff. The initiative is especially notable given the size of the program and the number of LAUSD staff responsible for carrying it out. To address these challenges, the district has developed a wide range of policies, practices, and programs to help ensure that all new projects consider and include a range of environmental and health features. While the results of the building program—the school facilities themselves—cannot yet be evaluated, the district has succeeded in putting in place a framework for instituting large-scale change in the school building process.

This chapter begins with a brief summary of the policy framework within which school construction takes place in Los Angeles. Most of the policies that affect the school building process are issued at the state level and were presented in Chapter 2. Section II of this chapter describes other sustainable building activities taking place within Los Angeles that may have a considerable impact on the LAUSD initiative in the future. Section III discusses the background leading to the LAUSD initiative and the major strategies developed by the district to change its approach to designing schools. Section IV then identifies some of the main barriers to building high performance schools in Los Angeles. Finally, Section V summarizes the main components of the initiative, the key factors in its success, and some of the challenges that lie ahead as the district designs, builds, and operates schools using the new approach.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

California state law and regulations, discussed in Chapter 2, provide the general framework for the financing, planning, design, and construction of schools in Los Angeles.

At the local level, LAUSD raises funds for school construction through a combination of general obligation bonds and developer fees. Over the past several years, district voters have approved two major bonds to support the district's ambitious new school construction program. In 1997, the voters approved Proposition BB, which provided \$2.4 billion in funding for new construction and renovation. The following year, the state's Proposition 1A resulted in \$670 million in state matching funds for LAUSD. Then, following the passage of another state bond referendum in November 2002, Los Angeles voters passed Measure K, which provided an additional \$3.35 billion for the district's school construction and renovation program. The district expects to put another measure on the ballot in 2004, in anticipation of the passage of another state bond referendum. See LAUSD, *New Construction Strategic Executive Plan (Program)* at 5, available at <http://www.laschools.org/sep/07-phase-2.pdf> (last visited: June 3, 2003); see also

schools.org/news/item?item_id=359986 (last visited: June 3, 2003).

As discussed in the preceding chapter, all school construction in California must comply with the state building code, and code review is carried out by the Division of the State Architect. In addition to local zoning and planning requirements, municipalities may implement state or regional environmental regulatory schemes that impact school construction projects—*e.g.*, storm water and urban runoff programs that establish requirements for all dischargers. *See, e.g.*, Los Angeles Municipal Code, §§ 64.70 through 64.70.13.

II. CONTEXT FOR THE LAUSD HIGH PERFORMANCE SCHOOLS INITIATIVE: Sustainable Building Activities at the Local Level

The breadth of state agency activities to promote sustainable design and construction, discussed in Chapter 2, has been an important factor in the development of the LAUSD high performance schools initiative. Sustainable building work in Los Angeles has also played a role in advancing the initiative.

A. PUBLIC AGENCY ACTIVITIES

Both the City of Los Angeles and the L.A. Community College District have developed sustainable building programs that complement the work underway at LAUSD. In fact, the school district has recently joined with both entities to form the Los Angeles Sustainable Collaborative, with the goal of “working to further the adoption of sustainable design in the region through education, expertise sharing, and supporting common standards.” Los Angeles Sustainable Collaborative, Statement of Purpose (September 2002) (on file with Environmental Law Institute).

City of Los Angeles Sustainable Building Initiative. The City of Los Angeles has been working on various sustainable design activities over the past several years. In 1995, the city council created the Sustainable Design Task Force, an inter-departmental advisory group of city employees and local experts charged with making recommendations to the city council about incorporating environmentally sensitive design features into the city’s new construction and remodeling projects. In 2000, the city authorized the creation of a Sustainable Design Implementation Program to pursue grants, provide training for city staff, and help integrate sustainable design measures into city projects. The city then created the “AB939 Sustainability Partnership” to promote sustainable development and green building practices. City of

Los Angeles Sustainable Building Initiative (Draft, 2001), *available at* <http://www.ci.la.ca.us/SAN/lasp/sbi-draft-nov2001-300.pdf> (last visited: June 2, 2003). In 2002 the Los Angeles city council voted unanimously to require all city-funded building projects 7,500 square feet or larger to meet the U.S. Green Building Council’s LEED Certified level, starting in July 2003. *See* Los Angeles City Council, Journal/Council Proceedings (April 19, 2002), *available at* <http://www.lacity.org/clk/oldactions/ND4363.pdf> (last visited: June 3, 2003). The city council measure instructed the city government to allocate \$10 million per year to pay for added energy-related components of LEED-certified buildings and to identify additional energy conservation and waste reduction design practices that could be adopted by the city.

Los Angeles Community College District (LACCD). In early 2001, Los Angeles voters approved Proposition A, providing over \$1.2 billion to the LACCD for new building construction and renovation at each of the LACCD’s nine campuses. In May 2003, the district approved Proposition AA, which added \$980 million to this effort. *See* LACCD, Proposition AA Passes Overwhelmingly, *available at* http://www.laccd.edu/district/news/web_versions/may_21_2003_prop_AA_passes.htm (last visited: June 3, 2003). The LACCD, the largest community college district in the United States, is planning 50 to 60 building projects over the next decade. *See* McGraw-Hill Construction, Largest Community College District Adopts Green Building Plan, *available at* <http://www.architecturalrecord.construction.com/features/green/archives/020321largest.asp> (last visited: June 3, 2003). In March 2002, the LACCD Board of Trustees adopted a green building plan requiring that new projects over 7,500 square feet meet the minimum standard for LEED certification. *See* LACCD, Proposition A Information, *available at* <http://www.propositiona.org/PropA-Info/SustainableBuildingPrinciples.asp> (last visited: June 3, 2003). The LACCD has also added energy requirements for these projects: new construction must exceed the state’s Title 24 energy efficiency standards by 20 percent, and 15-25 percent of a project’s energy must come from renewable sources (at least 10 percent from renewable energy generated on site).

B. NON-GOVERNMENTAL ACTIVITIES

Non-governmental organizations and community leaders in Los Angeles have played a significant role in school facilities issues generally. These efforts have had direct and indirect impacts on the creation of the district’s high performance schools initiative. General concern over

LAUSD's historical failure to manage school facilities led to the creation of a committee to oversee the district's expenditure of Proposition BB funds. The Proposition BB Oversight Committee, which includes representatives from a number of non-governmental organizations, focuses mainly on ensuring sound district management practices, but also issued a resolution specifically calling on the Board of Education to mandate the development and implementation of comprehensive sustainable design criteria. *See* Proposition BB Oversight Committee Resolution 2000-4 (last visited: June 2, 2003).

The issues generating greatest community involvement over the past several years relate to the siting of new schools in a city with an extreme scarcity of available land. The problem of siting schools on contaminated land—in particular the notorious case of Belmont High School—sparked community concern and action, and resulted in sweeping legislative reform of the process of assessing school sites (discussed in Chapter 2). Another significant siting issue that generated community involvement in facility decisions was the relocation of existing families in cases where the city seeks to exercise eminent domain over residential properties.

Another high profile school facility issue has been the inclusion of joint-use (or community-use) features in new school buildings. A number of non-governmental groups, such as New Schools Better Neighborhoods and the Center for Law in the Public Interest, have taken a leading role in advocating for LAUSD to address multiple community needs by including features such as health clinics, adult learning centers, and park areas in new construction projects. These goals have been incorporated into a number of projects. The recent bond measure provided \$10 million for new joint use projects with public and private agencies, in order to leverage other resources and create schools as centers of community. *See* LAUSD, New Construction Strategic Executive Plan (Phase II) at 38, *available at* <http://www.laschools.org/sep/07-phase-2.pdf> (last visited: June 3, 2003). Additionally, the district's strategic plan states a goal of building schools as centers of community by improving public access to school facilities and building schools near other important community buildings. *See* LAUSD, New Construction Strategic Executive Plan (Program) at 12, *available at* <http://www.laschools.org/sep/05-program.pdf> (last visited: June 3, 2003).

The sheer magnitude of the LAUSD building program has focused attention on establishing procedures and practices that will ensure that the investment results in high quality facilities.

III. THE LAUSD HIGH PERFORMANCE SCHOOLS INITIATIVE

The Los Angeles Unified School District, the nation's second largest, is carrying out a district-wide initiative to achieve high performance design in all new building projects. Strong leadership within the district has resulted in a broad array of new policies and programs to change the district's approach to school planning and design in order to maximize the very large investment in the area's public school buildings. This section provides some context for the initiative and then discusses the key strategies developed by the district.

A. BACKGROUND

The LAUSD high performance schools initiative took shape in early 2001. A number of factors were important in laying the groundwork for the initiative.

Magnitude of the building program. The Los Angeles Unified School District is growing rapidly with 40,000 new students expected by 2007. *See* http://www.laschools.org/news/item?item_id=359986 (last visited: July 30, 2003). In June 1998, the district prepared a master plan of development to address overcrowding and projected enrollment increases, which called for 78,000 new classroom seats in the next six years. This first phase of the new school construction program, valued at about \$3.6 billion, is currently underway and involves the addition of 77,000 new classroom seats—79 new schools and 60 building additions—by mid-2008. LAUSD, New Construction Strategic Executive Plan (Program) at 6, *available at* <http://www.laschools.org/sep/05-program.pdf> (last visited: July 30, 2003). The district will build an additional 35,000 seats in its Phase II building program by 2010, at a cost of about \$1.6 billion, equaling roughly 35-40 new schools. The sheer magnitude of the building program has focused attention on establishing procedures and practices that will ensure that the investment results in high quality facilities.

Highly publicized school facility issues. As noted above, the existence of adequate school facilities has been an important policy issue in Los Angeles for a number of years and has generated significant public interest. Siting and joint-use issues helped contribute to a growing public pressure in Los Angeles to reform the way school facilities are planned, designed, and built to ensure that efficient, high-quality facilities are developed. According to some people active in LAUSD programs, high profile school

facilities issues led to the election of new school board members in 1999. Of the four members elected that year, only one was an incumbent.

New facilities management. Shortly after taking office, the new school board hired managers for two key district offices—the Office of Environmental Health and Safety and the Office of School Building Planning and Construction. Both new managers had backgrounds in environmental and health issues and immediately brought these issues to the forefront in the district’s facilities programs. The health and safety program, which is the lead office for site assessment issues and for modernization work that takes place while schools are occupied, has played a key role in promoting high performance school design and construction generally. [The program has also developed a ground-breaking health and safety evaluation program for the district’s existing school buildings.] School Planning and Construction is the main office within LAUSD involved in design of new and renovated facilities. Soon after coming to LAUSD, the new manager for this office took the significant step of hiring a consultant to advance the district’s work on high performance schools issues.

Workshop on sustainable schools. In February 2000, LAUSD’s New Facilities Department held a day-long workshop on sustainable schools. The workshop was facilitated by private sustainable design consultants and addressed an audience of architects, engineers, LAUSD administrators and facility managers, and other building professionals. The purpose of the workshop was both to educate the participants and to generate input into the development of a sustainability plan for the district. LAUSD officials opened the meeting by underscoring the district’s intention to incorporate energy efficiency and other sustainable design goals into its building program. The meeting report included the participants’ comments and recommendations on the barriers to and the strategies for achieving sustainable facilities. See LAUSD, *Workshop on Sustainable Schools Report (2000)* (on file with Environmental Law Institute).

B. COMPONENTS OF THE INITIATIVE

The development and implementation of LAUSD’s high performance schools initiative is occurring in two stages. The first phase addressed the 85 or so schools that had already begun the design process. While the district sought to improve those designs in small ways, the first phase focused mainly on evaluating current design practices in order to strengthen policies and paractices for future projects. The second phase, which is getting under-

way in 2003 with a new round of school building projects, will apply what was learned and developed in phase one and will incorporate high performance strategies early in the design process.

One key component of the initiative was the hiring of a sustainable schools consultant to further the process. The two key programmatic elements of the initiative were (1) the development of a high performance schools scorecard—a metric that would be used to bring about early consideration of a range of design strategies, and (2) the establishment of district requirements relating to high performance goals. In addition, the initiative included the development of “showcase schools” to serve as models for future design and construction.

1. High Performance Schools Working Group

In early 2001, the head of LAUSD’s Office of Environmental Health and Safety convened a High Performance Schools Working Group. The group comprises representatives from LAUSD, area utility companies, state agencies, private architecture firms and vendors, and NGOs. The group, which has met regularly as LAUSD continues to implement its high performance initiative, provides a formal mechanism for convening experts from within and outside the district to consider strategies for advancing high performance design and to make recommendations to the district. See John S. Zinner, *Implementing CHPS: The Los Angeles Unified School District Experience (February 2003)* [hereinafter “Implementing CHPS”] (on file with Environmental Law Institute). The initial focus of the group was on drafting and reviewing a high performance schools resolution and seeking approval of the resolution by the Board of Education. The resolution, which was spearheaded by the LAUSD Director of Environmental Health and Safety, became a critical springboard for the district’s initiative.

2. Board of Education resolution

In February 2001, the Board of Education for LAUSD unanimously adopted a High Performance Schools Resolution sponsored by district officials and the High Performance Schools Working Group. See Los Angeles City Board of Education Resolution of February 13, 2001, available at <http://www.ciwmb.ca.gov/GreenBuilding/Schools/LAUSD/Resolution.htm> (last visited: June 2, 2003). The resolution explicitly supports the recommendations of the Proposition BB Oversight Committee on incorporating sustainable design criteria. According to officials with the district and the Board of Education, the board had heard several presentations on the subject and

gave its approval readily when the resolution came up for a vote.

In addition to supporting high performance goals generally, the Board's resolution requires the LAUSD Facilities Division, in consultation with the Environmental Health and Safety Office, to "develop more resource efficient design criteria" for use in new construction and renovation. The resolution explicitly calls on the district to work with CHPS in developing the criteria and to include specific issues such as site orientation, energy efficiency, water efficiency, waste management, and material resource efficiency. To ensure effective implementation, the board required district staff to present a plan including performance measures and a performance tracking mechanism.

While the resolution directly addressed high performance school design and construction, it did so in a fairly general way, serving as a springboard for the district's development and implementation of its initiative. A second resolution has been drafted for future consideration by the board, which would build on the initial stage of the district's initiative and contain more specific directives on incorporating of high performance criteria in future school building projects.

3. *High performance schools consultant*

One of the key actions taken by LAUSD in implementing the board resolution was to apply for a grant from the California Energy Commission, which operated a grant program with funding from the U.S. Department of Energy's Rebuild America program. LAUSD used the grant money to hire an outside consultant—a planner with considerable experience working on sustainable development and sustainable design projects in California—who was charged with institutionalizing high performance school design and construction within the district. The consultant was hired in spring 2002, and the district has extended the contract in 2003 using its own funds.

The sustainability consultant has been critical to the progress of the high performance schools initiative. In addition to bringing expertise on the subject, the consultant has had the advantage of maintaining a single focus on these issues, in contrast to existing LAUSD staff, who are busy with numerous ongoing construction projects and deadlines. Working mainly with the Facilities Division's design office, the consultant has the responsibility of ensuring that the district continues to develop and implement the high performance schools initiative.

4. *High performance schools scorecard*

Following the Board's resolution, and prior to the hiring of the sustainability consultant, LAUSD had asked architects working on new school projects to use the existing CHPS criteria—then available in draft form only—to rate their projects. LAUSD officials note that this was done in order to gauge the extent to which designers were incorporating high performance goals already and to identify what steps LAUSD should take. Later, though, the district determined that using the draft version of CHPS did not provide the district with the type of information it needed to make decisions about future policy and practice changes.

Once the sustainability consultant was on board, the district set about developing a tool for determining how well high performance features were being incorporated into new building projects. Using the recently completed CHPS manual and CHPS criteria as a framework, the consultant worked with the district and with its High Performance Schools Working Group to create a "scorecard" that lists design features and assigns corresponding point totals. The scorecard also provides space for the designer to include comments and to document references for each credit claimed. See Los Angeles Unified School District, Collaborative for High Performance Schools (CHPS) Scorecard – New School, *available at* www.chps.net/manual/index2.htm (last visited: June 2, 2003). The CHPS board of directors has approved the scorecard and incorporated it into the CHPS program for use by other school districts.

One feature of the LAUSD scorecard is a listing of "baseline" points—points that would be achieved if architects simply follow current LAUSD guidelines as well as state and local requirements. The district found that because a number of environmental and health-related features were already incorporated in the district's design guidelines, schools would achieve 23 points out of the required minimum 28 points for qualifying as a high performance school under the CHPS criteria.

Once the scorecard was developed, LAUSD requested that architects working on current school building projects complete the scorecard. Because contracts had already been signed for these projects and most designs were well underway or completed, the district did not require firms to change the designs to address the CHPS criteria. Ultimately, the district found that most of the more than 80 scorecards they received achieved about 24 points. The district is still evaluating the results and will use the information to identify areas of focus for strengthening its guidance on high performance features. See *Implementing CHPS*.

Beginning in 2003, LAUSD will undertake the second phase of its building program. The district will require that all new projects use the scorecard and qualify as a CHPS school, and the district recently revised its Design Guidelines and specifications to include this requirement. LAUSD, Design Guidelines, Section 2.4(A) (March 2003) (on file with Environmental Law Institute). In a section addressing environment and sustainability, the guidelines state that the district is “committed to sustainable design” and “advocates an integrated, holistic design approach.” *Id.* The guidelines further “endorse” the CHPS initiative and state the district’s intention to “meet as many criteria as economically feasible.” *Id.* The guidelines specifically require that architects submit a CHPS scorecard at three points during the design process: schematic design (anticipated CHPS points); design development (detailed description of points achieved in the design); and final design (confirmation and certification of points achieved). *Id.* The guidelines further require that new construction and modernization projects must apply for any utility energy efficiency incentive programs, and must do so during the schematic design phase in order to promote a collaborative approach to the project.

5. District Design Guidelines

Another important component of the LAUSD initiative is the revision of the existing Design Guidelines to incorporate and highlight specific environmental and health goals. Following the adoption of the board resolution in 2001, the district reviewed its guidelines to identify possibilities for strengthening the guidelines immediately. The district made revisions in a few areas that could be incorporated by projects already in design—*e.g.*, use of “cool roofs” (detailed specifications about roofing materials that can be used) and recycling of construction and demolition waste (model specifications for recycling 75 percent of all such wastes). *See* Implementing CHPS. These two practices were among those included in the “baseline” point total on the scorecard that was initially distributed to architects.

Other priority issues that were not amenable to retroactive changes in the design were put on the district’s agenda for future consideration. Some of these have recently been incorporated into the Design Guidelines for phase two school projects. For example, the guidelines require that projects: “Increase the effective use of daylighting in combination with electric lights. . . .and achieve a minimum 2% daylight factor in 75% of class-

rooms.” LAUSD, Design Guidelines, Section 2.4(B). The guidelines establish a minimum energy performance of 15-35 percent beyond state energy efficiency standards and require energy modeling. LAUSD, Design Guidelines, Section 2.4(C). The guidelines also include requirements and recommendations for acoustics. Others design features are still under consideration—*e.g.*, commissioning, use of recycled and low-emitting materials, and storm water management. *See* Implementing CHPS.

These changes to the Design Guidelines will likely raise the district’s “baseline” point total to at least 28 points, thereby making every LAUSD new project that complies with district guidelines a CHPS school before taking any additional steps to incorporate the CHPS criteria. *See* Implementing CHPS. The guidelines currently note that the district may decide in the future to require more than the minimum 28 points.

An important component of the LAUSD initiative is the revision of the existing Design Guidelines to incorporate and highlight specific environmental and health goals.

6. Showcase schools

As noted in the preceding chapter, the CHPS program is coordinating the development of several “showcase schools,” or model high performance facilities individually sponsored by a CHPS member agency or utility. There

are two such projects within LAUSD—Cahuenga Elementary and the Southeast Learning Center—each sponsored by a utility company, and the district is using the model facilities to help implement its high performance schools initiative.

Each showcase project expects to achieve 20 or more points above the minimum 28 required to meet the CHPS criteria. The designs incorporate a range of high performance strategies, with each exceeding California’s energy efficiency standards by at least 30 percent and achieving nearly all of the possible CHPS points in the site and indoor environmental quality categories. *See* CHPS Schools, available at http://www.chps.net/chps_schools/index.htm (last visited: June 3, 2003). The design costs for these schools were higher than typical projects, and these added costs were covered by utility incentive programs. The construction estimates for one of the projects suggest that the school will not cost more to build than a school using a traditional design approach. *See* Implementing CHPS. LAUSD is planning on using the projects’ specifications related to high performance features as a model for future district projects.

7. LAUSD sustainability committee

Recently, the district set up a Sustainable Design Committee made up of four divisions: New Facilities; Existing Facilities; Environmental Health and Safety; and Maintenance and Operations. The purpose of the committee is to facilitate communication about and implementation of high performance school practices within the district. See *Implementing CHPS*. This type of intra-district body is an important step in integrating sustainable schools issues across programs in the district, e.g., helping to ensure that new schools are designed with operations and maintenance needs in mind.

8. District Strategic Executive Plan

In January 2003, LAUSD published a Strategic Executive Plan for its new construction program. The document describes the goals of the program and the benchmarks for achieving those goals. One of the general goals included is to design schools that are “environmentally and educationally appropriate.” Strategic Executive Plan (Program), *available at* <http://www.laschools.org/sep/05-program.pdf> (last visited: June 2, 2003). In setting forth design principles for the new construction program the plan states that the district “has fully embraced the concept of sustainable design,” including the adoption of the CHPS criteria and the consideration of life cycle costs in selecting materials and systems. *Id.* at 12-13.

The plan also underscores the district’s intention to design all new schools as “centers of community,” in response to community requests to make schools more “neighborhood-friendly.” Related to this goal is a new joint effort of LAUSD and the city to integrate school siting and neighborhood revitalization activities. The school district and city have signed a Memorandum of Understanding to meet regularly and share information in order to coordinate efforts and leverage resources for promoting economic development and strengthening communities. See LAUSD, City, School District, CRA/LA Announce Unprecedented School Site Selection and Neighborhood Revitalization Agreement, *available at* http://www.laschools.org/news/item?item_id=360135 (last visited: June 3, 2003).

IV. BARRIERS TO HIGH PERFORMANCE SCHOOL DESIGN AND CONSTRUCTION IN LOS ANGELES

The Los Angeles Unified School District faced numerous challenges in undertaking the largest school building program in its history. In addition to the difficulty of building tens of thousands of new seats in a rela-

tively short period of time and finding the land to do so, the district’s history of mismanagement of school construction projects created a skeptical public and a private sector reluctant to work with the district. The district addressed a number of additional barriers in pursuing a high performance design and construction approach to its new building program.

A. FINANCIAL CONSIDERATIONS

With pressure on the district to use school construction bond funds efficiently, the potential for increased first costs associated with high performance design created a challenge for LAUSD. The district has addressed this challenge primarily by mandating the CHPS approach, thereby ensuring incorporation of some environmental and health features regardless of cost issues. Nevertheless, the CHPS system is flexible, and financial pressures could still discourage designers from incorporating strategies that require additional up-front costs. LAUSD has addressed this issue by modifying its Design Guidelines to include priority CHPS criteria as requirements for all projects. Another step taken by the district to address added up-front costs is to mandate that all new projects register with the utilities’ Savings by Design program at the outset of the project in order to maximize financial incentives and technical assistance. Most significantly, however, the district has embraced the concept of life cycle cost analysis in determining whether a high performance design approach is financially viable.

B. TIME PRESSURE

LAUSD has been under great pressure to show progress in building schools. Thus, the district has had to create and implement a high performance initiative on a building program already in motion. One of the steps taken by the district to address this challenge is the hiring of a sustainability consultant. The consultant, rather than district staff with heavy workloads and multiple responsibilities, took the lead in developing the initiative. The district made what changes it could to projects already underway, learned from those projects, and is preparing to implement a high performance design approach from the outset of the next round of new construction projects. The district has had less success in integrating high performance goals into its modernization program. That program involves an entirely different office and separate institutional processes within LAUSD, and thus far has not been the focus of the high performance schools initiative. This has begun to change in light of the revision of the district’s Design Guidelines and specifications, which apply to all projects. In addition, the district has begun a

separate effort examining the application of CHPS criteria to modernization projects.

C. EDUCATION AND TRAINING

One of the key barriers to institutionalizing a high performance design approach in LAUSD as elsewhere is a lack of familiarity with the approach, particularly on the part of school district staff and private design professionals, and the corresponding resistance to changing the traditional approach to the design process. By establishing board-level support for a high performance initiative, the district has addressed these obstacles to some extent. A related challenge remains the need for training of both designers and project managers. The creation of a policy and the development of a tool for carrying it out do not ensure that the numerous individual staff and contractors working on projects will be equipped to navigate the decision making process for integrating environmental and health goals from design through construction. The district has held some workshops in the past, but there remains a great need for ongoing training given the size of LAUSD and its extensive use of contract employees. The district plans to meet this need by developing a list of pre-qualified architects and then conducting training sessions for those firms using the district's specific CHPS requirements.

One additional barrier related to training and education is the need for technical information that can be readily applied in school building projects. For example, people involved in the LAUSD initiative emphasize the need for model specifications and other information relating to building materials. Existing information in this area is not easy for most design teams to incorporate into projects. There has also been some concern about whether the state's model criteria for low-emitting materials is too complicated and time-consuming for architects to use. As noted in Chapter 2, state agencies in California have projects underway to further develop product lists and other informational resources.

V. SUMMARY AND OBSERVATIONS

A. PRINCIPAL STRATEGIES USED

Upper level management within LAUSD took three basic steps in institutionalizing a high performance schools initiative: (1) developing a short policy statement that accurately reflected the district's goals and obtaining review of the statement by stakeholders within the district; (2) presenting the statement to the Board of Education to adopt as a formal resolution; and (3) provid-

ing simple tools, such as the CHPS scorecard, for school officials to use to carry out the policy.

Board resolution. The Board of Education resolution provided the key underpinning for the high performance initiative. In a district as large as LAUSD, with many managers and staff needed to make the initiative work, the resolution was important to moving the initiative forward and countering resistance from within. The role of the Board of Education has been to affirm that high performance goals are important, direct the district to incorporate those goals, and then turn the implementation over to the district. Passage of a second resolution, currently being considered, would help to solidify further the progress made in developing the initiative by supporting its more specific components.

Sustainable design consultant. The hiring of a sustainable design consultant, using state grant funds that originate with the federal Rebuild American program, was a critical step in implementing the new district policy. The key to LAUSD's effective use of a consultant for this effort was hiring someone with considerable experience in this field and giving him a clear mandate and broad access to district officials. In this way the district could set the initiative apart from its ongoing workload and bureaucratic processes but ensure that the effort would be integrated into the building program. Also of great importance was the district's decision to hire the consultant for an additional year using its own funds.

Metric. The scorecard developed by LAUSD provides a tool for measuring a project's use of the CHPS high performance schools criteria. The scorecard lists numerous design features and provides corresponding points for including those features. LAUSD also developed a baseline score that should be achieved by school projects by simply following existing law and best practices outlined in the district's Design Guidelines. LAUSD took a two-phase approach to incorporating use of the scorecard: for projects already underway, the district gathered information about the scores achieved; for projects that will be undertaken in the future, the district will require use of the scorecard and a minimum point total. This phased approach has enabled the district to both evaluate its current practices and raise awareness among stakeholders about how those practices would be changing.

Supplemental design requirements. An important component of the LAUSD initiative is the re-evaluation of its existing design requirements and revision of the district's Design Guidelines to incorporate additional health and environmental features. A number of changes have

already been made for projects that are started in 2003, and the district is studying further changes. By revising its guidelines to include new minimum standards, the district can ensure that individual projects do not opt to exclude certain priority issues when using the CHPS scorecard.

Working groups. The establishment of a High Performance Schools Working Group was central to LAUSD's initiative. The group provided a forum for bringing considerable expertise to the table in developing and carrying out the initiative. The district's Sustainability Committee is also a potentially important vehicle for coordinating these activities within an organization the size of LAUSD. Significantly, both entities seek to integrate the district's maintenance staff into the school building program.

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

Upper level management champions. While the Board of Education resolution was vital to institutionalizing the LAUSD high performance design initiative, the key to the district's success has been the work of two upper-level managers who made high performance design a priority. These managers quickly took ownership of the initiative and identified the steps needs to move it forward. Moreover, the fact that these managers oversaw both the new construction and health and safety operations of the district has helped to integrate high performance goals into the design, construction, and operation/maintenance of facilities. Indeed, the LAUSD initiative has been strengthened by a robust environmental health and safety program that is focusing on such high performance school features as siting and indoor air quality.

State-wide expertise and support. Although California's CHPS initiative was still in its early phase prior to 2001, state agencies were active in sustainable building issues at the time. According to many people involved in the LAUSD high performance schools initiative, the encouragement and assistance provided by CHPS members was a significant factor in the creation and development of the LAUSD initiative. Through informal consultation, facilitation of a district workshop on sustainable design, participation in the LAUSD High Performance Working Group, and funding of the sustainability consultant, state agencies (along with federal offices and utility companies) played a significant role in jump starting the district's initiative.

C. IMPLEMENTATION CHALLENGES

With a board resolution, the development of a scorecard, revisions to its design guidelines, and the creation of

an advisory committee, LAUSD has gone a long way toward institutionalizing a new way of designing and building its schools facilities. Nonetheless, there remain some significant challenges in carrying out these new policies and practices.

District oversight. The hiring of a sustainability consultant to lead the implementation effort, while vital to the success of the initiative, has also resulted in more diffuse control over the initiative. As the building program evolves (and the role of the consultant diminishes and eventually ends), it will be important for the district's new construction office (and the modernization office) to establish a clear internal system for accountability in implementing the key components of the initiative.

Use of a metric. The use of a metric that enables project teams to select from a wide range of design strategies provides a useful and flexible system for incorporating health and environmental goals into a large number of projects. Used alone, this approach does not guarantee that certain priority issues are addressed, nor does it ensure that designers will consider health and environmental goals in an integrated fashion, a core principle of high performance design and construction. LAUSD has addressed the former problem by revising its design guidelines to require certain specific features. In so doing, the district is creating a baseline that already achieves the minimum requirements under the CHPS program. A greater challenge is in encouraging a whole-building approach to the design and construction process that can maximize efficiencies and building performance. One process change that may help in ensuring an early, integrated approach is submission of the CHPS scorecard at several stages of the design process. LAUSD will, however, need to take steps to ensure that district staff and designers understand and embrace the broader goals of the design process within which the scorecard is used.

Community participation. Although LAUSD is making a number of environmental and health features mandatory through revision of its design guidelines, use of the CHPS scorecard still requires trade-offs in determining which additional features to incorporate into the building projects. To date, there has not been a significant amount of community advocacy or involvement focused specifically on the high performance schools initiative. Community involvement in the school planning and design process has been a high profile matter in the district for a number of years, and the district has sought to improve its performance in this area. Community involvement has been most notable in the areas of siting of facilities and development of joint-use features. Because health

and environmental goals are an integral part of the design process and of the resulting school facility, the district can strengthen its initiative by ensuring that the community is educated about the district's initiative and has a meaningful opportunity to participate in decisions about how high performance goals will be met in each project. The district's recently announced community outreach effort, part of its new school construction program, could help advance participation in planning and design decisions.

Technical assistance and training. A key to the success of the LAUSD high performance schools initiative will be training those charged with carrying out the new policies. Ongoing training is needed for project managers who oversee the design and construction process, in order to ensure that high performance goals are considered in an early, integrated manner and to ensure that schools are built as designed. Training for architects will also be critical. In its next Request for Qualifications for architects,

the district is considering including a requirement that firms have experience in sustainable design.

Modernization. The LAUSD initiative has made tremendous inroads in the new construction program, but only recently has begun to address the considerable work being undertaken to modernize existing facilities. This reflects not only the difficulty in expanding the focus to include a large number of additional projects, but also the fact that modernization is a separate program with separate managers and staff, as well as more decentralized decision making procedures. Additionally, the CHPS criteria and scorecard can be used in renovation projects but are primarily geared toward new construction. By addressing the need for information, tools, and procedures aimed specifically at modernization, LAUSD will not only improve the quality of numerous schools in the district, but also will help provide a model for school districts elsewhere in the country whose school building programs consist mainly of renovation projects.

CHAPTER 4

STATE OF MASSACHUSETTS

The Commonwealth of Massachusetts has created and is implementing a \$13.5 million Green Schools Initiative to fund pilot school building projects that incorporate renewable energy technologies and other related high performance design features. The state plans to maximize its investment in these pilot projects by conducting evaluations and analysis of the projects after they are completed and by developing a manual and criteria to guide other school building projects in the future. While the Green Schools Initiative itself is ambitious in scope, the state also seeks to expand the impact of the initiative by integrating high performance goals into the state's school construction funding program. Like other states with serious budget deficits, Massachusetts faces a challenge in strengthening its school building program at a time of considerable financial constraint.

This chapter begins with an overview of the state policies that bear most directly on school design and construction. Section I describes the laws and regulations that govern funding, project delivery and environmental and health issues that arise in the school building process. Section II provides some background information on state-level activities that address sustainable building generally and that have an indirect effect on current and future school building initiatives. Section III discusses the state's Green Schools Initiative, including related activities being undertaken or planned by the state Department of Education. The barriers to institutionalizing a high performance approach in Massachusetts are outlined in Section IV of this chapter. Finally, Section V provides a summary of the state's initiative, along with observations about key factors in the state's success so far and challenges for the future.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

A. STATE SCHOOL CONSTRUCTION FUNDING SCHEME

In Massachusetts, school construction is funded by a combination of state and local money. At the local level, funds are typically raised through the issuance of bonds. Since the early 1980s, the amount of money a community may raise from property tax levies has been limited by a

law known as Proposition 2½, which also establishes the mechanisms for local overrides of these limits. *See generally* Massachusetts Department of Revenue, *Levy Limits: A Primer on Proposition 2½*, at 4 *available at* <http://www.dls.state.ma.us/PUBL/MISC/levylimits.pdf> (last visited: July 30, 2003).

The Commonwealth funds school construction through the Department of Education's School Building Assistance (SBA) Program, with the Massachusetts Board of Education providing oversight of the program. The SBA is funded by the legislature through general or supplemental appropriations acts. 603 Code of Massachusetts Regulations 38.11. Funds may be awarded to a city, town, regional school district or an independent agricultural/technical school. The SBA contribution is derived from a statutorily-established formula based largely on the community's ability to pay, although the state's share cannot be less than 50 percent nor more than 90 percent. Massachusetts General Laws (M.G.L.) c.70B, § 10.

Funding levels for the program have decreased significantly over the past few years. *See* Mass. Board of Education, *Annual Report to the Governor and Legislature on the School Building Assistance Program* (Feb. 2003), *available at* http://finance1.doe.mass.edu/sbuilding/info_02.html (last visited: July 30, 2003). In 2002, new grants were awarded for two major repair projects and 23 capital construction projects, all of which had been on the state's waiting list since 1998 or 1999. In addition, 66 new project applications were reviewed by the commissioner and added to the current waiting list. *Id.*

The SBA has existed for over 50 years, but legislation governing the program was re-written in 2000 and new regulations were issued. M.G.L. c. 70B; St. 2000, c. 159, s. 140; 603 Code Mass. Regs. 38.00. The legislation, together with new regulations, made a number of significant changes to the program requirements. Following are some of the key aspects of the regulatory scheme that impact how school construction is funded.

Prioritization of projects. The law sets forth criteria for ranking school building projects for state funding. As in years past, first priority is for existing schools that present a threat to health and safety.

Eligible costs. State law authorizes the Massachusetts Board of Education to determine which costs of a school project are eligible for reimbursement. M.G.L. c. 70B § 3. The regulations establish these cost standards as maximum amounts per square foot (\$158, \$168, and \$180 per square foot for elementary, middle and high schools, respectively). 603 Code Mass. Regs. 38.06(1). The state is required to review these cost factors annually and in 2003 approved an increase of 0.5 percent (\$1 per square foot). See Dep't of Education, Notice of Public Comment, *available at* http://www.doe.mass.edu/lawsregs/comment/-050203_38.html (last visited: August 5, 2003); Mass. Board of Education, Minutes of the Regular Meeting (May 27, 2003), *available at* <http://www.doe.mass.edu/boe/minutes/03/0527reg.pdf> (last visited: July 30, 2003).

Department of Education regulations establish the square foot limits used to determine the eligible costs. "Community school spaces" are to be included within these limits "unless the state specifically approves of additional space based on a demonstrable community need that cannot be accommodated within those limitations." 603 Code Mass. Regs. 38.05(1)(3). The law also establishes that the costs related to architectural features and square footage that exceed state defined school design standards and space recommendations "shall not be included in the estimated cost and final approved cost on the basis of which the state construction grant is calculated." M.G.L. c. 70B, § 9(b); 603 Code Mass. Regs. 38.06(4).

Financial incentives. The state law provides for "incentive percentage points," which may be added to the project's base state reimbursement percentage. Incentive points are available for a variety of items relating to high performance goals, including "excellent [or good] maintenance rating," "energy efficiency meets industry standards," "use of construction/project manager," "renovation/reuse," and "innovative community use." M.G.L. c. 70B § 10(a).

B. STATE REGULATORY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

School districts in Massachusetts are essentially subdivisions of the town or city government, and the city or town is the owner of a school building project. Alternatively, regional school districts may be established by two or more cities or towns for the purpose of operating a regional school or an independent agricultural/technical school. M.G.L. c. 70B, § 2; c. 71, §§ 14-16I. Of the state's 330 school districts, 81 are regional districts.

At the local level, general oversight of and responsibility for the school district is held by the School

Committee, roughly the equivalent of the board of education for the district. M.G.L. c. 71, §§ 37, 16A. However, school building projects are managed by separate Building Committees, which are appointed by the municipality (or regional school district). M.G.L. c. 71, § 68. The Building Committee, which issues approvals throughout the school building process, may be created for an individual project or serve as a standing committee. It generally includes some community representation, but may or may not comprise individuals with experience in building issues. One member of the School Committee or a designee must be a member of the Building Committee.

A variety of state agencies also play a role in various aspects of the school design and construction process. This section summarizes the principal statutory and regulatory requirements that apply to school building projects.

1. School Building Assistance program requirements

In addition to affirming that schools must comply with the state building code, the new SBA regulatory scheme incorporates a variety of requirements and incentives that reflect the Commonwealth's policy priorities and that apply to any school project seeking SBA program funding. Because projects that had already received funding approval before the reforms took effect were grandfathered, 2002 is the first year that many of the programmatic changes took effect. SBA Admin. Advisory 02-1 (3/21/02). Following are the provisions that relate most closely to the development of sustainable schools.

Guiding principles. The state law establishes as guiding principles the preservation of open space and emphasis on thoughtful community development. M.G.L. c. 70B § 3.

Renovation versus new construction. The law requires all projects to consider renovation instead of tear-down. M.G.L. c. 70B § 9. The regulations provide that new school construction will only be approved where the feasibility and cost of renovating an existing school shows that new construction is the best alternative based on cost, educational needs, and the public interest. 603 Code Mass. Regs. 38.03(10). As noted above, the state law allows incentive points for projects involving rehabilitation or renovation, as opposed to new construction.

Siting. The state law provides that the Massachusetts Board of Education must require schools to base site selection on cost and environmental factors. M.G.L. c. 70B § 9. The regulations elaborate on this provision by setting forth some general siting requirements. For example, the regulations require that a site be chosen to minimize any

possible adverse educational, environmental, social or economic impact on the community.” 603 Code Mass. Regs 38.04. The site must be “reasonably free from olfactory, auditory, visual, and noxious pollution, or should be capable of being made so prior to commencement of construction.” *Id.* In addition, the regulations encourage siting schools near community facilities that would enhance the educational program. *Id.*

In February 2003, the state Board of Education approved changes to the SBA regulations that require an environmental site assessment in conformity with ASTM Phase I standards for any school site (and its vicinity) not currently in educational use. The regulations also require a Phase II assessment if warranted based on the results of the Phase I assessment. Applicants for SBA funding must make the results of the assessments available for public review and comment, as well as provide the Department with the results of the assessments and a summary of the public comment. *See* Massachusetts Department of Education, Proposed Amendments to School Finance and School Construction Regulations, *available at* <http://finance1.doe.mass.edu/sbuilding/amend.html> (last visited: August 5, 2003); *see also* Mass. Board of Education, Board in Brief (Feb. 27, 2003), *available at* <http://www.doe.mass.edu/boe/bib/bib03/0225.pdf> (last visited: August 5, 2003).

Life cycle cost analysis. Both the law and the regulations require that applicants for SBA funds address life cycle costs. The law directs applicants to follow procedures that will “assure maximum attention to the operating and capital cost effects” of decisions about the educational program and about materials and systems selected in the design. M.G.L. c. 70B § 9(a). The regulations augment this requirement:

In the interest of cost effectiveness, the applicant shall carefully weigh the effects of initial capital costs against maintenance costs over the life of the building in order to reduce such maintenance costs. Life-cycle cost estimates. . . shall be considered during the preliminary design stage in order to ensure that the energy system with the lowest life-cycle cost estimate will be identified. . . .

603 Code Mass. Regs 38.03(9)

Indoor air quality during construction. SBA-funded construction projects undertaken while a building is occu-

ried must implement containment procedures for pollutants created during the construction process. 603 Code Mass. Regs 38.03(13). The procedures must be consistent with the “IAQ Guidelines for Occupied Buildings Under Construction,” published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA). The regulations establish a mechanism for ensuring compliance by requiring that all bids include the cost of planning and carrying out the containment measures. The application form for SBA funding requires that the project architect certify that these containment procedures have been included in the planning and cost estimates. *See* Department of Education, Comprehensive Capital School Construction Grant Application Checklist, *available at* http://finance1.doe.mass.edu/sbuilding/docs/645_1.pdf (last visited: August 5, 2003).

Construction management. The SBA regulations require that all projects receiving SBA funding use a qualified construction manager to oversee the project. 603 Code Mass. Regs 38.03(12).

Maintenance. Regardless of a project’s priority ranking, no project may be funded unless the district shows that it is spending 50 percent of its calculated foundation budget amounts for utilities and ordinary maintenance, plus extraordinary maintenance. M.G.L. c. 70B § 8; 603 Code Mass. Regs. 38.14. The SBA program application form requires districts to submit a copy of their preventive maintenance plan. *See* Department of Education, Comprehensive Capital School Construction Grant Application Checklist, *available at* http://finance1.doe.mass.edu/sbuilding/docs/645_1.pdf (last visited: August 5, 2003).

Technical assistance. In addition to the specific requirements outlined above, state law authorizes the Massachusetts Board of Education to “provide architectural or other technical advice and assistance, training and education. . . .” to applicants for SBA funds. M.G.L. c. 70B § 3.

2. State Building Code

The state building code applies to private and public structures and is enforced by local building inspectors. M.G.L. c. 143 §§ 2A, 3, 3A; *see also* 603 Code Mass. Regs. 38.03. The most significant aspects of the code in terms of sustainability are the recent revisions to the energy conservation requirements. These changes include

In February 2003, the state Board of Education approved regulations that require an environmental site assessment for any school site not currently in educational use.

elements from both ASHRAE Standard 90.1-1999 and the International Energy Conservation Code (IECC 2000), as well as some requirements that are unique to Massachusetts. See http://www.state.ma.us/bbbs/commercial_home_link.htm (last visited: May 13, 2003). Some of the key changes in substantive requirements, which took effect in 2001, include: increased efficiency requirements for HVAC systems; labeling and rating requirements for fenestration and doors; requirements for improved vapor barriers, continuous air barriers, and full continuous insulation on metal-framed buildings; and requirements for the installation of automatic lighting controls for most spaces. See U.S. Dep't of Energy, Massachusetts Commercial Energy Code, *available at* http://www.energycodes.gov/implement/case_studies/massachusetts.stm (last visited May 13, 2003). The revisions also establish commissioning requirements. See U.S. Dep't of Energy, Promoting Building Commissioning and Best Practices in Design, *available at* <http://www.famuso.net/ibs/proj/ornl/articles/article.php3?031> (last visited: May 13, 2003).

3. Environmental protection laws

The Massachusetts Environmental Policy Act (MEPA), M.G.L. c. 30 § 61, requires state agencies to study the environmental consequences of their actions and to take all feasible measures to avoid, minimize, and mitigate damage to the environment. MEPA applies to projects above a certain size that involve some state agency action, including state funding of projects. MEPA establishes thresholds for review, based on the nature of the project and the areas of impact on the environment. See 301 CMR 11.02(b). All school projects must file a MEPA Review Thresholds form along with their application for SBA funding, and must undergo MEPA review with the state Executive Office of Environmental Affairs if they meet any of the regulatory thresholds for such review. See Department of Education, Comprehensive Capital School Construction Grant Application Checklist, *available at* http://finance1.doe.mass.edu/sbuilding/docs/645_1.pdf (last visited: August 5, 2003).

The Department of Environmental Protection also oversees compliance with a variety of laws and regulations governing the environmental impact of construction projects—*e.g.*, laws requiring permits for construction projects affecting wetlands or river front areas and laws requiring proper handling and disposal of asbestos. See *generally* M.G.L. c. 131 § 40 (wetlands); 310 Code Mass. Regs. 7.09, 7.15 (asbestos). The Department also oversees the assessment and cleanup of hazardous waste sites. See *generally* 310 Code Mass. Regs. 40.00.

4. Procurement laws

The state designer selection law sets forth requirements for state projects and mandates that municipal projects adopt procedures that comply with the “purposes and intent” of the state law. M.G.L. c. 7 § 38K. The Massachusetts Designer Selection Board has published guidelines for municipal designer selection that are similar to the state’s process. See Massachusetts Office of the Inspector General, Designing and Constructing Public Facilities at 19 (2003), *available at* <http://www.state.ma.us/ig/publ/dcmannual.pdf> (last visited: August 5, 2003). Municipalities may deviate from this designer selection process, and whether the municipal process complies with the state law is a matter of judicial interpretation. The guidelines establish a qualifications-based process in which the owner sets the fee or sets a ceiling on the fee subject to negotiations with the successful applicant. The law requires that the contract state the fee as a fixed dollar amount, rather than as a percentage of the construction cost. M.G.L. c. 7 § 38(c). Requests for applications must be advertised, and proposals are evaluated based on factors such as experience, quality of work, public sector experience, and general capacity to undertake the scope of work. *Id.* at 19-24.

Another state law addresses the awarding of public construction contracts and requires that contracts be awarded to the “lowest responsible and eligible” general bidder on the basis of competitive bids in accordance with the procedure set forth in the law. M.G.L. c. 149 § 44A. (“Responsible” is defined as “demonstrably possessing the skill and integrity necessary to faithfully perform the work. . . based upon. . . workmanship and financial soundness. . . .” *Id.*) Projects are bid as single lump sum general contracts. Alternatives such as design-bid or construction manager/general contractor are not allowed under state law without prior legislative authorization. See M.G.L. c. 29 § 7E. In addition, Massachusetts uses a “filed sub-bid system,” requiring that project owners contract out separately for sub-contractors. M.G.L. c. 149 § 44E-F. State law allows municipalities to opt out of this requirement through home rule overrides. In October 2002, the Department of Education submitted proposals to the state legislature that would exempt school projects from the filed sub-bid requirement. See <http://finance1.doe.mass.edu/sbuilding/amend02.html> (last visited: August 5, 2003).

State law prohibits sole source specification provisions in construction contract documents: “For each item of material, the specifications shall provide for either a minimum of three named brands of material or a description of material which can be met by a minimum of three manufacturers or producers, and for the equal of any one

of said name or described materials.” See M.G.L. c. 30 § 39M(b). Proprietary specifications that restrict competition to a single vendor are permitted only “for sound reasons in the public interest” that are stated publicly, and those specifications must provide an “or equal” clause. *Id.*

II. CONTEXT FOR THE MASSACHUSETTS GREEN SCHOOLS INITIATIVE:

Sustainable Building Activities at the State Level

A. PUBLIC AGENCY ACTIVITIES

Various state agencies have played a role in promoting sustainable design and construction. This section begins with a description of four state agency programs that have addressed sustainable building issues for a number of years, as well as a recent state-wide sustainability initiative that seeks to integrate the various aspects of the Commonwealth’s work in this area. These activities are relevant to school construction, although most have not been linked closely with the state’s green schools activities.

State building program. The Division of Capital Asset Management (DCAM) provides public design, construction, and real estate services to other Commonwealth agencies. DCAM has developed a sustainable design program that has undertaken the following activities, among others.

- Established a set of sustainable design policies and goals, including minimizing life cycle costs, using resources efficiently and creating healthy indoor and outdoor environments. See <http://www.state.ma.us/cam/statewide/sw-sustain02.html> (last visited: August 5, 2003).
- Developed guidelines for incorporating principles of sustainable design in new projects. See <http://www.state.ma.us/cam/statewide/sw-sustain05.html> (last visited August 5, 2003) The guidelines provide a fairly extensive list of specifications that “should be adopted by the designer” and if not adopted, require a justification. The specifications include a separate indoor environmental quality section, as well as numerous items concerning low-emitting materials.
- Created a “conservation team” to advise DCAM staff and design consultants on opportunities for preventing pollution. Through research and life cycle cost analysis, the team provides project-specific information and specifications that can increase efficiency and reduce environmental impacts.
- Carried out various project-specific activities, including energy modeling; specifying recycled content materials; using third-party commissioning for energy efficiency and indoor environmental quality; con-

ducting life cycle cost analysis; and recommending LEED certification. See generally www.state.ma.us/cam/statewide/sw-sustain.html (last visited: August 5, 2003).

Operational Services Division. The Operational Services Division, in coordination with other state agencies, manages an environmentally preferable purchasing (EPP) program that sets forth required purchasing practices for state agencies. The program also provides guidance for other governmental entities, including schools and municipalities, that are seeking approved contractors who sell environmentally preferable products. See generally <http://www.state.ma.us/osd/enviro/enviro.htm> (last visited may 14, 2003). The program provides general information, as well as information about specific products and vendors. Among the areas covered by the program are building materials and supplies, carpeting, and flooring.

Department of Telecommunications and Energy. Investor-owned utilities in Massachusetts operate a variety of incentive programs for incorporating energy efficiency measures in school design and construction. Although they are not run by the Commonwealth, the programs have their basis in legislation requiring a surcharge on ratepayers. The legislation, initially enacted in 1997, was re-authorized in 2002 and extended through 2007. Chapter 45, Acts of 2002 (Mass. Session Laws). In 2000, over \$26 million in ratepayer funds were spent on non-residential, construction-related activities, including school construction. See Commonwealth of Massachusetts, Office of consumer Affairs and Business Regulation, *2000 Energy Efficiency Activities: A Report by the Division of Energy Resources* at 22 (Summer 2000), available at http://www.state.ma.us/doer/pub_info/ee00-long.pdf (last visited: August 5, 2003).

The programs vary among the four principal utilities, but they generally provide funding and technical assistance for schools to incorporate energy-saving design features and equipment. For example, the utility NSTAR recently launched a school design and construction assistance program that aims to work with A/E firms or School Building Committees for all new school construction projects in the service area. According to utility officials, the program will cover up to 100 percent of the incremental costs of electric energy efficiency measures that exceed the current code and satisfy the payback period established by the program, and will pay up to 50 percent of the incremental costs for gas energy efficiency measures. Another utility, MassElectric, operates the Design 2000*plus* program, which provides financial incentives and technical assistance to project owners and designers to encourage the use of design features and electrical equipment that

enhance energy efficiency in new construction and renovation. See <http://www.masselectric.com/bus/effic/2000/index.htm> (last visited: August 5, 2003). The services include technical consulting on design; design incentives for evaluating energy efficiency options; financial incentives to help defray the cost of more energy efficient equipment and systems; and commissioning services.

Executive Office of Environmental Affairs. The Executive Office of Environmental Affairs (EOEA) has been active in promoting sustainable practices in Massachusetts for a number of years and recently has begun focusing on sustainable design. In 2002, the agency worked with DCAM to put together a Sustainable Design Roundtable meeting attended by public officials responsible for funding, planning and managing construction, as well as the private sector firms who bid to design and build those facilities. The meeting was not a training session, but rather an attempt to “engage both public and private sector representatives in an open discussion about sustainable design and construction practices as the first step in a long-term initiative.” See Commonwealth of Massachusetts/The Green Roundtable, Sustainable Design Roundtable Meeting Notes (June 2002) at 4, available at http://www.state.ma.us/envir/sustainable/resources/pdf/Resources_SusD_Green_Roundtable_Notes.pdf (last visited: August 5, 2004). The participants identified key barriers to promoting sustainable design and construction and discussed suggested actions. Among the agencies that committed to take a leadership role in continuing this effort were the EOEA, DCAM, the Department of Housing and Community Development, and the Department of Education. *Id.* at 17.

Following the meeting, in July 2002, the governor signed an executive order establishing a State Sustainability Program. Mass. Executive Order No. 438 (July 22, 2002). The central goal of the program is to further state agency efforts to develop programs that achieve a wide range of environmental goals, including the “siting, design, construction and management of Commonwealth facilities in an environmentally sound and resource efficient manner.” *Id.* at 3. The program is to be led by a State Sustainability Coordinating Council composed of more than 15 state agencies and chaired by the EOEA and the Executive Office of Administration and Finance (EOAF). The executive order further directs all state agencies to appoint a sustainability coordinator and to give full management support and the necessary resources to meet the goals of the order.

The State Sustainability Program, still in its very early stages of implementation, has established sustainable design as one of its core initiatives. The EOEA has published a

Sustainable Design Fact Sheet that describes the sustainable design process as well as key environmental and health goals. See Massachusetts State Sustainability Program, Sustainable Design and Construction, available at http://www.state.ma.us/envir/sustainable/resources/pdf/Resources_SusD_Factsheet.pdf (last visited: August 5, 2003). According to program officials, future activities will involve work with the state highway agency and with DCAM to identify barriers to sustainable design and to develop actions to overcome those barriers. These activities will not address school design and construction directly, though they may provide an indirect benefit and support for the School Building Assistance program and other state offices working in the schools arena. See generally, <http://www.state.ma.us/envir/sustainable/default.htm> (last visited: August 5, 2003).

B. NON-GOVERNMENTAL ACTIVITIES

Non-governmental organizations in Massachusetts have played an important role in advocating for healthy and sustainable schools throughout the state and in the New England region. Indoor environmental issues have been particularly prominent in the state, and organizations such as the Massachusetts Healthy Schools Network and the Massachusetts Coalition for Occupational Safety and Health (MassCOSH) have been strong proponents of state and local policies and practices that result in healthier school environments. See “Citizens Seek Less Exposure to Toxic Items,” Worcester Telegram & Gazette (Sept. 21, 2002). The Green Roundtable has brought its sustainable design expertise to bear on a variety of initiatives around the state and region. The work of these groups has played both a direct and indirect role in advancing the current Green Schools Initiative, as well as other parallel efforts.

In addition, A/E firms play a prominent role in the school building process in Massachusetts. Throughout the state a number of private architecture firms with experience in sustainable design have been instrumental in promoting high performance schools.

III. MASSACHUSETTS GREEN SCHOOLS INITIATIVE

The focus of the state’s activities in promoting high performance schools has been the Green Schools Initiative, a pilot program that is carried out by a quasi-governmental entity, the Massachusetts Technology Park Corporation. Significantly, this entity has worked closely with the state Department of Education to institutionalize the goals of the initiative through the School Building Assistance program. This section provides background on

the initiative and describes the components of both the initiative and the Department of Education's related activities.

A. BACKGROUND AND CREATION OF THE INITIATIVE

1. Background

The creation of the Green Schools Initiative reflects the development of two important policy changes in Massachusetts—the reauthorization of the School Building Assistance program described above, and the restructuring of the electric utility industry and creation of related energy programs.

State law created the Massachusetts Technology Park Corporation. See M.G.L. c. 25 §§ 19-20; c. 40J § 3. The Electric Utility Restructuring Act of 1997 established the Renewable Energy Trust (RET) as a separate trust fund within the corporation, to be funded by a mandatory charge per kilowatt hour on investor-owned electric utility customers in the state. M.G.L. c. 40J § 4E. The Massachusetts Technology Collaborative (MTC) is the “operating entity” of the corporation and administers the RET.

The broad purpose of the RET is to generate “maximum economic and environmental benefits over time from renewable energy. . . .” M.G.L. c. 40J § 4E(b). To advance the broad and specific purposes set forth in the act, the MTC is authorized to take a variety of actions. Among the specific activities allowed are “pilot and demonstration projects and other activities designed to increase the use and affordability of renewable energy resources by and for consumers in the commonwealth” and “matters related to the conservation of scarce energy resources.” M.G.L. c. 40J § 4E(d). The law also requires RET to adopt a plan that ensures that the fund “shall be employed to provide financial and non-financial resources to overcome barriers facing renewable energy enterprises, institutions, and projects. . . .” *Id.* The law specifically directs RET to leverage expertise and resources of other state and federal agencies and requires the creation of an advisory committee appointed by the governor. *Id.*

2. Initial steps in the Green Schools Initiative

Green Buildings Program. The RET charter is to develop initiatives to increase the supply and demand of renewable technologies, and the program undertook a needs assessment and developed a set of programs to meet the identified needs. One of the programs created is the

Green Buildings Program, which provides incentives and resources for designing and constructing high performance buildings. Within the Green Buildings program is the Green Schools Initiative, which began operating in 2001. According to MTC officials, the main reasons for the focus on schools were the amount of public funds being channeled to school construction (30-50 new projects per year at the time), the importance of schools as centers of communities, and the opportunity for schools to promote sustainability generally.

Department of Education and other partners. The Department of Education became a partner in the MTC Green Schools Initiative from the outset. Department officials noted that in addition to the sheer volume of state-funded school construction projects, a key factor in the agency's participation was the new SBA legislation. Responding to public concern over school siting issues, the legislation created a broader role for the agency with respect to facilities, and implicitly encouraged the department to look at the connection between facilities, health and productivity. The law also specifically autho-

The Green Schools Initiative has sought to fund projects that integrate renewable energy technologies with energy efficiency measures and other high performance design strategies.

rized the department to provide incentive funding for energy efficiency. The goal for the Department of Education, according to officials, was to learn from the Green Schools Initiative and then institutionalize the goals of the initiative within the department.

The MTC created a working group to provide advice on the development of the Green Schools Initiative. Two state agencies in addition to the Department of Education participated in the group—EOEA and DCAM. In addition, certain non-governmental entities were included—an architecture firm, the state association of school business officials, a green building NGO and a health advocacy organization. The group held a number of meetings in the planning phase of the program, though it has not played a formal role in ongoing implementation.

Integration of other environmental and health goals. According to MTC officials, the Green Buildings Program adopted a broad approach to achieving its energy-related goals. Rather than focusing exclusively on specific renewable technologies, the program has sought to fund projects that integrate renewable energy technologies with energy efficiency measures and other high performance design strategies. This more comprehensive sustainability focus was spurred in part by the initial efforts of the working group, which included representatives of a number of organizations and offices with considerable expertise in

environmental and health issues. At the outset, the MTC held a series of educational meetings with the working group, and according to officials, one of the consistent themes that emerged was the interrelation among various environmental issues and between health and environmental issues.

B. COMPONENTS OF THE INITIATIVE

The central function of the Renewable Energy Trust is to provide funding to increase the supply of and demand for renewable energy technologies. The Green Schools Initiative addresses this goal by promoting the installation of renewable energy technologies in school construction, in combination with energy efficiency and other high performance design features. The initiative takes a limited, pilot-project approach, to be carried out in two phases: Track I projects are expected to be completed by 2004, and Track II projects are to be completed by 2006. MTC plans to gather and evaluate data for five years after the pilot schools are built. The MTC Board of Directors has allocated a total of \$13.5 million for the initiative. In addition, as part of the initiative, the Department of Education has taken preliminary steps to institutionalize incentives and other measures to promote sustainable school design and construction.

1. *Direct funding of school projects*

The Green Schools Initiative is a pilot program providing funding for demonstration projects. The core of the initiative is the awarding of grants to municipalities and regional school districts to assist in school design and construction. Grants are made to cover the costs associated with three aspects of the school building process: feasibility studies, design, and construction. The availability of design and construction assistance grants under Track 1 was announced in November 2001, and those grants were awarded in 2002; Track 2 grants were awarded in late 2002 and early 2003.

Grant activities: feasibility studies, design and construction. Grants of \$20,000 were made available to school projects to undertake a feasibility study to assess opportunities for including renewable energy and related features in the design. The general purpose was to provide seed money to communities to allow them to begin thinking about high performance school goals. Provided that the schools considered renewable energy technologies, they could also consider other high performance strategies. The program initially set aside feasibility study grants for up to 40 school districts, and MTC has awarded all of those grants. See http://www.mtcp.org/Grants_and_Awards/Awards/gbp/gr

[een_schools/02GS02Fea.htm](http://www.mtcp.org/Grants_and_Awards/Awards/gbp/gr) (last visited: August 5, 2003). Although MTC officials indicate that they had some difficulty generating interest in the feasibility study grants at first, the level of interest began to increase as more grants were awarded.

Design grants of up to \$130,000 were made available for increased planning costs associated with analyzing and incorporating high performance design strategies. The grants, payable on a cost-reimbursement basis, could be used only for the “direct incremental costs incurred by the school district’s design team in performing the additional design work associated with the project. . . .” MTC Pilot Program Track II Guidelines at 4. While grantees were required to analyze renewable energy technologies, the grants could be used for a variety of activities, including charrettes, analysis of renewable energy options, building performance modeling, life cycle costs analysis, daylighting analysis, green materials and resource selection, and planning for commissioning. *Id.*

In addition, construction grants of up to \$500,000 were available for increased construction costs associated with renewable energy. [The amount available equals the lesser of a 5-year payback to the school or 90 percent of the incremental costs.] Grantees were required to use the funds for “eligible” renewable energy technology. However, other renewable energy features as well as energy efficiency features could be supported along with these eligible technologies, up to the maximum grant limit, provided the “other” features could not total more than 30 percent of the assistance provided and could not duplicate utility program incentives. In addition, up to \$30,000 could be used by the school to develop “mechanisms that institutionalize the use of the high-performance green school as a structured student and community educational tool.” MTC Pilot Program Track II Guidelines at 7.

Criteria for selecting projects. The Green Schools Initiative set forth three basic criteria for selecting pilot projects: threshold criteria, distributional criteria, and competitive criteria. The threshold criteria include “sufficient evidence of the applicant’s commitment to green design and construction such that the project will meet the solicitation’s minimum requirements. . . .” Mass Technology Collaborative, Pilot Program Track II Guidelines at 14. The distributional criteria include: a balance between new construction and renovation projects; geographic distribution; and a minimum of three middle schools or high schools. *Id.* Finally, the competitive criteria include: “evidence of school district/community support for high-performance green design; energy efficiency; and renewable energy technologies working together.” *Id.* at 15.

BASIC PROJECT REQUIREMENTS FOR THE GREEN SCHOOLS INITIATIVE

Design Assistance Requirements:

- analyze renewable energy options
- design the school as a "Massachusetts Green School" in accordance with the draft MASS-CHPS Manual
- arrange for independent commissioning
- provide for instrumented monitoring of renewable technologies
- use utility energy efficiency incentive programs
- exceed energy performance code by 20%

Construction Assistance Requirements:

- submit progress reports and final report
- document costs
- provide performance data
- conduct program monitoring and evaluation
- build as designed

Source: Mass Technology Collaborative, Pilot Program Track II Guidelines at 5-8.

In order to receive the grants, those communities selected for participation must satisfy certain program requirements. [See box below.] Among the pre-conditions to funding are the utilization of any available utility-sponsored energy efficiency incentives and the use of commissioning of any mechanical and electrical systems supported by the grant. MTC Pilot Program Track II Guidelines at 5-8.

Another significant requirement for those receiving design grants is that the projects must demonstrate consideration of a range of high performance goals, including indoor environmental quality, siting, and materials. Toward this end, the program calls on grantees to use the draft version of the Massachusetts Collaborative for High Performance Schools (CHPS) Best Practices Manual, which discusses a range of sustainable school features and sets forth basic criteria. (See sub-section 2, below.) At the end of the design process, schools must provide documentation of the features they have considered and incorporated from the draft manual. The MTC then considers whether to certify the school as a "Massachusetts Green School." The criteria for this certification are "qualitative," and grantees must show "evidence of a good faith effort . . . to weigh and conscientiously evaluate the various criteria" in the draft manual. Mass. Technology Collaborative, Green Schools Initiative Question and Answer Session at 3 (October 2002) (on file with Environmental Law Institute). For emphasis, the program notes:

Grantees that focus all of their time and attention on one or two areas (e.g., energy efficiency, day-

lighting), ignoring other areas (e.g., water efficiency, indoor air quality, materials selection, siting considerations, etc.), may not qualify as Massachusetts Green Schools.

Id.

Grants awarded. A total of 17 projects throughout the state have received Green Schools Initiative design/construction assistance. Of these, six projects received funds for both design and construction, while 11 projects have received only design grants so far. See http://www.mtpc.org/Grants_and_Awards/Recent_Awards.htm (last visited August 5, 2003).

Results to date. While design documents are not yet available online for most of the grantees, the feasibility studies produced thus far suggest that recipients are including a broad array of environmental and health features in their preliminary planning. This is particularly true with respect to Track II grant recipients, many of whom have used the California CHPS scorecard (see Chapter 2) to document the diverse high performance characteristics of the schools they are planning. In a number of the projects, indoor environmental issues are explicitly addressed in addition to energy and other resource conservation goals.

For example, in the Newton School District, where a citizen's committee has proposed a district resolution to include high performance standards in the specifications for all new schools, the MTC feasibility study and design grants for a new high school project supported the incorporation of elements such as recycling of construction waste, low-emitting materials, water conservation measures, and inclusion of a green energy curriculum based on the facility's photovoltaic systems. See Mass Energy, Newton South High School Overview of High Performance Design Features, available at http://www.mtpc.org/RenewableEnergy/green_schools/green_schools_projects.htm (last visited: August 5, 2003). The Newton project used the CHPS scorecard and submitted detailed information indicating the design elements that were and were not incorporated. *Id.* Another project focusing on indoor air quality issues, in addition to energy-related features, is a new elementary school in the town of Milton. The Milton School Committee had already created an Environmental Health and Safety Subcommittee and an ambitious set of policies and activities for its school building program. [See box below].

Program evaluation. The MTC plans to collect data for five years after the pilot schools are open. This information will include "final incremental costs, ongoing energy costs, actual school occupancy and use. . . and other

**LOCAL SCHOOL DISTRICT POLICIES ON SUSTAINABLE DESIGN AND CONSTRUCTION:
THE TOWN OF MILTON, MASSACHUSETTS**

In 2000, the Milton School Committee established an Environmental Health and Safety Subcommittee to address growing concerns about the impact of school facilities on health. The subcommittee comprised a very broad range of stakeholders from the community, including the local health department, parents, and school staff. The subcommittee also received assistance in its work from a variety of area NGOs with public health and design expertise. The subcommittee focused on operations, maintenance, and school construction, and formed a Green Design and Construction subgroup. As a result of the work of the subcommittee, the Milton School Committee adopted an Environmental Health and Safety Policy that sets a broad range of goals and activities, including the following statement on building healthy and sustainable facilities:

In regard to any new or renovated school building projects, the School committee endorses and promotes a design of facilities that supports healthy learning and incorporating elements of "green" sustainable building design as well as toxic-use reduction principles where feasible. In addition, the School Committee places the highest priority on maintaining the health and safety of school occupants during the construction and/or renovation phase of any building project.

Town of Milton School Committee, Environmental Health and Safety of School Facilities Policy, *available at* <http://www.iltonps.org/ehscdoc.htm> (Last visited: May 22, 2003). The policy further states that the School Committee will aim to use bid documents and contracts to request non-toxic or less toxic products and materials.

The impact of this policy is potentially large, given that the school district is in the middle of a program of rebuilding or renovating all of its school facilities. The district received a Green Schools Initiative feasibility study grant and a design grant.

environmental and performance criteria.” MTC Pilot Program Track II Guidelines at 3-4. The MTC plans to develop case studies and to sponsor tours of pilot schools, and grantees are expected to cooperate in these evaluation and education activities. *Id.*

2. *Education and technical information*

High performance design manual. In connection with the Green Schools Initiative, the MTC has supported the development of a manual on high performance schools. Currently in draft form, the Massachusetts CHPS Best Practices Manual (MASS-CHPS) is based on the Collaborative for High Performance Schools model developed in California. MTC has been working with CHPS and with Eley Associates to develop the manual, and the project has drawn on numerous technical experts for assistance in drafting and review. Like the original California CHPS manual, the MASS-CHPS manual includes separate volumes on planning and design. The Massachusetts version varies from the original CHPS model in that the MASS-CHPS version is specific to the state: the manual references state laws and requirements, as well as resources that are particular to Massachusetts. In addition, MASS-CHPS includes significantly more state-specific detail on the planning process.

According to the MTC, the grantees under the Green Schools Initiative “will be helping to field test and refine MASS-CHPS.” MTC Pilot Program Track II Guidelines at 3. Moreover, the MASS-CHPS manual is being created

as a bench-marking tool for school districts, and one of the goals of the initiative is to use the experiences of the grantees to develop a formal set of criteria for certifying schools as Massachusetts Green Schools. According to MTC planning documents, the criteria could then be incorporated into Department of Education regulations for the SBA program. To date, the criteria have not been developed. Mass. Technology Collaborative, Green Schools Initiative Question and Answer Session at 2 (October 2002) (on file with Environmental Law Institute).

Community-based workshops and information services. The Green Schools Initiative also has included a technical assistance component. Initial program materials described the availability of workshops to assist communities in understanding basic green building practices, principles and resources, noting that a “qualified RET contractor will be available for informational presentations and discussion with the school building committee members and other stakeholders. . . .” Mass. Technology Collaborative, Pilot Program Track II Guidelines (Solicitation No. 2002-GS-02) at 2 (on file with Environmental Law Institute). The MTC contracted with two organizations (the Northeast Sustainable Energy Association and the Green Roundtable) to provide on-site workshops in school districts that were considering or undertaking school renovation or construction projects, and to provide follow-up consulting as the projects progressed. Despite the potentially important role of these workshops in increasing community awareness

and involvement, only 14 communities have requested and received the training workshops.

3. *Department of Education assistance*

Funding incentive. The Department of Education has contributed significantly to the Green Schools Initiative by establishing a financial incentive for participating school districts. For schools certified as “Massachusetts Green Schools” under the initiative, the department will increase by 2 percent the state’s contribution to the school construction project, as calculated under the education law. *See generally* Mass. Technology Collaborative, Green Schools Initiative Question and Answer Session at 2-3 (October 2002) (on file with Environmental Law Institute). The department bases this incentive on the provision in the education law that authorizes additional funding percentage points for schools that meet industry energy efficiency standards. *See* M.G.L. c. 70B, § 10(a). The incentive is not available to projects that are already eligible for the maximum amount of state reimbursement.

The goal of the Green Schools Initiative, supported by the Department of Education, is to institutionalize this financial incentive. According to MTC documents, the criteria being developed in the MASS-CHPS manual are intended to be incorporated into the department’s SBA regulations. *See generally* Mass. Technology Collaborative, Green Schools Initiative Question and Answer Session at 2 (October 2002) (on file with Environmental Law Institute). Some of the criteria might be adopted by the department as mandatory practices, while others would be voluntary and linked to the 2 percent incentive. Education officials hope to submit draft regulations to the state Board of Education in 2004 and have them in place the following year, though current fiscal constraints may impede this effort.

Cost cap waivers. As part of the pilot Green Schools Initiative, the Department of Education has agreed to consider requests from grantees for waivers of the state funding caps established by regulation. The additional costs allowed pursuant to a waiver “must be used to pay for approved incremental project costs not already covered by MTC that are related to high performance green design features, renewable energy technologies and/or energy efficiency measures.” Mass. Technology Collaborative, Pilot Program Track II Guidelines (Solicitation No. 2002-GS-02) at 11 (on file with Environmental Law Institute). According to MTC documents, the department consults with MTC in determining whether to authorize the funding cap waiver. *Id.* Thus far, one pilot program grantee has received such a waiver. According to officials, the agency

is considering requests for waivers of the cap if a waiver is needed to demonstrate particular technologies in which the state is interested, however the agency is not planning on institutionalizing the practice of granting waivers for incremental costs of high performance schools. Rather, agency officials state that they will seek to ensure that cost caps reflect the sound design and construction practices necessary for building a quality school.

Green schools staff position. With a grant of \$228,000 from the MTC, the Department of Education has hired a full-time staff person devoted to promoting green school design and construction. The grant covers the position for a three-year period, though officials note that the goal is for the department to cover the cost of the position after that period. The new staff person will concentrate on incorporating the information developed in the Green Schools Initiative into the SBA regulations. The position will also enable the department to conduct outreach and education around high performance building issues.

IV. BARRIERS TO SUSTAINABLE SCHOOL DESIGN AND CONSTRUCTION IN MASSACHUSETTS

A. FINANCIAL CONSIDERATIONS

1. *Cost caps on reimbursement*

Like some other states, Massachusetts law places a dollar limit per square foot on the state’s contribution to a school project. According to many in the state, the current caps (\$158, \$168 and \$180 for elementary, middle, and high school) are low and drive school construction to the lowest level. There is considerable pressure on districts to cut costs, which makes it more likely that A/E firms will use familiar approaches in designing projects to meet the reimbursement rate. The Green Schools Initiative, along with available utility incentive programs, addresses this issue by providing grants to cover incremental costs in planning, design and construction. Institutionalization of financial incentives through the School Building Assistance program would likely have a large impact on the extent to which school districts adopt a high performance approach in the future.

2. *Higher first costs*

Related to the cost cap issue is the barrier posed by real or perceived higher first costs in building a high performance school. This is a barrier mainly due to the separation of budgets and of decision making on construction

and operations/maintenance. See Commonwealth of Massachusetts/The Green Roundtable, Sustainable Design Roundtable Meeting Notes (June 2002) at 8, 11, *available at* http://www.state.ma.us/envir/sustainable/resources/pdf/Resources_SusD_Green_Roundtable_Notes.pdf (last visited: August 5, 2003). In Massachusetts, the local Building Committee is the entity responsible for making major decisions about school construction, and its performance is judged largely on whether a project is completed within budget. The Building Committees are not responsible for decisions about maintenance or operations. The manual being developed through the Green Schools Initiative may address this problem to some extent by providing strategies for achieving cost reductions through an integrated design approach. In addition, the Department of Education's planned financial incentives and strengthening of minimum environmental and health standards may also help address this barrier.

3. State budget constraints

Like many states, Massachusetts' budget crisis has taken a toll on education programs. The pressure to cut costs is a significant obstacle to achieving the goal of the Green Schools Initiative to institutionalize the program following completion of the pilot projects.

School facilities funding. The SBA is a very large school construction program, but in recent years, the state has been less generous with funding due to tighter budgets. The current waiting list for reimbursement for projects already approved by the Department of Education is seven to 10 years. Although the state legislature lifted a moratorium on new SBA project approvals in March 2003, a new moratorium on adding projects to the priority waiting list was imposed on July 1, 2003. See Department of Education, School Building Assistance Update, *available at* http://finance1.doe.mass.edu/sbuilding/info_03_01.html (last visited: August 5, 2003). Moreover, the new governor has announced that the administration will "begin immediately to work with the legislature to prepare a comprehensive approach to restructuring this important, but unsustainable program." *Id.* (The Department of Education has already proposed, and the legislature is expected to consider, changing the state's reimbursement rates to 40-80 percent of the total eligible costs, from the current 50-90 percent). Because of these constraints on the program, the Department of Education cannot provide reliable time frames for individual projects, and has cautioned districts against undertaking preliminary project activities in the coming fiscal year that involve significant cost or effort. *Id.* These con-

straints also present a barrier to developing financial incentives for sustainable design and construction.

Department of Education resources. In addition to uncertainty regarding funding levels for new school building projects, the department has limited agency resources for overseeing program requirements or incentives related to the initiative. As noted in a government review of the program in 2000, technical review of construction documents traditionally has not been part of the program, and agency staff "relies heavily on local assertion in the project review process." Mass. Executive Office for Administration and Finance, Restructuring the School Building Assistance Program at Section IVE (Jan. 2000) (on file with Environmental Law Institute.) In its 2002 Annual Report, the Board of Education also noted that the "SBA unit currently has two project managers assigned to oversee more than 200 projects in planning, design, or construction, which limits the amount of state involvement in any individual project." The agency concluded that additional resources are needed to allow the state to "conduct independent analyses of siting and design options; ensure compliance with design and construction standards; and provide training and technical assistance to volunteer members of school building committees." *Id.* Not only do limited resources impede the department's ability to enforce requirements already on the books—*e.g.*, protection of indoor air quality during construction, or life cycle costs analysis—they also make it difficult to develop new program requirements or incentives relating to sustainable school design.

The recent hiring of a new green schools staff person for the SBA program will help address this problem. Such a position is potentially very important to ensuring that sustainable school building issues remain a focus at the agency and to institutionalizing this approach for new school projects. One staff position, however, is likely inadequate to provide ongoing agency review of projects for compliance with any new (or existing) regulations or policies adopted.

B. EDUCATION AND TRAINING

Another barrier to sustainable school building in Massachusetts is the lack of understanding on the part of designers and agency employees about how design decisions directly impact public health and natural resources. See Commonwealth of Massachusetts/The Green Roundtable, Sustainable Design Roundtable Meeting Notes (June 2002) at 11, *available at* http://www.state.ma.us/envir/sustainable/resources/pdf/Resources_SusD_Green_Roundtable_Notes.pdf (last visited: August 5, 2004). This lack of awareness limits what architects offer their clients and what

school districts request. Related to this is the problem of limited technical expertise to design and construct a school as a high performance building. In addition, the community requires education and training in order to participate effectively in decisions about how best to incorporate environmental and health features in a particular project.

The need for education and training of school officials is significant in Massachusetts, where municipalities “often have limited technical expertise in managing a major construction project such as the construction of a new school building.” Massachusetts Executive Office for Administration and Finance, *Reconstructing the School Building Assistance Program, Section VIIC* (Jan. 2000). Because Building Committees in small municipalities typically manage very few projects, there is less opportunity to develop institutional memory or expertise. This structure elevates the role of the architect; indeed, in many of the Green School Initiative pilot projects to date, it has been the architect who has applied for and pursued financial incentives.

The principal way in which the Green Schools Initiative has addressed these needs is through the pilot projects themselves. The initiative seeks to create models for other districts to use, and MTC plans to compile and disseminate quantitative and qualitative information gleaned from evaluation of the pilots. In large part, though, the potential for providing education has been untapped. The community workshops offered by MTC had limited reach. In addition, the Department of Education has not conducted significant outreach on high performance design to date, though it has explicit authority to do so under its statute. Its role may change with the recent addition of staff resources focused on sustainable schools issues.

C. REGULATORY CONSTRAINTS/PROCUREMENT

Many people within and outside government in Massachusetts note that regulatory requirements relating to project delivery pose an obstacle to building high performance schools. One issue cited is the lump sum-low bid requirement, which restricts the choice of contractors and requires hiring the contractor after many key decisions about sustainability are made. Some do not see the preclusion of the design-build project delivery method as an obstacle to high performance schools—and indeed green schools are being developed under the current system—though the requirement for low bid and the absence of pre-selection or pre-qualification have been widely noted as impeding this approach. *See Commonwealth of Massachusetts/The Green Roundtable, Sustainable Design Roundtable Meeting Notes* (June 2002) at 8,13, *available at*

http://www.state.ma.us/envir/sustainable/resources/pdf/Resources_SusD_Green_Roundtable_Notes.pdf (last visited: August 5, 2004). These provisions increase the importance of creating bid documents that set forth the minimum qualifications for “responsible” bidders.

Another issue is the requirement for filed sub-bids, which generally adds to the cost of a project and makes it harder for the district to hold the contractor accountable for various parts of the work. With no single entity in charge, this contracting method may also make it more difficult to communicate high performance goals. The requirement is perceived to lengthen the bidding period and increase the importance of crafting very clear construction documents. The Department of Education has responded to this problem by recommending that the legislature change the law to exempt school projects from the requirement.

State law also prohibits sole source specification provisions in construction contract documents. This puts added pressure on architects and school officials to draft appropriate performance specifications for green, healthy materials or to pursue local political approval of the designation of a particular brand.

V. SUMMARY AND OBSERVATIONS

Massachusetts has made significant progress to date in promoting the consideration and integration of renewable energy technologies and other high performance design elements into school building projects. Now that the development of the program and the selection of participating projects have been completed, the key challenges facing the state are evaluating the pilot projects and adapting state policies, guidance and programs to institutionalize the strategies and goals of the initiative.

A. PRINCIPAL STRATEGIES USED

Green schools pilot program. The central component of the state’s efforts to institutionalize sustainable school design and construction is the funding of demonstration projects to advance knowledge and understanding about how to build schools sustainably. Program grants cover the incremental costs of studying, designing, and building schools that include renewable energy technologies and other related features. The pilot program is one of the largest state efforts to promote renewable energy technology, and it also expressly seeks to leverage a commitment to more comprehensive high performance school planning, design, and construction. Indeed, the emphasis in the program solicitation documents on incorporating a broad range of high performance features appears to have resulted in pilot projects that address issues such as indoor air qual-

ity, water conservation, recycled materials, etc. See MTC, Green Schools Initiative Project Information, *available at* http://www.mtpc.org/RenewableEnergy/green_schools/green_schools_projects.htm (last visited: August 5, 2003). A key aspect of the pilot program is to conduct an evaluation of the pilot projects for five years after the schools are opened, so that the lessons learned from the projects can be disseminated widely and effectively to other school districts.

High performance schools manual. The pilot program has included the development of a high performance schools guidance document. The Green Schools Initiative worked with Eley Associates to adapt the California CHPS manual to the Massachusetts context. The MASS-CHPS manual includes detailed information about the general principles and specific practices involved in designing a high performance school. Pilot project grantees were required to use the draft manual in conducting feasibility studies and completing designs, and the MTC expects to finalize the manual based on these experiences. The draft manual is noteworthy in that it is specific to Massachusetts on issues ranging from the school planning and building process to climate characteristics, and it makes frequent references to state laws, agencies and resources.

Criteria/metric. The MTC is planning, though has yet to undertake, the development of a set of criteria for determining whether a school qualifies as a high performance school. Moreover, the initiative seeks to integrate these criteria for building a “Massachusetts Green School” into the state’s School Building Assistance program through regulatory requirements and incentives.

Department of Education green schools staffing. The MTC has provided a three-year grant to the Department of Education to fund a staff person dedicated to advancing the goals of the initiative within the department. This action is a critical component of the state’s plan to institutionalize high performance school design and construction in the future. The Department hired the new green schools program manager in spring 2003. According to agency officials, that staff person is focusing initially on working with the MTC to finalize the MASS-CHPS manual, beginning a process within the department to consider changes to agency regulations and guidance, and identifying opportunities for outreach and education.

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

Political support for promoting renewable energy. The Green Schools Initiative resulted from electric utility

restructuring legislation that imposed a per-kilowatt charge on consumers to promote renewable energy technologies. Taking advantage of flexibility in the statutory language creating the Renewable Energy Trust, and capitalizing on the growing interest in green buildings, the MTC used these financial resources to create a program that integrates renewable energy technologies and high performance design.

Role of the private sector and non-governmental organizations. Architects have played a key role in advancing green school design in Massachusetts. Because of the local political and institutional framework for school construction, A/E firms have a considerable impact on the process. Indeed, the impetus for pursuing high performance school design often has come from the A/E firm, and in many of the pilot projects funded by the Green Schools Initiative, the architect took the lead in applying for a grant. According to some architects involved in these projects, the feasibility and design funding helps architects work with community stakeholders early in the process to show what can be done and to build support.

NGOs and community groups also have played a role in the development of the Green Schools Initiative. At least two NGOs served on an MTC working group to assist in the development of the initiative, and these organizations provided critical input on integrating non-energy issues—including health issues—into the initiative. Although the advisory committee has not been used by MTC in implementing the initiative, these NGOs continue their state-wide work on green, healthy building practices.

The small size of many school districts creates challenges in terms of developing knowledge and expertise in sustainable building, but also creates the potential for a community-centered school building process. The tradition of local Town Meetings in Massachusetts provides an opportunity for broad-based discussion of high performance goals. Some districts—*e.g.*, Williamstown, Concord, and Milton—have been developing local policies to promote sustainable school design and construction. The development of such policies through a community-based process can serve to clarify the goals of the district, as well as increase the likelihood that indoor air quality and other health-related issues will be addressed.

State agency coordination. Collaboration between the MTC and the Department of Education has been a key element of the Green Schools Initiative. The involvement of the department has helped in coordinating limited state resources and has strengthened the pilot program by providing an added funding incentive. The partnership is also critically important to the initiative’s goal of institutional-

izing sustainable design and construction through the School Building Assistance program. MTC's funding of a green schools position at the department will help to advance this goal. While it remains to be seen whether the department will succeed in developing new policies to incorporate sustainable school goals, its continuing focus on health and environmental issues in school building projects is vital to maximizing the impact of the initiative. Additional inter-agency coordination—*e.g.*, collaboration between the Department of Education and DCAM on life cycle cost analysis and other sustainable building issues—could further strengthen the school construction program.

C. IMPLEMENTATION CHALLENGES

Program evaluation. The Green Schools Initiative has succeeded in attracting interested school districts from around the state and in providing funding for those districts to consider and implement high performance practices. The state now has a tremendous opportunity to leverage these accomplishments by ensuring that all municipalities and school districts in Massachusetts benefit from the experiences of the pilot projects. Effective evaluation and data collection from the pilots is a critical element of the initiative. In particular, quantitative information about incremental design and construction costs, as well as the operations, maintenance and other implications of incorporating health and environmental features, is greatly needed in order to overcome the educational and financial barriers discussed above. It is thus vital that the economic pressure to cut costs at the state level not impede the MTC's planned evaluation activities.

Use of a metric. The Green Schools Initiative took the significant step of expanding its reach to issues related to, but distinct from, renewable energy technology. This broader focus will also come into play when the initiative continues its work to develop a set of criteria similar to the CHPS model. The criteria will play an important role in furthering the initiative because they will be promoted for use by school districts throughout the state, and they will establish the benchmark for determining whether a school qualifies for (planned) state financial incentives as a "Massachusetts Green School." In developing these criteria, the MTC and its partners have an opportunity to provide flexibility while establishing pre-requisites and a scoring system to ensure that school projects address priority issues. For this reason, it is important that community organizations and individuals representing community

stakeholders play a role in the development of these criteria, just as they did in the early stages of developing the Green Schools Initiative. It is also important to include other state agencies with expertise in different aspects of sustainable development—*e.g.*, the Department of Public Health, DCAM, and the Department of Environmental Protection.

Community involvement. Participation of community residents is important in implementing state policies at the local level. The use of a set of criteria that provide for flexibility and trade-offs in the design process provides a natural opportunity for infusing community goals and values into school building projects. The town of Milton provides an example of how strong community involvement in school facilities programs resulted in a focus on indoor air quality issues, in addition to energy and other resource conservation goals. The existence of state-wide organizations such as the Healthy Schools Network give further impetus to these efforts. The Department also has an important role to play in helping to ensure that sustainable design is accomplished in a "bottom-up" manner, as well as from the top down. For example, the Department's new green schools program manager could provide training on high performance design to community groups, pursuant to the agency's explicit legislative authority for providing technical assistance. The Department might also develop guidelines for community participation in the school planning, design and construction process.

State policy development and oversight. Limited staff resources at the Department of Education is a significant problem both now and for the future. The agency has not taken steps to publicize or oversee compliance with some existing regulations related to health and environmental goals (*e.g.*, the agency does not require or review any additional documentation on indoor air quality during construction or on life cycle costs), largely because it lacks staff resources to review school building plans in detail. These resource constraints are significant considerations for the development of new health or environmental requirements and for the establishment of a financial incentive for schools meeting the future Massachusetts Green School criteria. Although the hiring of a green schools program manager will help ensure a certain level of agency activity in this area for the near future, strategic use of the state's education resources will be critical to achieving the greatest returns on the state's considerable investment in high performance design and construction.

CHAPTER 5

STATE OF NEW JERSEY

The state of New Jersey is undertaking one of the largest school construction and renovation programs in the country, a program funded and developed by the state following many years of litigation over educational equity. The program is unusual not only for its magnitude, but also because the state itself is managing the building process for the great majority of the new projects. While the institutional and regulatory context in New Jersey is complex, the state's experience is relevant to both large school districts and to other states that fund and oversee local school construction programs.

Among the notable features of New Jersey's school building program is the issuance of state policy setting forth a number of goals for the planning, design and construction of school facilities. Sustainable design is one of these goals, and state policy specifically requires that all new schools incorporate health and environmental features. Taking the lead in implementing the state's broad goals is the Schools Construction Corporation, a public entity established by the governor specifically for this school building program. The corporation, charged with managing hundreds of school building projects in urban districts with the greatest needs, has embarked on an ambitious program to incorporate a wide range of best practices in educational facilities design. As part of this effort to make the most efficient and effective use of public funds—to make high performance the standard practice—school projects managed by the state will consider specific health and environmental features and document the extent to which these features have been incorporated into facilities.

Section I of this chapter describes the state laws and regulations that govern how schools in New Jersey are funded and built. These policies relate both directly and indirectly to the state's efforts to promote a high performance approach. Section II provides additional background by describing a number of governmental and non-governmental activities at the state level that promote sustainable development or sustainable building generally. The state's principal sustainable school building initiative is discussed in Section III, followed by a description of related state programs in Section IV. Section V presents some of the barriers to advancing high performance design and construction in New Jersey. Finally, Section VI summarizes the key elements of New Jersey's initiative and

identifies challenges facing the state as it continues to implement its ambitious goals in this area.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

In the course of litigation spanning two decades, the New Jersey Supreme Court found that students in several urban districts in the state were being denied a "thorough and efficient education" as required under the state constitution, due in large measure to disparities in educational expenditures between wealthy suburban districts and poor, urban districts. The case, known as *Abbott v. Burke*, resulted in sweeping legislative reform of the state system of education for disadvantaged communities in the state. See generally *Raymond Abbott, et al. v. Fred G. Burke*, 153 N.J. 480, 710 A.2d 450 (1998). This reform encompasses a very broad set of educational issues and is directed at 30 urban communities known as "Abbott districts." The New Jersey Supreme Court underscored the importance of school facilities to a child's education. The court found that the state must, as part of its constitutional obligation, provide funding to build and renovate facilities in financially needy, urban districts so that those facilities enable students to obtain a thorough and efficient education. See generally *New Jersey Department of Education, New Jersey's Facilities Construction and Renovation Program*, available at <http://www.state.nj.us/njded/facilities/over/program.shtml> (last visited: June 30, 2003). The court ordered that the quality of the facilities cannot depend on the district's willingness or ability to raise taxes or to incur debt.

A core element of the post-Abbott education reform is the redirection of public funds to the construction and renovation of public school facilities, principally in the state's most disadvantaged communities. While the state has played a role in school construction in New Jersey for many years, the policies and programs spawned by the Abbott case have radically changed the state's school construction financing system and have created one of the largest school building initiatives in the country.

A. STATE SCHOOL CONSTRUCTION FUNDING SCHEME

The Educational Facilities Construction and Financing Act of 2000 (EFCFA), enacted in response to

the Abbott decisions, sets forth the legal framework of the new school construction program. New Jersey Statutes Annotated (N.J.S.A.) 18A:7G-1, *et seq.*; *see also* New Jersey Annotated Code (N.J.A.C.) 6A:26. The law authorizes the sale of \$6 billion in state bonds for school construction in Abbott districts and another \$2.6 billion dollars in bonds for facilities in other communities, state debt to be issued by the New Jersey Economic Development Authority. N.J.S.A. 18A:7G-14(a). Under the law, the state is to provide 100 percent of the funding for approved projects in the Abbott districts, and at least 40 percent of the funding for approved projects in other districts. N.J.S.A. 18A:7G-5(k). State officials note that while the state is limited to \$6 billion in bonding for Abbott districts, the state will likely spend more than that amount to meet the facilities needs of the districts.

A key feature of the legislation is the designation of the Economic Development Authority (NJEDA) as the entity responsible for building schools in the Abbott districts. The NJEDA is a “self-supporting, independent state financing and development agency serving New Jersey’s business community.” New Jersey Economic Development Authority, *About EDA* *available at* www.njeda.com/abouteda.htm (last visited: July 30, 2003). Under the law, the NJEDA, which theretofore had not been involved in school construction, would be responsible not only for financing the schools, but also for undertaking the construction—from acquiring any necessary land to procuring design and construction services.

This approach applies not only to Abbott districts, but also to districts that receive 55 percent or more in state aid. N.J.S.A. 18A:7G-5(a). New Jersey’s school building program is thus unusual in giving the state direct control over decisions made in the design and construction process. School facility projects in the remaining 550 or so school districts are funded locally, but may obtain state debt service aid or grants covering a minimum of 40 percent of approved costs. N.J.S.A. 18A:7G-9, 15. These districts can opt to have the NJEDA construct their schools and fund the state share directly. N.J.S.A. 18A:7G-5(b).

In July 2002, amidst increasing concerns about the lack of progress in building schools under the EFCFA, the new governor issued Executive Order #24. N.J. Exec. Order No. 24 (July 29, 2002), *available at* <http://www.state.nj.us/infobank/circular/eom24.htm> (last visited: June 30, 2003); *see also* Testimony of Education Law Center Before the Assembly Education Committee

on the Abbott School Construction Program (July 2002), *available at* http://www.edlawcenter.org/ELCPublic/Testimony_of_ELC.htm (last visited: July 30, 2003).

The policies and programs spawned by the Abbott case have radically changed the state’s school construction financing system and have created one of the largest school building initiatives in the country.

One of the central provisions of this order was the creation of a Schools Construction Corporation (SCC) within the NJEDA. The order required that the SCC be led by an individual experienced in construction management, and the governor soon appointed the former CEO of the Turner Corporation.

Before the state agrees to fund any school construction project, the New Jersey Department of Education determines the costs that are eligible for state reimbursement. The EFCFA establishes a per-square-foot cost allowance of \$138 for all projects receiving state funding, a figure that includes construction and “soft costs” such as site acquisition/development, and design fees. In addition, the law establishes square foot allowances per pupil—125, 134, and 151 square feet per pupil for elementary, middle and high schools. N.J.S.A. 18A:7G-8. In reviewing the school district’s application for state funding, the department determines eligible state reimbursement costs by calculating the allowable square footage and then multiplying that square footage by \$138. *See generally* <http://www.state.nj.us/njded/facilities/approval/faq.shtml> (last visited: July 10, 2003). Under the statutory scheme, individual projects may exceed this calculated amount, but the local district would be responsible for the excess; in the case of Abbott districts, however, the state is responsible for 100 percent of the cost for educational spaces approved by the Department of Education. For all school building projects, local districts are required to fund spaces that are not approved by the department. SCC officials indicate that in some Abbott projects the corporation seeks to assist districts in identifying sources of funding for such additional spaces.

B. STATE REGULATORY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

The central state policy relating to sustainable school design and construction—Executive Order #24—and its implementing policies are discussed in Section III. This section summarizes how the EFCFA and other state laws address environmental, health and procurement issues in school planning, design and construction.

1. EFCFA

The Educational Facilities Construction and Financing Act begins with a statement of findings and declarations that echoes some of the principal goals of sustainable school design and construction:

The Constitution of the State of New Jersey requires the Legislature to provide for the maintenance and support of a thorough and efficient system of free public schools and this legislative responsibility includes ensuring that students are educated in physical facilities that are safe, healthy and conducive to learning. . . .

While providing that the educational infrastructure meets the requirements of a thorough and efficient education, the State must also protect the interests of taxpayers who will bear the burden of this obligation. Design of school facilities should incorporate maximum operating efficiencies and new technologies to advance the energy efficiency of school facilities and the efficiency of other school building systems, construction should be achieved in as efficient a manner as possible, and a mechanism to assure proper maintenance of new facilities should be established and implemented, in order to reduce the overall cost of the program and to preserve this infrastructure investment.

N.J.S.A. 18A:7G-2(a)(d).

Although these provisions generally support the creation of high performance schools, with limited exception neither the law nor its implementing regulations directly address how to achieve health or environmental goals. Rather, they set forth the process by which the state reviews, approves, and in some cases, carries out school construction projects. This process, which differs depending on whether the state is in charge of construction, involves a complex set of requirements.

Review and approval of school projects. One key requirement set forth in the law is that school districts must prepare long-range plans every five years and submit the plans to the state Department of Education for approval. N.J.S.A. 18A:7G-4(a). School districts may then submit applications for funding of individual school projects to the Department of Education, based on priorities established in the long-range plan. N.J.S.A. 18A:7G-5(d). These applications for funding include schematic drawings and estimated costs. N.J.S.A. 18A:7G-5(d). The Department of Education reviews projects for compliance with the district's long-range plan and with the state's

“facility efficiency standards,” which were developed to ensure that facilities will support the state's core curriculum content standards. N.J.S.A. 18A:7G-5(e), 18A:7-4h. This review does not focus on health or environmental issues relating to facility construction, but rather on the types of spaces included in the school design. In 2002, the department eliminated the position of Assistant Commissioner of Facilities; currently the Division of Finance has principal responsibility for facilities issues, in conjunction with the Division of Abbott Implementation and the Office of Early Childhood Education.

Following approval of a project, non-Abbott districts that are managing their own projects may apply to the Schools Construction Corporation for a grant. In such cases, the school district is required to submit checklists to the SCC at various stages of the design. N.J.A.C. 19:32-3.6. For schools built by the SCC, the Department of Education forwards the application to the SCC, which must obtain the Department of Education's final approval of the educational adequacy of a project, through submission of detailed plans and specifications that are at least 60 percent complete. N.J.A.C. 6A-26-5.4(a). Non-SCC managed projects must submit final plans and specifications for review. N.J.A.C. 6A-26-5.4(b).

Neither the EFCFA nor its implementing regulations contain many explicit provisions governing community participation in the planning, design and construction process. For projects managed by the SCC, the EFCFA requires that agency to consult with the district in preparing detailed plans and specifications. N.J.S.A. 18A:7G-5(I). The SCC's actions to promote participation at the district level are discussed in Section III.

Planning, design, and construction requirements. In addition to the facility efficiency standards, the Department of Education's EFCFA regulations set forth a limited number of educational facility planning standards which, in conjunction with the state building code, “form the requirements for the design and construction of public schools.” N.J.A.C. 6A:26-6.2(a). The department's regulations contain provisions governing lighting and pesticide storage, but do not otherwise address environmental or health issues. N.J.A.C. 6A:26-6.(b). The SCC recently issued regulations under EFCFA that address health and environmental considerations in the siting of school facilities. The following paragraphs describe these and other provisions of the law and regulations that deal with issues relevant to sustainable school construction.

- Siting. The SCC undertakes (or delegates to school districts) site analysis for projects being managed by the state. N.J.A.C. 19:34-3.4. This analysis includes environmental site investigation to determine if contaminants are

present at the site, as well as other types of investigation. The regulations authorize the SCC to reject a proposed site during or after the site analysis due to environmental or other reasons. Before requesting final approval of the project from the Department of Education, the SCC obtains approval of the site analysis and any remediation plans from the state's Department of Environmental Protection. SCC officials note that the agency also oversees the screening of sites for consistency with smart growth principles and with permitted land uses.

- **Presumption and incentive favoring rehabilitation.** The regulations implementing the EFCFA establish a presumption favoring rehabilitation over new construction, providing that all school facilities "shall be deemed suitable for rehabilitation" unless a feasibility study demonstrates that the facility may pose a health and safety risk even after rehabilitation, or that rehabilitation is not cost-effective. N.J.A.C. 6A:26-3.3(k)(1). In addition, rather than applying the cost formula of \$138 per square foot, the regulations provide for determination of the "reasonable estimated cost" of rehabilitation projects. N.J.A.C. 6A-26-3.4(b). Thus, the state has more discretion in approving costs, and school districts could possibly receive a higher rate of reimbursement for a rehabilitation project compared to a new construction project, potentially including additional costs relating to health and environmental goals. Indeed, for rehabilitation projects the statute explicitly includes as preliminary eligible costs, the "costs to render a school facility energy efficient," as well as "other allowable costs."
- **Community-use features.** The EFCFA establishes a demonstration program for incorporating community design features and coordinating community development with school construction. Upon application by school districts, the SCC may recommend that the State Treasurer approve up to six demonstration projects, to be constructed by a local redevelopment agency. N.J.S.A. 18A:7G-6. School districts applying as a demonstration project may request that the Department of Education include community design features as eligible costs, provided the features are an integral part of the school building and grounds and do not exceed the facility efficiency standards. N.J.S.A. 18A:7G-6(e). The SCC has issued regulations implementing this program, though to date no demonstration projects have been designated. N.J.A.C. 19:33. SCC officials indicate that the agency has assigned staff to work with interested districts in order to facilitate the development of demonstration projects.
- **Smart growth and planning.** The EFCFA requires that school districts submit their long-range facilities

plans to the local municipal planning board for that board's review and findings. N.J.S.A. 18A:7g-4(g). The act further provides that if a municipal planning board recommends against the approval of plans and specifications for a school facility during the Department of Education's plan review process, the department may not approve the plans and specifications for educational adequacy until the objections of the municipal planning board have been considered. N.J.S.A. 18A:18A-16; N.J.A.C. 6A:26-3.2(C).

- **Maintenance requirements and incentives.** The EFCFA includes minimum maintenance standards in its formula for calculating the percentage of state debt service aid provided to non-Abbott districts that manage their own construction projects. N.J.S.A. 18A:7G-9(b). Regulations require all school districts, following completion of a school facilities project, to submit to the Department of Education a maintenance plan that includes a maintenance reserve fund to be funded annually with two-tenths of one percent of the replacement cost of the facility. N.J.A.C. 6A:26-3.9i, 3.10c. The regulations also set forth certain maintenance standards applicable to both existing and new schools. Districts must develop five-year corrective and preventive maintenance plans containing specified elements, and they must maintain schools in a "safe and healthy and energy efficient condition." N.J.A.C. 6A:26-12.1.

2. *State Building Code*

All school construction must comply with the State Uniform Construction Code, enforced by the state Department of Community Affairs. N.J.S.A. 52:27D-119, *et seq.*; N.J.A.C. 6A-26- 6.1, 5:23-3.11A. The code includes an energy sub-code (based on the Model Energy Code/1995), and a mechanical sub-code (based on the International Mechanical Code/2000). N.J.A.C. 5:23-3.18, 3.20.

The state has promulgated a new radon hazard code to ensure that schools located in areas of high radon potential are constructed to minimize radon gas entry and to facilitate any subsequent remediation that might be necessary. The code sets forth minimum radon-resistant construction features that must be incorporated in new school construction projects in zones designated as having high radon potential. N.J.S.A. 52:27D-123a-c; N.J.A.C. 5:23-10.1-4. According to state officials, the SCC is incorporating passive radon-resistant features in all of its new construction projects.

In addition to these radon requirements for new construction, the state's education law requires that all public school buildings be tested for radon at least once every

five years. N.J.S.A. 18A:20-40. In January 2003, the Department of Education sent a memo to school district officials outlining the radon testing requirements and advising districts that beginning in 2005, the department will not approve long-range facilities plans unless the required radon testing has been completed. Memorandum from Department of Education to Chief School Administrators (January 29, 2003), *available at* <http://www.nj.gov/njded/facilities/memos/radon.pdf> (last visited: July 10, 2003). The memo encourages districts planning major renovation projects to test for radon now and to include any necessary mitigation in the proposed project. The department also noted that radon testing is considered an eligible required maintenance activity under state regulations (and therefore could be counted in satisfying the districts' minimum required maintenance expenditures), and that mitigation may be treated as a health and safety project eligible for state reimbursement. The Department of Education is working with the Department of Environmental Protection to develop a web site with information and guidance on radon testing and mitigation.

3. *Environmental protection laws*

A variety of state environmental laws may be applicable to school construction and renovation projects. Executive Order #215 requires state agencies and authorities to submit to the New Jersey Department of Environmental Protection (NJDEP) an environmental assessment or environmental impact statement for construction projects undertaken by the agency or funded at least 20 percent by the agency. N.J. Exec. Order No. 215 (Sept. 11, 1989), *available at* <http://www.nj.gov/infobank/circular/eok215.htm> (last visited: July 10, 2003). According to NJDEP officials, urban school building projects often involve site remediation activities that are within the purview of the agency. Additionally, rural projects may raise wetlands or endangered species issues under the state's environmental laws, or may require a water quality permit from the NJDEP if they are being constructed outside of a sewer service area.

The NJDEP has incorporated school building projects into the agency's One-Stop Permitting program and has dedicated staff for school projects. This program, established by the agency's Office of Pollution Prevention and Permit Coordination, provides permit applicants for new construction projects with a review of all permits required, as well as information about pollution prevention. The program seeks to help coordinate the different NJDEP offices involved in large construction projects, in order to avoid unnecessary delays and to identify any opportunities within the agency for expediting the processing of particular permits. *See generally*

<http://www.state.nj.us/dep/opppc/onestop.htm> (last visited: July 30, 2003). The Department of Education has included a reference to this program in its school building project application forms.

4. *Occupational health and safety law*

New Jersey has adopted occupational safety and health regulations that apply to public workplaces, including schools. The regulations address indoor air quality in both maintenance and construction activities. N.J.A.C. 12:100-13.5. With respect to construction, the regulations require local ventilation if the work produces dust, particles, toxic gases or other harmful substances in quantities that are hazardous to health. Work in occupied areas must be isolated, with dust and debris confined to the work area. The state labor law and regulations contain general inspection and enforcement provisions to ensure compliance by schools and other public employers with these provisions. The Department of Health and Senior Services is the agency charged with conducting inspections in response to employee complaints and with recommending appropriate sanctions to be issued by the state Department of Labor. *See generally* N.J.S.A. 34:6A-25-50; N.J.A.C. 12:110-4.11; *see also* N.J. Dept of Health & Senior Services, PEOSH Policy on Building Renovations, *available at* <http://www.state.nj.us/health/eoh/peosh-web/bldgren.htm> (last visited: May 15, 2003).

5. *Smart growth policy*

On January 31, 2002, Governor McGreevey issued Executive Order #4, which sought to strengthen state government actions to promote smart growth. The order established an inter-agency Smart Growth Policy Council within the Office of the Governor, whose mission includes ensuring that "school construction initiatives promote smart growth, open space, and revitalization of communities." The order further requires all state agencies to prepare a Smart Growth Impact Statement in connection with future rule making.

6. *Procurement law*

Procurement requirements differ for projects managed by the Schools Construction Corporation and those managed directly by the school district. The EFCFA requires pre-qualification of contractors and mandatory uniform performance evaluations of contractors for all school projects undertaken by the SCC. N.J.S.A. 18A:7G-33-36. SCC-initiated projects are publicly advertised, may seek single prime or multiple prime contractors, and make awards based upon price and "other fac-

tors,” though price is given at least equal consideration as the combination of other factors. N.J.S.A. 34:1B-5.7(c)(d); *see also* NJSCC, General Contractors and Subcontractors: Frequently Asked Questions, *available at* http://www.njscc.com/general/faq_consultants.asp#BAC KQ9 (last visited: May 6, 2003). For non-SCC projects, the provisions of the state Public School Contracts Law governing qualifications, advertising, and awarding of contracts apply. N.J.S.A. 18A:7G-5(n); 18A:18A-1 *et seq.* Districts may issue bid solicitations for single prime or multiple prime contractors, and contracts must be awarded to the lowest responsible bidders in each branch of work in the case of separate bids and to the single lowest responsible bidder in the case of single bids. N.J.S.A. 18A:18A-18.

The SCC maintains a list of pre-qualified A/E firms. For projects under \$20 million, the agency randomly creates a short list of pre-qualified firms and invites those on the list to submit technical and fee proposals based on the scope of work for an individual project. Larger projects are open to all pre-qualified firms meeting the criteria as listed in the advertisement. The SCC uses a qualifications-based selection process to rank proposals, and then negotiates a fee with the most qualified firm. *See* NJSCC, Professional Consultants: Frequently Asked Questions, *available at* http://www.njscc.com/general/faq_consultants.asp#BACKQ6 (last visited: May 6, 2003). The statutory requirement for pre-qualifying A/E firms does not apply to non-SCC managed projects.

II. CONTEXT FOR THE NEW JERSEY SUSTAINABLE SCHOOLS INITIATIVE:

Sustainable Building Activities at the State Level

At the core of New Jersey’s efforts to institutionalize sustainable school building practices are the development and implementation of executive level policies and administrative programs beginning in 2002. These activities are the subject of Section III of the report. This section discusses other state and non-governmental actions that formed the general context within which the new policies and programs were created.

The most important context for New Jersey’s sustainable school construction efforts is the Abbott case, which prompted the creation of the massive new school construction program. Yet, while Abbott established the requirement for adequate facilities, sustainable school design was not directly addressed in the case. Nonetheless, a number of government agencies and non-governmental organizations within New Jersey have undertaken activities over the past few years relating directly or indirectly to sustainable building.

A. PUBLIC AGENCY ACTIVITIES

Department of Environmental Protection. The New Jersey Department of Environmental Protection has been the state agency most active on green building issues over the past few years. The NJDEP’s Office of Innovative Technology and Market Development (Division of Science, Research and Technology) has developed and implemented the state’s Sustainability Greenhouse Gas Action Plan, which identifies strategies that will achieve a 3.5 percent reduction in New Jersey’s greenhouse gas emissions below 1990 levels by 2005. *See* <http://www.state.nj.us/dep/dsr/gcc/gcc.htm> (last visited: July 10, 2003). The agency has initiated a campaign to encourage private and public sector parties to sign a covenant in support of the Greenhouse Gas Action Plan. To date, a variety of companies, religious institutions and municipalities, as well as the state’s association of school boards and all state colleges and universities, have signed the covenant. *See* <http://www.state.nj.us/dep/dsr/gcc/gcc.htm> (last visited: July 10, 2003).

The agency has also sponsored workshops on sustainable building design and construction and helped to form the New Jersey High Performance Building Design Workgroup. The Workgroup includes several state agencies (the Department of Community Affairs, the Department of Education, the Economic Development Authority, the state Board of Public Utilities) and a number of NGOs. The workgroup was formed in 2001 as an informal mechanism for coordinating and advancing activities relating to high performance building generally, with an initial focus on school design and construction. The workgroup is coordinating a pilot program to create model high performance school facilities, using the LEED model. *See generally* <http://www.state.nj.us/dep/dsr/gcc/SchoolBoards.pdf> (last visited: July 30, 2003). Some of the NGOs participating in the workgroup are leading one or more of the pilot projects. According to workgroup members, these organizations provide the participating school districts with technical assistance in developing the school plans, and they link the districts to other resources, including utility energy efficiency incentives. Funding for the groups to undertake this work comes in part from the Department of Environmental Protection and in part from private foundations. According to NJDEP officials, the pilot program is intended to serve two principal goals: to assist in the development of high performance schools in individual school districts; and to create case studies that will inform future governmental and school district programs.

Office of Smart Growth. New Jersey has been at the forefront nationally on programs and policies to promote

sustainable development, and these efforts have had an impact on school construction.

In 1999, the state helped to develop a report, *Living with the Future in Mind*, which set forth environmental, economic, and social goals for achieving a more sustainable society, and a subsequent executive order required progress reports on achieving those goals. See Executive Order #96 (May 20, 1999). The state has since prepared *Governing with the Future in Mind*, which contains a short section on school construction that underscores the emphasis of state law on energy efficiency and facility maintenance, describes the existing efforts to promote high performance building, and notes the opportunity to integrate new schools with other programs within the community. New Jersey Interagency Sustainability Working Group, *Governing with the Future in Mind* at 26-7 (December 2001), available at <http://www.state.nj.us/dep/dsr/governing/governing.PDF> (last visited: May 1, 2003).

The state has also produced the *New Jersey State Development and Redevelopment Plan*, a blueprint for smart growth created through a state-wide planning process. See N.J.S.A. 52:18A-196 *et seq.*; see also <http://www.nj.gov/dca/osg/docs/stateplan030101.pdf> (last visited: July 30, 2003). The Office of Smart Growth, which oversees the development and implementation of the plan, issued a report in 2001 on the relationship between smart growth and schools. See *Creating Communities of Learning*, available at <http://www.nj.gov/dca/osg/resources/publications.shtml> (last visited: July 30, 2003). The report emphasizes the importance of creating schools as centers of community in order to reduce sprawl and create more livable communities. In addition to advocating for community-use features in schools, the report discusses the concept of sustainable schools as encompassing a broad range of environmental and health goals. For the past several years, the Office of Smart Growth has also administered a smart growth planning grant program that originally included a special sub-category for school planning. The current program, Smart Future Planning, funds local governments to develop smart growth planning documents at the regional and inter-municipal level; schools are no longer an explicit focus, but they may be included as one component of the planning process. See generally <http://www.nj.gov/dca/osg/docs/grantapp2002.pdf> (last visited: May 1, 2003).

A new smart growth initiative focusing on school construction, the School Renaissance Zone program, is discussed in Section IV.

New Jersey Institute of Technology. The New Jersey Institute of Technology (NJIT), located in Newark, is part of the state university system. Within the School of Architecture is the Center for Architecture and Building

Science Research (CASBR), which is “dedicated to examining the interaction between the built environment and society.” See generally http://www.njit.edu/old/Directory/Centers/CABSR/cabsr_overview.htm (last visited: July 10, 2003). Following the appointment of a recognized authority on sustainable design to head the CASBR, the research center has focused on serving as an information resource to the state’s school construction program. In 2003, the NJIT and the SCC developed a memorandum of agreement to establish at the Institute the New Jersey High Performance Schools Information Center. (See Section III.) The NJIT is a significant resource in the development and implementation of programs to promote sustainable schools in New Jersey and potentially outside the state as well.

B. NON-GOVERNMENTAL ACTIVITIES

Advocacy organizations. A number of NGOs have been working actively to reform the state’s education policies and programs. Some of these groups have addressed sustainable school design and construction issues directly, while others have focused more on educational equity and have addressed health and environmental issues in a less direct way. Although these groups have not played a leading role in the development of the SCC’s sustainable schools policies or programs, their activities distinguish New Jersey as a state with a high level of advocacy on educational facilities issues.

One group that has been at the center of the education reform movement is the Education Law Center, which brought the Abbott lawsuit on behalf of school children living in historically disadvantaged school districts. The Education Law Center has continued to play a significant role in monitoring the implementation of the Abbott decision and advocating for community participation in decision making. While sustainable school construction is not a central focus of the group, the center has supported the inclusion of health and environmental goals in the new school building initiative. See generally <http://www.edlawcenter.org/index.htm> (last visited: July 31, 2003). Another organization engaged in school reform is the Coalition for Our Children’s Schools, formed in 2000 to coordinate advocacy efforts of diverse groups working on Abbott implementation issues. See generally <http://www.njpp.org/cfocs/>. The coalition is a strong advocate for community-centered schools and joint-use facilities. While high performance design and construction are not core issues of the coalition, the group has included sustainability goals as part of their review of the state’s school construction program. See *Coalition for Our Children’s Schools, 2003 Report Card* at 4-5 available at <http://www.edlawcenter.org/ELCPublic/AbbottSchoolFaciliti>

es/FacilitiesPages/Resources/COCS_report_card_2_03.pdf (last visited: May 1, 2003).

Other non-governmental groups in New Jersey have been working more directly on sustainable schools issue. The New Jersey Higher Education Partnership for Sustainability has played an important role in advancing sustainable building practices on campuses. *See generally* <http://www.njheps.org/>. As a result of the group's work, all 56 presidents of state colleges and universities signed the NJDEP's Greenhouse Gas Action Plan. The group has also played a role in promoting sustainable design and construction in K-12 facilities by partnering with other organizations and agencies in the state and by chairing the New Jersey High Performance Buildings Design Workgroup. The Sustainable Schools Network, a consortium of about 80 individuals, businesses, schools, and NGOs, works to advance education for a sustainable future in New Jersey schools. One of the organization's activities in 2003 is to conduct outreach on the benefits of high performance schools and to provide technical assistance to three model high performance schools pilot projects. *See* <http://community.nj.com/cc/sustainableschools> (last visited: July 10, 2003).

Another organization, the Work Environmental Council, addresses indoor environmental quality issues in school construction and renovation and played an important role in developing draft guidance for healthy schools. (See Section IV.)

Professional groups. A significant influence on the development and implementation of the state sustainable school policies have been the activities of architects with experience in this field. In particular, architects involved with the U.S. Green Building Council and the LEED certification program became increasingly active during the period following enactment of the EFCFA. Around that time, the New Jersey chapter of the U.S. Green Building Council was formed, and the chapter held a number of trainings on LEED for A/E firms that were already pre-approved by the Economic Development Authority. The organization also provided information directly to the authority about the potential value of using LEED as part of the school building program.

Utilities. For several years, the New Jersey SmartStart Buildings program has provided design support, technical assistance and equipment incentives for a variety of building projects. The program, created in the wake of the state restructuring of the electric utility industry, is a statewide energy efficiency program sponsored by the New Jersey Board of Public Utilities and administered

jointly by seven electric and gas utilities. Recently, the program was expanded to include a "SmartStart Schools" project to target these incentives to reach the new school construction taking place around the state. (See Section IV.)

III. NEW JERSEY SUSTAINABLE SCHOOLS INITIATIVE

The election of a new governor in November 2001 led to a policy shift toward building sustainable schools in New Jersey. Within several months of taking office, Governor McGreevey made sustainable school design state policy with the issuance of Executive Order #24.

In light of the considerable public pressure to show progress in building schools, the policy has required quick and efficient implementation in order to have an impact on the tremendous number of school projects underway. The Schools Construction Corporation has made significant progress in establishing the framework within which state-managed construction projects will incorporate health and environmental goals. This section discusses both the executive order and the steps taken in its implementation.

In 2002, sustainable school design became state policy.

A. ESTABLISHING SUSTAINABLE DESIGN AS STATE POLICY

On July 29, 2002, Governor McGreevey signed Executive Order #24 (EO 24). As noted earlier, the central provision of the order was the creation of the Schools Construction Corporation, a measure that considerably altered the institutional framework for the state's school building program. The executive order also addressed sustainable school design and construction specifically, as well as certain other facilities issues related to this goal.

The executive order's preamble notes that the EFCFA sets a goal of "maximum operating efficiencies," including "energy efficiency of school facilities and the efficiency of other school building systems." The preamble also states that "it is in the best interests of the people of New Jersey that school facilities. . . shall be modern facilities of the 21st century combining all of these features: the best possible learning environment, the most energy-efficient design, the most environmentally sustainable systems, and the highest community-relevance. . . ."

The section of EO 24 directly addressing high performance school design is brief, but significant:

All new school designs shall incorporate the guidelines developed by the United States Green Building Council known as "Leadership in

Energy & Environmental Design (“LEED™”), Version 2.0 to achieve maximum energy efficiency and environmental sustainability in the design of schools.

There are several aspects of this provision that are noteworthy. First, the directive applies to *all* new school designs. Second, the order does not require sustainable design generally, but rather mandates that designs “incorporate” a particular approach to sustainable design, namely the LEED rating system of the U.S. Green Buildings Council. As noted earlier, the inclusion of LEED in this policy reflects the considerable activity in New Jersey of architects familiar with that rating system and/or affiliated with the U.S. Green Building Council. Nevertheless, the requirement to “incorporate” LEED and the absence of any directive on how to do so leaves considerable room for interpretation as to how state agencies are to ensure that this goal is met.

Indeed, while the executive order is unique in establishing a state requirement for sustainable design, it’s bold statement created a formidable challenge to state agencies to develop an effective approach to implementation. Moreover, those agencies were grappling with numerous other facility-related issues that arose from the Abbott decision and were under considerable pressure to show results on the ground. Implementation of EO 24 has proceeded on two tracks: one approach for schools built by the SCC and another approach for schools built by local districts.

1. Implementation: SCC-built schools

The SCC was created with the signing of Executive Order #24 in 2002 and has moved rapidly to meet the strong public demand for progress in school construction. As of June 2003, the SCC had awarded over \$190 million in design fees, over \$900 million in construction contracts, and over \$1 billion in grants to Abbott and non-Abbott districts. NJSCC, Awarded Contracts Report Card, *available at* <http://www.njscc.com/schools/default.asp> (last visited: July 10, 2003). The SCC anticipates opening 254 new schools and school additions in 2003 and 2004. SCC, February 2003 Monthly Report, *available at* http://www.njscc.com/general/reports/february_03_rept.asp (last visited: July 10, 2003). The magnitude of the SCC’s building program is particularly notable considering that the program serves the state’s most economically disadvantaged urban communities.

Given the tremendous needs of the school districts being serviced by the SCC, the Corporation has sought to integrate a wide range of elements into its building program. SCC officials cite as the central mission of the

Corporation to build high quality schools that incorporate best practices in the design and construction of educational facilities. While this report focuses mainly on environmental and health goals, the SCC has emphasized a broad definition of sustainability, addressing issues such as technology, safety, community integration, and economic development.

Following the issuance of Executive Order #24, the SCC created a committee to provide advice on implementing the order. In December 2002, the SCC issued its implementation policy.

SCC implementation policy. The policy, in the form of a memorandum that was approved by the SCC’s Board of Directors, has several key features:

- LEED Version 2.0 is adopted as a “benchmark” for the design and construction of new schools. Projects are required to meet all LEED prerequisites and to incorporate features that will achieve a minimum of 26 points under the rating system “wherever possible.”
- A “best practices approach” is adopted for the design process. This is to be achieved through the use of a “charrette,” or series of brainstorming meetings involving a range of stakeholders to integrate sustainable design principles into the project at an early stage.
- To ensure compliance with the policy, project architects will complete a checklist documenting the LEED criteria they have incorporated, and the SCC’s project management firms (PMFs) will conduct the review of the projects to verify compliance.
- The SCC will contract with an entity such as the NJIT to develop a methodology for evaluating the costs and effectiveness of the policy and to conduct an evaluation within a 12- to 18-month time frame.

Memorandum of December 5, 2002 from Alfred T. McNeill, SCC Chief Executive Officer, to the Directors of the Corporation (on file with Environmental Law Institute).

Design checklists. The SCC has developed two checklists to assist in implementing EO 24 and the SCC policy. The “Design Consideration Checklist” is intended to be used during the initial program phase to develop ideas and identify features that could be incorporated into the project, and during the design phases to monitor progress on including those elements. The checklist must be signed by the school district and the design consultant and approved by the PMF at the program, schematic design and design development phases. *See* SCC, Design Construction Checklist (on file with Environmental Law Institute).

The Design Consideration Checklist is a guide to a broad range of design strategies that are to be considered in developing a school project, many of which reflect the different goals articulated in Executive Order #24. The five-page checklist includes sections on community involvement, community schools, smart growth, emergency shelter, safety/security, information technology, and sustainable design. The sustainable design portion of the checklist contains a listing of individual design features or goals that fall under the following categories: sustainable sites; water efficiency; energy and atmosphere; materials and resources; and indoor environmental quality. In creating the list, the SCC noted that it used information from the LEED system, the CHPS program (see Chapter 2) and the Department of Energy. See SCC, Design Construction Checklist (on file with Environmental Law Institute).

The second checklist created by the SCC is a more straightforward listing of design features included in the LEED rating system, along with the corresponding points allotted to the feature. Next to each item is space for including a “justification/explanation.” Crafted as a scorecard, this checklist is to be used by the PMFs to certify that the project achieves the 26 LEED points required under the SCC policy. The PMF is to fill out the scorecard several times during the process, from the program phase through project closeout. See SCC, Checklist Form (LEED™) (on file with Environmental Law Institute).

Design and Construction Guidelines. During 2003, the SCC has been revising its Design and Construction Guidelines, which contain required performance specifications for all projects. According to officials, the SCC aims to strengthen these specifications and to incorporate the requirements contained in Executive Order #24, including sustainable design goals. The SCC has stated the goal of its program broadly—“to deliver the highest quality education possible to New Jersey’s children by creating superior learning environments while developing energy efficient, environmentally friendly, safe, secure and easily maintainable facilities.” See SCC, Design and Construction Guidelines (Summary) (on file with Environmental Law Institute).

The introduction to the Design and Construction Guidelines reiterates the executive order’s LEED requirement, and also encourages projects to incorporate the high performance schools guidelines published by the U.S. Department of Energy. See SCC, Design and Construction Guidelines (Summary) (on file with Environmental Law Institute). The guidelines incorporate the Design Consideration Checklist described above and note that “(s)ustainable design principles are critical and required.” *Id.*

In addition to underscoring the importance of a sustainable design approach generally, the guidelines are being revised to include a variety of specific requirements that relate to environmental and health goals. SCC officials note the following examples of requirements contained in the new guidelines that exceed current code requirements in New Jersey.

- **Life cycle cost analysis:** The guidelines require design consultants to develop a baseline design and three alternate concepts in the program phase of a project. Designers must run simple cost-benefit analysis on all four designs, including total first cost, 20-year life-cycle costs and comparative energy consumption and maintenance and operation estimates.
- **Energy efficiency:** The guidelines adopt ASHRAE Standard 90.1-2001 and encourage projects to exceed this goal by 20 percent or more. Projects are required to use Energy Star™ windows and to consider a number of window design elements to promote energy efficiency. The guidelines also emphasize the importance of the entire design team working together beginning in the program phase, in order to create a balance between building envelope criteria, building orientation, and mechanical, electrical, plumbing, and daylighting systems.
- **Indoor air quality and ventilation:** The guidelines require a minimum of 65 percent efficient filtration for new school construction and also establish a number of required considerations for locating outside air intakes to avoid sources of pollution.
- **Low-emitting materials:** The guidelines require low- or no-VOC materials in areas such as carpeting, roofing systems and casework, and direct projects to avoid the use of CCA-treated lumber.
- **Sustainable materials:** According to the guidelines, projects should consider and give preference to third-party certified sustainable wood.
- **Acoustics:** The guidelines require acoustic control consistent with the ANSI/ASA S12.60-2002 standard of 35 decibels for background noise.

Selection of design firms. According to SCC officials, all proposals submitted by architects are independently reviewed by a selection committee composed of school district representatives and SCC staff, and the SCC recently changed its policy to ensure that school district representatives form a majority of this committee. Officials note that A/E contracts incorporate the requirement that architects comply with the SCC Design and Construction Guidelines, which in turn contain requirements related to sustainable design.

Design charrettes. The SCC policy expressly states that it will not mandate individual design features, but rather seeks to encourage an “integrated system of decision making.” Toward this end, the agency has incorporated the idea of the design charrette to ascertain the needs and desires of the users of the building and to identify sustainability goals up front. The policy makes explicit reference to the fact that EO 24 emphasizes community participation in the design process, and lists as potential participants in the charrette process the architect, engineer, PMF, SCC project officer, school district, contractor, and the public. The meetings take place in the school district, and the SCC has hired a staff person to help facilitate the participation of districts early in the process. SCC officials note, however, that the school district is the agency’s client, and it is primarily the district’s responsibility to ensure that the public is represented during the design phase. The SCC’s Design and Construction Guidelines note that the charrette is to take place during the program phase of the project and is to make use of the Design Considerations Checklist. See SCC, Design and Construction Guidelines (Checklist) at 2 (on file with Environmental Law Institute).

SCC oversight. The SCC’s EO24 policy explicitly rejected the option of requiring that schools obtain LEED “certification” through the U.S. Green Building Council. Rather, the regional project management firms that SCC hires to oversee the design and construction process will be responsible for assisting the designers and school districts in achieving the sustainability goals and for reviewing projects to ensure they satisfy the SCC policy and the executive order. SCC officials view the PMFs as having the capability of providing, or obtaining, the expertise necessary to oversee the policy.

The SCC recently sent a memorandum to all project management firms highlighting the role of the PMF and attaching a copy of the SCC’s LEED implementation policy. For all projects that have not yet entered the construction document phase, the memo requires the PMFs to:

document and certify on the NJSCC Checklist . . . that the Project shall meet or exceed 26 points on the LEED rating scale, wherever possible. The PMF shall be required to provide this certification to the [SCC] at each phase of each Project, from Programming through Post Occupancy, as identified in the Building Commissioning process and the Scope of Work.

New Jersey Schools Construction Corporation, NJSCC Design & Construction BULLETIN #24: Clarification of

PMF involvement in LEED™: Implementation and Oversight (May 5, 2003) (on file with Environmental Law Institute). The PMFs are to “lead, organize and work with the Design Consultant, Contractors and all involved parties” to achieve the LEED goal.

Sustainability consultant. As noted above, the SCC has developed a memorandum of agreement with the New Jersey Institute of Technology to provide the SCC with comprehensive information on school planning, design, construction, financing, and operation. The SCC anticipates that the Institute’s High Performance Schools Information Center would serve as the research arm of the corporation and act as a “funnel for expertise and specific design issue exploration,” particularly through the establishment of best practices in sustainable design. See SCC, February 2003 Monthly Report, available at http://www.njsc.com/general/reports/february_03_rept.asp (last visited: May 30, 2003). According to SCC officials, the center will evaluate current school building projects both within and outside the state, so that the SCC can adjust its program and practices to reflect lessons from the field. Significantly, the center will create an inter-agency Advisory Board and will address environmental and health issues, as well as a broad range of design goals that are important to creating state-of-the-art learning centers. By formally involving the NJIT in its program, the SCC has taken an important step towards coordinating and strengthening the state’s sustainable school construction initiative.

2. Implementation: Locally built schools

The LEED requirement in Executive Order #24 applies to all new schools built in New Jersey. Implementation of the policy in non-SCC managed project presents considerable complexities, in light of the traditional institutional role of the Department of Education and the limited resources available to the agency.

The department has been considering how best to implement the order and has not yet issued a policy. According to officials, one option is a self-certification approach, in which the school districts would sign a statement indicating that they are aware of the EO 24 requirements and intend to consider the LEED criteria in the design and construction process. The principal disadvantage to this option is that it provides little guidance and no oversight over how the mandate is carried out.

Another option would be to require that school districts complete some type of checklist showing which environmental and health features would be incorporated in the project. This option is problematic for the depart-

ment because the agency lacks the staff and resources needed to verify information provided by the district. Moreover, the agency's main review of project documents occurs at the schematic design stage, which affords only a preliminary idea of the features incorporated. It is possible that another state agency could take responsibility for reviewing the checklist—*e.g.*, the SCC, which is in the position of reviewing project documents prior to awarding the state's portion of the project funds.

A third option would be to require that school districts obtain LEED certification through the U.S. Green Building Council, though state officials are reluctant to impose on districts the added costs involved in certification.

B. ENCOURAGING COMMUNITY DESIGN FEATURES AND COMMUNITY PARTICIPATION

In addition to requiring the use of the LEED criteria, Executive Order #24 addresses two issues that are relevant to the goal of sustainable school design and construction: community design features and community participation in the design process. The order states that the Economic Development Authority (the SCC) and school districts "should attempt" to incorporate features to maximize public access to the building to help ensure that the building meets the needs of the community. In addition to the demonstration program created by the EFCFA (to be administered by the SCC), the SCC has included in its sustainable design checklist some community design strategies. The state's new School Renaissance Zones program, discussed in the following section, seeks to integrate school construction with community planning and economic development.

The executive order also "strongly encourages" the SCC and school districts to "provide opportunity for the community at large to have a meaningful participation" in the site selection and design processes. This provision, like the directive on community design features, appears to be a response to the advocacy of many NGOs around the issues of community participation, and to the fairly "top-down" approach created by the EFCFA. Unlike the LEED provision, though, the order does not mandate any particular implementation action on the part of the state or school districts.

The SCC has taken a number of steps to implement the executive order's community participation component. As discussed above, the SCC policy on EO 24 requires a design charrette with community participation. SCC officials note that the agency is setting up regional offices and has established internal requirements for holding public meetings at the schematic and design development phases. These meetings would involve both the presentation of information by the SCC to the community

and the opportunity for the community to present information and ideas to the SCC. SCC officials indicate that the agency will use its communications staff as liaisons with the community to ensure that the corporation responds adequately to issues raised by community members. The SCC has also included in its Design and Construction Guidelines the requirement that A/E firms "solicit and incorporate input from the members of the community to be served by the school." See SCC, Design and Construction Guidelines (Summary) (on file with Environmental Law Institute). The Corporation's Design Consideration Checklist has a section on Community Involvement that lists a number of items, including the establishment by the school district of a community working group at the inception of the project.

Responding to the lack of state education laws or regulations governing community participation in the planning, design, and construction of schools, the Education Law Center developed a set of guidelines for community input. The center presented the proposal to the Economic Development Authority, the Department of Education, and the Governor's office in 2002. See Education Law Center, Guidelines for Community Input (2003) *available at* <http://www.edlawcenter.org/ELCPublic/AbbottSchool-Facilities/FacilitiesPages/EmergencyGuidelinesCommunityInput.htm> (last visited: May 3, 2004). The recommendations include establishing permanent, district-wide facilities advisory committees and project-specific advisory committees.

IV. RELATED STATE ACTIVITIES

This section provides an overview of various state programs and activities that complement the EO 24 implementation activities described above and help advance the state's goals of institutionalizing sustainable school design and construction.

A. DEPARTMENT OF EDUCATION: HEALTHY SCHOOL FACILITIES GUIDANCE

In February 2002, shortly after taking office, Governor McGreevey issued Executive Order #6, creating the Abbott Implementation and Compliance Coordinating Council. The cabinet-level coordinating council was charged with "ensuring full, effective and timely implementation" of Abbott programs and reforms and with recommending needed improvements in state law and policy in this regard. A key component of the order is the requirement that the council "establish issue priorities and . . . convene and supervise work groups and committees of stakeholders to address reform and improvement of Abbott implementation, as necessary."

N.J. Exec. Order No. 6 (Feb. 19, 2002), *available at* <http://www.nj.gov/infobank/circular/eom6.htm> (last visited: July 10, 2003). The Department of Education has overseen the various working groups established under EO 6, and has submitted their recommendations to the governor.

One of the working groups—the facilities working group—has dealt with issues related to sustainable school design and construction. The working group has set up a special subgroup to address the impact of facilities on health. This healthy schools committee is composed of representatives from non-governmental groups as well as private architecture and construction firms. The Department of Education oversaw the work of the committee, and the Department of Environmental Protection and (to a lesser extent) the Economic Development Authority were also involved.

In February 2003, the committee completed a draft of its guidelines for designing healthy schools. The Preamble to the draft criteria states the Department of Education's goal as building schools that are "healthy, comfortable, [and] well lit" in order to help provide a quality education. Department of Education, Safe and Healthy School Facilities Design Criteria ["Draft Criteria"] at 2 (Draft, Feb. 2003) (on file with Environmental Law Institute). The document notes the benefits of incorporating design strategies that promote a healthy indoor environment, including avoided medical and building repair costs. The criteria are "intended to ensure that new schools and school additions in New Jersey will incorporate indoor air quality and other healthy school goals as part of the school planning and design process." *Id.*

Drawing from a variety of governmental guidance documents and industry standards, the draft criteria include a comprehensive set of issues relating to: health; siting; pollutant source reduction; ventilation and filtration; moisture control; low-emitting materials; easily maintainable materials and equipment; pest-resistant features; daylighting and visual comfort; water quality; acoustics; safety and security; and commissioning. For each topic, the draft sets out general goals that the project must pursue, and requires the project to show how a set of specified features and practices have been achieved.

Although the proposal sets forth an ambitious set of guidelines for creating healthy schools, it is unclear whether or how the criteria will be integrated into the department's review of school designs. The draft states only that the department proposes to use the criteria "in reviewing and approving school facility construction and renovation projects for educational adequacy. . . ." Draft Criteria at 1. Such a review would change the role of the department, which traditionally has not undertaken a

detailed review of design documents, except to ensure that they have incorporated adequate educational spaces.

It is also unclear how the healthy school facilities criteria would be integrated with the other efforts underway to implement Executive Order #24. The criteria were developed by a task force established within the Abbott Implementation process set up by Executive Order #6, and the preamble to the criteria states that the proposal is initiated pursuant to Executive Order #24. Yet the process of developing the criteria has occurred on a separate track from the SCC's implementation of EO 24, and the two efforts do not appear to be coordinated.

B. SCHOOL RENAISSANCE ZONES PROGRAM

In March 2003, the governor's office unveiled a new program aimed at using school construction as the cornerstone for neighborhood economic development and revitalization. For selected communities, the School Renaissance Zones Program identifies new school projects that can serve as catalysts for redevelopment and investment in surrounding neighborhoods. The program prioritizes and coordinates existing public, private, and non-profit resources to those projects. The Economic Development Authority, along with the SCC, is leading the program with participation from the state's education, health, housing, and other agencies. The program aims to collaborate closely with local governments, school districts, community residents, and the private sector. *See* State of New Jersey, McGreevey Announces School Renaissance Zone Program, *available at* http://www.state.nj.us/cgi-bin/governor/njnewsline/view_article.pl?id=1092 (last visited: May 9, 2003).

Thus far, a school in Trenton and one in Neptune, New Jersey have been selected for participation in the program. The Neptune School District has taken an active role in developing a new elementary school with community-use features. The project, which will include the renovation of an abandoned warehouse to create an early childhood center, is currently in the design phase. One of the first SCC-managed school projects to formally incorporate the new sustainability criteria, the school will include a rooftop green space and energy efficiency features that can be viewed by students through transparent flooring, among other elements. In addition, the project is considering community features such as an inter-generational tutoring center, a fitness complex, and a swimming pool (which would be funded through a separate local bond measure). *See* State of New Jersey, McGreevey Announces Neptune School Renaissance Project, *available at* http://www.state.nj.us/cgi-bin/governor/njnewsline/view_article.pl?id=1156 (last visited May 9, 2003).

C. SMARTSTART SCHOOLS PROGRAM

As noted earlier, the New Jersey Board of Public Utilities sponsors the New Jersey SmartStart Buildings Program, a utility-administered program of financial incentives and technical assistance services aimed at helping schools build more energy efficient facilities. The program emphasizes the view that “a well-designed, well-engineered and well-constructed school not only saves energy but also directly influences the learning environment.” New Jersey SmartStart Buildings Program, About SmartStart Schools, *available at* <http://www.njsmartstart-buildings.com/smartstartschools/about/index.html> (last visited May 9, 2003).

The program offers financial incentives at various stages of the design and construction process to reduce or eliminate added initial costs that might discourage a school district from incorporating energy efficiency measures. The program emphasizes a “comprehensive” approach, which involves paying for some of the added up-front design costs involved in sustainable school projects. For example, the program provides funds to the design team for a “brainstorming session” at the outset of a project, for a design simulation, and for incorporating energy efficiency measures into the final design. For a description of the program, see <http://www.njsmartstart-buildings.com/smartstartschools/participate/index.html> (last visited: May 9, 2003). The program also provides technical assistance (in-kind design support services) for incorporating energy efficiency features, as well as financial incentives for qualifying energy-efficient equipment. Although the SmartStart program focuses on energy efficiency, program materials explicitly reference the new state LEED requirements. The incentives could potentially help defray the design costs of school projects that are aiming to incorporate a broad range of environmental and health goals in implementing Executive Order #24.

The SCC is seeking to take advantage of the utility incentives in its school building projects. The corporation is currently working with the SmartStart Schools program to develop a mechanism whereby school districts—the formal owners of a school building project—will pass on to the SCC any utility incentive funds that are typically provided to the project owner. The Department of Education has included a reference to the program in its school building project application forms.

V. BARRIERS TO SUSTAINABLE SCHOOL DESIGN AND CONSTRUCTION IN NEW JERSEY

The barriers to building sustainable schools in New Jersey differ somewhat depending on whether the projects

are managed by the state (the SCC) or by the local school districts. This is due in part to the fact that state law requires 100 percent state funding for most SCC-managed projects.

A. FINANCIAL CONSIDERATIONS

According to a number of people involved in school construction in New Jersey, the statutorily imposed cap of \$138 per square foot for state reimbursement creates financial constraints for many districts that manage their own school construction projects. Because school districts—especially in the northern part of the state—typically exceed this limit in practice, the actual percentage of the project paid by the state is lower than the percentage approved. Thus, to the extent that the costs associated with high performance design increase the cost of a project—or are perceived to do so—school districts are reluctant to take on this approach. This is not the case for schools funded 100 percent by the state, because the state is required to pay the additional costs that arise in the state’s management of the projects. Nevertheless, although the amount dedicated to school construction in the Abbott districts is substantial, the need for facilities in those districts is great, and there is pressure to keep costs down in state-managed projects as well. SCC officials note that this fiscal reality will not preclude school designs from meeting the requirements of Executive Order #24, but will likely require the balancing of priorities and careful decisions about which sustainability features to include.

The state’s sustainable schools initiative addresses these barriers primarily through the adoption of policies that mandate integration of environmental and health goals. It remains to be seen whether the general and specific budgetary constraints facing the state and the districts will affect the way in which LEED criteria are incorporated into projects, and indeed, whether those effects will be evaluated.

A related financial constraint is the absence of community or joint-use features in the regulations governing educational adequacy, which means that the Department of Education will not approve the extra square feet (and hence the costs) needed for such purposes. The state has sought to address this issue through Executive Order #24, which states that school districts “should attempt” to incorporate community design features in all school facilities projects, and the SCC’s sustainability checklist includes community design features as one item to be considered. For non-SCC managed projects, however, the restrictions on reimbursement for such features remain.

B. TIME PRESSURE

Both the state and school districts are under considerable time pressure to complete projects. The pressure on the state comes largely from communities that have lived with inadequate facilities for many years and want to see progress in getting schools in the ground. The executive orders mandating sustainable design and setting up Abbott Implementation Committees were issued nearly two years after the state established the school building program. As a result, state agencies have had to work quickly to implement the executive orders. The SCC has succeeded in putting a process in place in a relatively short time period. The pace of the state program, in turn, puts some pressure on Abbott districts to submit their projects quickly.

The Department of Education has taken longer to implement Executive Order #24 for schools in non-SCC managed districts. This is problematic, given the fact that non-Abbott districts are also under significant pressure to initiate projects quickly. Some districts have had projects on hold for many years because of a lack of state funding. The amount of money dedicated to projects in non-Abbott districts is considerable, but finite; many districts have moved quickly to get in line for funding. Thus, preliminary designs already have been completed for many school building projects. According to one community organizer, at least one school district bypassed consideration of renovation (versus new construction) for fear of delaying the approval and funding process.

C. AGENCY COORDINATION AND RESOURCES

While most states have multiple agencies with jurisdiction over some aspect of school planning, design and construction, the administrative backdrop in New Jersey is particularly complex in light of the role of the SCC. In addition to the Department of Education and the SCC, the Department of Environment, the Department of Health and Senior Services, and the Department of Community Affairs, among others, have a role to play in promoting health and environmental goals in school construction. Without adequate coordination of these agencies, programs will be less effective and efficient in promoting sustainable school facilities.

The activities of these various agencies have remained largely separate in implementing Executive Order #24. For example, the recent Healthy School Facilities Criteria were drafted without major participation by the SCC. Similarly, the state's health agency, while active in addressing indoor air quality issues, has not been closely involved in the development of state policies to implement EO24. The involvement of indoor air quality officials in new

construction of schools is particularly important, given the potential health impacts on children. These issues are also important in renovation projects, which may involve the removal of asbestos or lead-containing materials. The state's current initiative to link school construction with economic revitalization also suggests a potentially important role for the health department in evaluating the impacts of brownfields redevelopment.

A promising effort to enhance inter-agency coordination is the recent memorandum of agreement between the NJIT and the SCC, which establishes an interagency advisory board to guide the work of the NJIT's High Performance Design Information Center. According to officials involved, the advisory board will include the SCC, the Departments of Education, Community Affairs, and Environmental Protection. Although it could benefit from the participation of other agencies such as Department of Health, this board represents an important opportunity for the state's school construction program.

A separate, but related institutional obstacle is the fact that the Department of Education has not historically played a role in addressing the environmental and health features of facility design. With the agency currently working at only half of its regular staffing due to budget constraints, this is a particularly difficult time for taking on new project review responsibilities. The absence of a mission and resources to address sustainable design and construction poses an obstacle for implementing the governor's mandate that all school projects integrate LEED. To date, the lack of an institutional framework and funding for addressing these types of design and construction issues within the Department of Education has resulted in separate efforts within the department to implement the order, and a slower pace for developing guidance than in the SCC.

D. EDUCATION AND OUTREACH

Although the sustainable schools mandate was issued directly from the governor, one challenge to implementing the policy has been the need to change organizational thinking, particularly within the SCC. In this respect, the barriers faced by the SCC are similar to those faced by large school districts charged with carrying out such a policy. The new executive order has required a shift in thinking about how to oversee the design and construction process. Some SCC officials noted that the growing public acceptance of the LEED rating system, and the view that this was a fairly mainstream approach, facilitated the adoption of the SCC's policies on integrating health and environmental goals into school projects.

VI. SUMMARY AND OBSERVATIONS

School construction in New Jersey occurs in two basic ways; projects are either managed (and funded 100 percent) by the state, or projects are managed by local school districts (who receive state grants for part of the costs). The state's efforts to promote sustainable school design and construction have focused almost entirely on projects managed by the state, which constitute the large majority of projects included in the current building program. For those projects, policies issued by the governor and subsequently by the Schools Construction Corporation have embraced a high performance approach and have put in place a framework for individual projects to incorporate a range of environmental and health goals.

A. PRINCIPAL STRATEGIES USED

Executive order. The cornerstone of New Jersey's sustainable schools initiative is Executive Order #24, issued in July 2002. The order, which radically altered the state's administrative organization for building schools, mandated that all new school designs in the state address health and environmental goals. The order also encouraged community participation in the siting and design process, and noted the importance of including community-use design features.

This state policy is both very specific (in requiring the use of the LEED model in particular) and very general in establishing how that model will be used. For example, the order did not require that schools obtain formal certification through the U.S. Green Building Council, nor did the policy state the number of points that a school must obtain in order to successfully "incorporate" LEED. In addition, the order left open the possibility of adapting or tailoring LEED to New Jersey and to the school-specific context.

Checklist/metric. To implement the LEED mandate, the Schools Construction Corporation developed two checklists. The first is to be used at the preliminary design phase to aid in discussion of how to address health and environmental issues in the design process. The checklist is not limited to the LEED criteria. Rather, it draws from LEED and CHPS and also includes other community-use and smart growth issues. A second checklist more closely parallels the LEED criteria, and serves as a scorecard to ensure that schools have satisfied the executive order and the SCC policy of achieving a minimum of 26 points from the LEED model. Two interesting features of the SCC policy are the requirement that the first checklist be used at the outset of the design process—thus encouraging a more integrated approach to sustainable design—and the requirement that the SCC's Project Management

Firms complete the scorecards at several stages in the school building project, thereby encouraging ongoing consideration of how best to achieve environmental and health goals.

Design and construction guidelines. To supplement the use of a flexible checklist containing sustainable design strategies, the SCC is revising its Design and Construction Guidelines to ensure that all projects incorporate certain priority environmental and health goals. The new guidelines, which must be followed by all SCC-managed projects, contain specific energy efficiency standards and practices, as well as requirements relating to acoustical performance and material selection.

Design charrettes. The SCC has established the requirement of a design charrette as the central process for considering and deciding which aspects of the LEED criteria will be incorporated into an individual school design. The SCC policy calls for all stakeholders, including the "public," to meet early in the process to hold this brainstorming session.

Sustainability consultant. The SCC recently entered into an agreement with the New Jersey Institute of Technology for assistance in evaluating and identifying best practices to incorporate into the SCC's building program. This partnership with an academic institution that has substantial sustainable design expertise is a significant step for the future of the state's sustainable schools initiative. The NJIT can potentially play an important role in evaluating current building projects and in recommending adjustments to the state's program to reflect experiences in the field. The NJIT program also aims to serve as a technical resource to schools districts outside New Jersey in the future.

Utility incentives. Although independent of the state's new sustainable schools policy, the energy efficiency incentive program carried out by the state's utility companies seeks to complement that policy. It remains to be seen whether the financial and technical assistance offered will help to foster the sort of integrated design approach that is critical to successful implementation of the state initiative.

Pilot/demonstration programs. At least three different pilot programs relating to sustainable school building have been set up at the state level. Pursuant to the new state education law, there is a demonstration program for including community-use features in school design. The governor recently established the School Renaissance Zones programs, aimed at combining school construction

and community economic development. In addition, the Department of Environmental Protection has worked with numerous governmental and non-governmental offices to set up a pilot high performance schools program that will assist up to 10 school building projects seeking to incorporate high performance strategies.

Other policies. In addition to Executive Order #24, there are a number of state policies that directly or indirectly promote individual environmental or health goals. These include an executive order promoting smart growth in the development of schools, a regulatory presumption and incentive favoring rehabilitation over new construction, maintenance requirements linked to new construction, requirements for addressing indoor air quality during construction, and requirements for radon-resistant design features.

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

The state's sustainable schools initiative takes place in the context of many years of advocacy and litigation to address an inequitable system of funding schools. Nevertheless, although court decisions and the subsequent state legislation address the connection between facilities and educational adequacy, neither the judicial nor the legislative activities focused specifically on building and renovating schools with health and environmental goals in mind.

Political support at the state level. The central impetus for New Jersey's sustainable schools work came directly from the office of the governor. Following his election in 2001, after a campaign that emphasized education issues, Governor McGreevey issued numerous executive orders, many of which addressed school reform. Among the governor's policy staff were individuals who had previously worked for the Economic Development Authority and who were familiar with the LEED system. In addition, the appointment of a Schools Construction Corporation CEO with considerable credibility in the construction and political arenas likely facilitated the agency's ability to move forward with policies to carry out the state's sustainable design mandate.

Role of the private sector and non-governmental organizations. The private sector design community played a central role in the issuance of the executive order. Various architects familiar with LEED and in the process of establishing a New Jersey chapter of the U.S. Green Building Council provided substantial information to the SCC as they were developing the school construction program. Although non-governmental organizations did not play a

direct role in the development of EO 24 or the SCC's implementation policy, they have advocated effectively for quality school facilities, voiced their general support for building healthy and efficient schools, and spearheaded specific high performance schools activities.

Related state programs. Although Executive Order #24 and its implementing measures are the central features of the state's sustainable schools initiative, the existence of numerous other related state programs are important in understanding the political and social context for the initiative. They are also important in supplementing the core policy. For example, the SCC's new preliminary design checklist includes not only LEED criteria, but also other smart growth elements that are derived from the state's various policies and programs in that area. In addition, the programs of the Department of Environmental Protection and the Board of Public Utilities are making technical and financial assistance available to some school projects as they seek to achieve high performance goals.

C. IMPLEMENTATION CHALLENGES

Agency oversight. The key to the success of a general policy document like EO 24 is ensuring that the implementing agencies have the resources and capacity to carry out the mandate. One difficulty with the order is the absence of any directive regarding the roles of the two principal agencies involved, the Department of Education and the Schools Construction Corporation. The institutional mission and organization of these two agencies poses another challenge to implementing New Jersey's sustainable schools policies. The SCC is in the business of building schools, and has taken relatively swift action to craft policies to implement EO 24. Nevertheless, as a state entity focused on construction, the SCC may encounter difficulties in addressing local community concerns that arise in the process.

Although the Department of Education has not historically undertaken detailed review of technical design documents, the agency is responsible for ensuring a thorough and efficient education, and state courts have ruled that school facilities are linked to that goal. The lack of clarity in the role of the department is compounded by the lack of resources available to take on these functions. The department appears to have adequate authority under state law and the executive order to require that school districts submit a checklist or other document showing that the district has considered health and environmental criteria and has incorporated those criteria in some fashion. Yet targeted resources and staffing within the department would be needed to ensure that the agency could exercise meaningful review of such submissions as part of the for-

mal approval process. Were such resources available, the agency could consider the hiring of staff or consultants whose sole responsibilities would be to ensure progress on implementing the executive order within the agency, including oversight of school district building plans.

As an alternative to Department of Education oversight of non-SCC managed projects, the EO 24 mandate could be overseen by the SCC (as part of the grant-making process). The current SCC policy indicates that implementation in non-SCC managed projects should be the province of the Department of Education. Nevertheless, the SCC already has developed a policy and some institutional framework for overseeing integration of sustainability criteria into school projects. Moreover, the SCC is in the process of bolstering its expertise and resources to carry out this initiative through a memorandum of agreement with the New Jersey Institute of Technology to provide ongoing information and consultation on sustainable school design and construction issues.

Community involvement. One of the key challenges to implementing any sustainable design process is incorporating meaningful community input into decisions. Given the trade-offs that are necessary when considering a broad range of environmental and health goals—as well as community features—the views of the community on these issues are vital.

In New Jersey, community participation is further complicated by the fact that the state, rather than the school district, controls the design and construction process for many school building projects. The SCC has taken a number of steps to promote public involvement, including the holding of public meetings at the schematic and design development phases of a project; the use of communications staff within the SCC to facilitate exchange of information between the community and the SCC's design professionals; and the creation of four regional offices. It remains to be seen how individual projects will carry out the SCC policy of holding a “series of brainstorming sessions” in which all stakeholders, including the public, meet to integrate sustainable design principles into projects “at an early stage.” Indeed, for all school building projects in the state, considerable responsibility for ensuring community inclusion in decision making ultimately rests with the school district, and the Department of Education has not issued guidance or requirements for districts to follow.

Use of a metric. The use of a “menu” of features similar to the LEED system has the advantages of ensuring consideration of a wide range of environmental and health goals and providing flexibility in achieving a more sustainable facility. This flexibility is particularly well-suited to a school building program that is enormous, state-wide, and already in progress. Outside of a small number of required items, however, this approach does not guarantee that any particular issue will be addressed. In New Jersey, there are relatively few state requirements relating to specific health or environmental features in school design, however the SCC has begun to integrate many such requirements into its Design and Construction Guidelines. One potential area for evaluation in the near term is whether certain features on the SCC's LEED-based checklist are being routinely incorporated or commonly overlooked. This information might prompt consideration of establishing additional pre-requisites in the SCC checklist or revising the Design Guidelines. This evaluation could be particularly useful with respect to indoor air quality and other health-related issues.

Technical assistance and training. Although the executive order and the SCC policy put in place certain minimum requirements, the effectiveness of those requirements will depend in large measure on the expertise of the Project Management Firms (in the case of SCC-managed schools), school district staff, and project architects. In addition, unless local communities receive information and assistance, they may not be in a position to contribute effectively to decisions about health and environmental issues. Two programs that are providing technical assistance on a formal basis are the utilities' Smart Start Schools program, and the more limited pilot program of the High Performance Design Workgroup.

One challenge for the state in implementing the sustainable schools initiative is to build in additional capacity-building activities. For example, it is critical to ensure that the Project Management Firms, as the principal points of contact and oversight, view the sustainable schools policy as a priority and have the capability to provide guidance to both the design team and the school community. The New Jersey Institute of Technology could potentially serve as an important training resource for communities, as well as for architects and school officials. Additional public and private resources may need to be tapped in order to support other local capacity-building needs, such as the hiring of sustainability consultants to work in school districts.

CHAPTER 6

WAKE COUNTY PUBLIC SCHOOL SYSTEM, NORTH CAROLINA

The Wake County Public School System (WCPSS) encompasses North Carolina's capital, Raleigh, and surrounding communities. With over 100,000 students and an enrollment that has been growing by about 3,000 students per year, Wake County is the state's second largest school district and is among the 50 largest districts in the United States. There are currently 125 schools within the district. *See* Wake County Public School System, 2002 Annual Report at 12, 16, *available at* <http://www.wcpss.net/annual-reports/2002-annual-report.pdf> (last visited: Aug. 8, 2003); National Center for Education Statistics, Characteristics of the 100 Largest Public Elementary and Secondary School Districts in the United States (Appendix D), *available at* http://nces.ed.gov/pubs2002/100_largest/table_app_d_1.asp (last visited: Aug. 8, 2003).

The district is currently carrying out a large school construction program to address this growing enrollment. Building on local commitment to energy efficient, high quality facilities, the district has institutionalized a design process that considers and incorporates health and environmental goals in each project. WCPSS officials were a driving force in creating high performance guidelines that are being used throughout the state and that have become mandatory for all new WCPSS projects. In addition, the district has reviewed and revised its own design guidelines to establish minimum standards governing priority health and environmental issues. With a new building program being planned for 2004, the district may have additional opportunities to advance its high performance approach.

Although North Carolina emphasizes local control over school construction, state law sets forth certain requirements relating to the school building process. Following an overview of these policies, Section II describes state and regional activities that provide some of the context for the WCPSS initiative. Sections III and IV discuss the key components of the initiative, as well as related activities that are underway at the state and county level. Section V notes some of the barriers to building high performance schools in Wake County. Finally, Section VI summarizes the strategies used in the initiative, identifies the key factors in its success, and comments on the challenges the district faces as it advances the initiative in the future.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

A. STATE'S ROLE IN FUNDING AND REGULATING SCHOOL CONSTRUCTION

There are approximately 1.3 million K-12 students in 2,400 public schools in the state of North Carolina. Of the 117 local school systems, 100 are county systems and 17 are city systems. *See* N.C. Department of Public Instruction, 2001 Facts and Figures: North Carolina Public Schools, *available at* <http://www.ncpublicschools.org/fbs/factsfigs.htm> (last visited: Aug. 8, 2003). Home rule is emphasized in North Carolina, and state regulation of school design and construction reflects this philosophy.

1. Funding

The state of North Carolina provides funding for school construction primarily through the issuance of state bonds. The state has approved the issuance of school bonds on five occasions since 1949. Most recently, in 1996, the citizens of North Carolina and the state legislature approved a referendum for the issuance of \$1.8 billion in general obligation bonds for the construction of school facilities. *See* Public School Building Bond Act of 1996, 1995 Sess. Laws ch. 631 (1996). State law requires that local boards of education submit a facility needs assessment (long-range plan) to the State Board of Education every five years. North Carolina General Statutes (N.C.G.S.) §115C-521(a). According to state officials, data that was gathered in the 1996 Facility Needs Survey, along with information collected by the School Capital Construction Study Commission, demonstrated the need for the bond act. Specific allotments to each school system were established in the legislation, based on three main criteria: average daily membership, high growth, and low wealth. Some funds were also allocated for small counties. Public School Building Bond Act of 1996, 1995 Sess. Laws ch. 631 (1996).

State education officials note that most of the state bond proceeds have already been distributed. Additionally, approximately \$3.1 billion in 33 different local bonds were

issued over the same time period. See N.C. Department of Public Instruction, Local Bond Issues for Schools Since 1995, *available at* <http://www.schoolclearinghouse.org> (last visited: Aug. 8, 2003) (listing total local bonds issued since just prior to the 1996 bond). About \$120 million in state funds were provided for public schools in Wake County. See *generally* Public School Building Bond Act of 1996, 1995 Sess. Laws ch. 631 (1996).

In addition to bond acts, the state maintains a Public School Building Capital Fund, supported by state corporate income tax revenue. N.C.G.S. §§ 115C-546.1, 546.2. According to state officials, the state provides approximately \$55-60 million per year from the fund to counties, which in turn provide funds to school districts. School districts generally allow these amounts to accrue until they are ready to use them for a specific project. The state also allows counties to levy two one-half cent additions to the sales tax, a portion of which goes to schools for public school capital outlay or to retire indebtedness incurred by the county for capital projects.

2. Regulation of design and construction

a. Department of Public Instruction

All school construction and renovation projects, regardless of whether they receive state funding, must undergo a review and comment process with the state education agency, the Department of Public Instruction (DPI). The DPI review covers “appropriateness for the educational program; structural and functional soundness, safety and sanitation; and long-term cost efficiency.” North Carolina Department of Public Construction, Design and Construction Procedures (1998) at 14, *available at* <http://www.schoolclearinghouse.org/pubs/proceweb.pdf> (last visited: Aug. 8, 2003). Officials note that the review focuses on the educational program, school safety and cost efficiency. Economic issues include durability and life cycle costs. The DPI reviews the school plans and provides comments to school districts and their design teams at conferences held after each design phase. There is no formal “approval” process required for school building plans. School districts are required to consider, but not to follow, the agency’s comments, although the agency may request that a local school board provide responses to its comments. N.C.G.S. §§ 115C-521. The Department of Public Instruction issues a “Certificate of Review” valid for one year. See North Carolina Department of Public Construction, Design and Construction Procedures (1998) at 14, *available at* <http://www.schoolclearinghouse.org/pubs/proceweb.pdf> (last visited: Aug. 8, 2003). According to state officials,

the DPI provides comments and suggestions for over 350 projects each year.

State law requires that school districts consider the North Carolina Public Schools Facilities Guidelines when developing plans for new or renovated schools. N.C.G.S. § 115C-521. (In 1996, state legislation directed the state to revise its “Facility Standards” and to change them to “Facility Guidelines.” North Carolina State Board of Education, Facilities Guidelines at i (2000).) The guidelines, published by the state Board of Education and last updated in 2000, focus on the types of educational and other spaces to be included. The guidelines also address a range of other facility issues, including safety, HVAC systems, electrical features and lighting. The Guidelines recommend energy-related measures and point out certain indoor air quality-related issues (such as moisture control and air filtration), but do not address high performance goals broadly. A revised version of the guidelines, expected in 2003, will include a description of high performance design and construction.

State law also requires consideration of the Energy Guidelines for School Design and Construction, published by the Department of Public Instruction. *Id.* The DPI uses both of these guidelines in reviewing and commenting on school plans. See North Carolina Department of Public Construction, Design and Construction Procedures (1998) at 14, *available at* <http://www.schoolclearinghouse.org/pubs/proceweb.pdf> (last visited: Aug. 8, 2003).

In addition to requiring consideration of both the Facilities Guidelines and the Energy Guidelines, the state education law requires consideration of specific energy-related features:

[T]he local board of education. . . shall adopt local energy-use goals for building design and operation that take into account local conditions in an effort to reduce the impact of operation costs on local and State budgets. In the design and construction of new school facilities and in the repair and renovation of existing school facilities, the local board of education shall consider the placement and design of windows to use the climate of North Carolina for both light and ventilation in case of power shortages. A local board shall also consider the installation of solar energy systems in the school facilities whenever practicable.

Id.

Finally, the state’s education law also contains a provision promoting consideration of renovation of existing schools in lieu of new construction. The law requires that before local boards of education invest any construction

funds in building a new school to replace an existing school, they must submit “to the State Superintendent and the State Superintendent submits to the North Carolina Historical Commission an analysis that compares the costs and feasibility of building the new building and of renovating the existing building and that clearly indicates the desirability of building the new building.” N.C.G.S. § 115C-521.

b. Procurement

North Carolina law regarding procurement of architectural, engineering and construction services applies to local governmental units as well as state agencies. State law sets forth a qualifications-based system for selecting A/E or construction management firms, requiring selection “on the basis of demonstrated competence and qualification. . . without regard to fee other than unit price information at this stage, and thereafter to negotiate a contract for these services at a fair and reasonable fee with the best qualified firm.” N.C.G.S. § 143-64.31(a). The law requires that contracts for construction be awarded to the “lowest responsible, responsive bidder” taking into account “quality, performance. . . and time specified in the bids to perform the contract.” N.C.G.S. § 143-128 (d1).

State law allows different construction methods—separate-prime bidding, single-prime bidding, dual bidding, and construction management at risk contracts. N.C.G.S. § 143-128 (a1). The law also provides for other contracting methods, such as design-build, if approved by the State Building Commission for use in a specific project. *Id.*; N.C.G.S. § 143-135.26(9). A recent state Attorney General’s opinion clarified that A/E services procured in connection with design-build projects need not be conducted “through a strict qualifications-based selection process unless the authorizing legislation specifically imposes such a requirement.” Op.Atty.Gen., Watkins, June 19, 2001. According to state officials, only a small number of requests for use of design-build contracting services have been made to the State Building Commission.

Another state law governing the preparation of specifications in public building projects requires specification of the desired performance and design characteristics of materials. Where this is impractical or impossible, the law allows the use of a brand name specification, provided that three or more examples are given and the specification makes clear that the examples are provided only to denote the quality of the product desired and not to limit bidders to the specific brands. N.C.G.S. § 133-3. This law was amended, effective January 1, 2003, to create a process for listing one or more preferred brands:

Specifications may list one or more preferred brands as an alternate to the base bid in limited circumstances. Specifications containing a preferred brand alternate under this section must identify the performance standards that support the preference. Performance standards for the preference must be approved in advance by the owner in an open meeting. Any alternate approved by the owner shall be approved only where (i) the preferred alternate will provide cost savings, maintain or improve the functioning of any process or system affected by the preferred item or items, or both, and (ii) a justification identifying these criteria is made available in writing to the public.

Id. Thus, the law requires that architects formally request approval to use preferred brands at a public meeting.

c. Department of Environment and Natural Resources

In recent years, erosion control and wetlands protection have become increasingly important issues in construction projects within North Carolina. State law gives the state—to the exclusion of local governments—authority to review land-disturbing activities conducted by local governments. N.C.G.S. § 113A-56. The Department of Environment and Natural Resources (DENR) reviews specifications and drawings for school building projects to ensure compliance with the state law governing pollution from erosion and sedimentation. *See* N.C.G.S. §§ 113A-50 --66. DENR also issues Section 401 water quality certifications for school construction activities involving wetlands.

The State Environmental Policy Act, N.C.G.S. § 113A-1, *et seq.*, requires state agencies to prepare an environmental assessment or environmental impact statement for all projects involving the expenditure of state funds that may have a potentially detrimental environmental impact. This requirement may thus apply to school construction projects that receive state funding.

d. Department of Insurance, Office of the State Fire Marshall

School construction must comply with the North Carolina State Building Code. The code incorporates the international mechanical code for HVAC systems and the international energy conservation code. 2002 North Carolina Building Code §§ 28, 13. The Office of the State Fire Marshall, within the Department of Insurance,

administers the code and reviews school building plans for compliance.

B. LOCAL ROLE IN FUNDING SCHOOL CONSTRUCTION

Local funding of school construction in North Carolina is accomplished at the county level. Once a local school bond referendum has been approved, the county board of education is responsible for executing the plans. *See generally Dilday v. Beaufort County Bd. of Ed.*, 148 S.E.2d 513 (1966).

In November 2000, Wake County passed a school bond referendum providing \$500 million in school bonds. The referendum funded a school building program (“PLAN 2000”) that had been developed by the school district and a citizens advisory committee. The citizens advisory committee made numerous recommendations that formed the basis for the plan, but did not address high performance design specifically. PLAN 2000, which includes an additional \$50 million in general county (“pay as you go”) revenue, includes 14 new schools and the expansion of 96 existing schools by 2004. A specific budget amount was included for each school project in the plan. *See generally*, PLAN 2000, *available at* www.wcpss.net/auxiliary-services/plan2000.html (last visited: Aug. 8, 2003).

The Wake County Public School System anticipates that the need for additional schools will continue. The district has begun developing the next building plan (“PLAN 2004”) in anticipation of a bond referendum in fall 2003. Wake County Public School System, Wake County School System Presents Building Need Through 2008, *available at* http://www.wcpss.net/auxiliary-services/bldg_needs_pres03.html (last visited: Aug. 8, 2003).

II. SUSTAINABLE BUILDING ACTIVITIES AT THE STATE AND REGIONAL LEVELS

A. STATE ACTIVITIES

Department of Public Instruction. As noted above, the DPI plays a role in providing information to school districts—individually through the review and comment process and generally through agency publications. In addition to the Facilities Guidelines and the Energy Guidelines, the DPI has produced a number of publications and other materials relating to school facilities. Some of these documents address aspects of sustainable school planning, design, and construction. For example, the DPI produced a handbook focusing on small, community-centered schools. *See* State Board of Education/DPI, *Making Current Trends in School Design Feasible* (2000), *available at* [\[house.org\]\(http://www.schoolclearinghouse.org\) \(last visited: Aug. 8, 2003\). Although the handbook does not focus on high performance design, it introduces the concept and provides some general background.](http://www.schoolclearin-</p>
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In addition, the state education law requires the agency to establish “a central clearinghouse for access by local boards of education that may want to use a prototype design in the construction of school facilities.” N.C.G.S. § 115C-521. The DPI has created a web site—www.schoolclearinghouse.org—that includes 36 prototype designs as well as the agency’s planning guides and publications.

Department of Administration, State Energy Office. In 2001, the state legislature passed a bill that affirmed the importance of the state in promoting energy conservation, and strengthened existing requirements for state agencies to use life-cycle costs analysis and energy conservation practices in the construction and renovation of state facilities. N.C. HB 1272; N.C.G.S. § 143-64.10, .12, .15. The bill also created a high performance building pilot program to be implemented through the State Energy Office. (See Section IV.)

B. REGIONAL ACTIVITIES

The Triangle J Council of Governments (TJCOG) is a voluntary, regional planning organization of municipal and county governments within the state’s “Region J.” Wake County is one of seven counties (including Durham and Orange Counties) from this region that form TJCOG. The organization provides a variety of services to its members on regional issues ranging from land use planning and economic development to environmental protection. *See* <http://www.tjcog.dst.nc.us/whatis.htm> (last visited: Aug. 8, 2003).

In 1993, TJCOG convened a task force on reducing construction and demolition waste, which constituted an estimated 13 to 20 percent of the region’s municipal solid waste. The task force identified the need for model specification language that could be adopted by architects and engineers seeking to reduce waste during construction projects. The result was *WasteSpec*, a manual that provides architects and engineers with both model specifications and background information addressing waste reduction, reuse, and recycling before and during construction and demolition. The background information includes alternatives for handling construction and demolition waste, information on how to estimate recyclable waste, a sample waste management plan, a checklist of 135 materials and items typically contained in demolished buildings, and a list of resources for further information. *See* <http://www.tjcog.dst.nc.us/cdwaste.htm> (last visited: Aug. 8, 2003).

III. WAKE COUNTY PUBLIC SCHOOL SYSTEM HIGH PERFORMANCE SCHOOLS INITIATIVE

Over the past two years, the Wake County Public School System has required the consideration and integration of a variety of environmental and health goals into new school construction projects. This work expands on school board policies and district guidelines promoting energy conservation.

A. BACKGROUND

Energy conservation policy. In 1991, the WCPSS School Board adopted a policy on energy conservation. The policy provides: “Appropriate means and methods of energy conservation shall be employed to minimize energy consumption, including but not limited to the design and operation of buildings, equipment, and vehicles.” Wake County Board of Education, Policy #7450: Energy Conservation and Management. The policy directs the WCPSS facilities department to include specific energy efficiency criteria in its design guidelines and requires that school construction and renovation projects conform to those guidelines. In addition, designs for construction and major renovation projects must include “an analysis of energy consumption and life cycle costs.” *Id.* at 7450.4.

Following issuance of this policy, a variety of energy-conservation provisions were included in the WCPSS Design Guidelines. The guidelines establish generally that the “Design Team shall make every effort to provide a system design with maximum utilization of energy conservation measures, consistent with functional requirements of the buildings.” Wake County Public School System, Design Guidelines, § 01030 (March 1999) *available at* http://www.wcpss.net/Auxiliary/Facilities/design_guidelines/design_guidelines_whole.pdf (last visited: Aug. 8, 2003). The guidelines require use of ASHRAE’s Energy Conservation in New Building Design standard, as well as the State Building Code. The guidelines “strongly recommend” natural daylighting and require thorough examination of daylighting strategies, as well as consideration of building orientation to minimize heat loss, facilitate beneficial solar gain, and promote natural daylighting.” *Id.* at §§ 01030, 02001. Life cycle cost analysis (30-year, computerized model) is required for at least three alternate HVAC systems. *Id.* at § 15500. In addition to these energy-related measures, the guidelines require that water-saving features be specified for all water-consuming devices. *Id.* at § 01030.

During the mid-late 1990s, a number of schools in Wake County were designed and built with high performance features, with particular emphasis on energy-related goals. For example, the highly publicized Durant

Road Middle School, built in 1996, features extensive daylighting and other energy conservation measures. *See* Innovative Design, Durant Road Middle School Information Sheet, *available at* <http://www.innovativedesign.net/art/info-du.jpg> (last visited: Aug. 8, 2003). According to the school’s designers, the project was completed under budget and the energy-saving features were paid back in less than two years, due to reduced operating costs. *See* <http://www.innovativedesign.net/board.htm> (last visited: Aug. 8, 2003); *see also* Watt Watchers, In North Carolina, *available at* http://wattwatchers.utep.edu/pages/Natural_Daylighting_in_schools.htm (last visited: Aug. 8, 2003).

The district’s focus on energy efficiency is also evident in its development of an “EnergySavers” program in 1996. Through the program, the district assists schools in taking actions that will conserve energy, save money and educate students about energy efficiency. *See* <http://www.wcpss.net/faqs/292.html> (last visited: Aug. 8, 2003). WCPSS has received a number of different awards for its accomplishments under the program. *See* <http://www.wcpss.net/auxiliary-services/rebuild.html> (last visited: Aug. 8, 2003); <http://www.wcpss.net/news/energy-savers.html> (last visited: Aug. 8, 2003). The district recently entered into a partnership with the Department of Energy’s Rebuild America program to further its energy saving activities.

New direction in facilities planning. Also in the late 1990’s, the WCPSS hired a new director of facility planning, who came to Wake County with experience and an interest in sustainable school design and construction. While this official was not brought into the school system for the explicit purpose of developing a sustainable building program, she became a strong proponent and facilitator of high performance school planning and design within the district.

B. COMPONENTS OF THE INITIATIVE

Wake County Public School System’s efforts to institutionalize high performance design and construction accelerated in 2001 and 2002, during the beginning of the PLAN 2000 school building program. In the first two years of the program, five new schools, four major capital improvement projects, and 21 minor capital improvement projects were completed, amounting to \$289 million in contracts awarded under the program. WCPSS, School Connection (March 2003), *available at* http://www.wcpss.net/online_newsletters/the_school_connection/newsletters/3_7_2003-tsconnection.html (last visited: Aug. 8, 2003). The effort to incorporate high performance features into these school projects was largely

HIGH PERFORMANCE SCHOOL POLICYMAKING AT THE SCHOOL BOARD LEVEL CHAPEL HILL–CARRBORO CITY SCHOOLS

The Chapel Hill–Carrboro School Board's development and implementation of a formal high performance school building policy has been an essential component of that district's high performance building initiative. After decades of stable enrollment, dramatic increases in student populations necessitated the building of several new schools beginning in the mid-1990's. After initially responding to the new demand by building schools as quickly as possible, by 1997, some members of the School Board had begun to consider how to improve the quality of the district's new buildings while increasing efficiency and environmental sensitivity. According to School Board officials, after working with an area sustainability consultant to incorporate high performance goals into an elementary school project, district and Board officials sought to integrate high performance design into their facilities planning and design policies. School Board members and district staff began to explore how they might draw on the CHPS criteria as they participated in creating the Triangle J High Performance Guidelines and continued to develop and revise their own high performance criteria and standards for the Chapel Hill–Carrboro City Schools.

The School Board's High Performance School Building Design Criteria were first drafted and adopted in 1999. The criteria provide a list of design characteristics to be "incorporated into every school design to the extent feasible" in order to "improve the learning environment while saving energy, material and natural resources." See School Board Policy 9040: High Performance Building Design Criteria and Regulations, *Available at* http://nt5.scbbs.com/cgi-bin/om_isapi.dll?clientID=431596&infobase=chaphill.nfo&jump=9040&softpage=PL_frame#JUMPDEST_9040 (Last Visited: August 29, 2003). The extensive criteria are divided into 13 categories that address environmental sensitivity, water efficiency, HVAC and lighting efficiency, conservation of "raw resources," indoor air quality, temperature, visual comfort, noise, training for school personnel, commissioning, safety, community use, and architectural interest. Within each of the 13 categories, several characteristics are listed, varying from general goals, such as "increase outside or natural light through daylighting," to specific practices, such as "install T-8 lighting."

In 2002, the district drafted and the board adopted a set of regulations to further implement the district's high performance school building policy. The regulations provide detailed performance standards to be applied to all district facility designs. They include everything from providing "100 foot buffers from any wetland area" during site selection, to achieving minimum daylighting levels "in 75% of all spaces occupied for critical visual tasks." According to the regulations, architects' and contractors' "experience related to high performance school standards" will be evaluated during the bidding process. During planning and construction, design teams and construction contractors are required to provide the Board with "written documentation verifying their compliance with the guidelines." *Id.*

The district has built two schools according to the Design Criteria since they were adopted in 1999. Because of the success of these initial projects, the Board is considering how it might further expand the policy to include other high performance strategies in the district's future building projects.

initiated by school staff, rather than by the announcement of a formal initiative or the adoption of a written policy at the school board level. [The development of board policy was a central component of the high performance school building initiative of nearby Chapel Hill-Carrboro City Schools, as described in the box above.]

Nevertheless, WCPSS has taken concrete steps to change the way it builds schools to incorporate high performance goals. The key elements of this initiative have been the development of a regional guidance document and the incorporation of that guidance document into all new school design and construction projects. In addition, the school district has strengthened its own facility guidelines on a number of issues.

1. *Strengthening the WCPSS Design Guidelines*

In 1999, the district's new director of facilities planning undertook a review of the WCPSS Design Guidelines to identify opportunities for incorporating high performance design measures. Subsequently, the dis-

trict made a number of changes addressing health-related goals. For example, the guidelines address mold and moisture prevention by establishing a number of requirements relating to humidity levels, including the requirement that outside air be pre-treated to prevent humidity problems and that humidity-resistant acoustical panels be used. Wake County Public School System Design Guidelines at §§15500, 09510. The guidelines also include requirements for low-emitting materials. For example, projects must use "environmentally safe, low odor adhesives" for carpeting; low-VOC adhesives and sealers for wall coverings; and water-based solvents and mercury-free paints with low or no VOCs. *Id.* at §§ 09680, 09720, 09900. Carpeted areas must be ventilated thoroughly prior to occupancy. *Id.* at § 09680.

Although these changes were significant in establishing minimum standards in a number of key areas, they did not require a comprehensive approach to high performance design and construction—that is, the early, integrated consideration by the school community of a broad range of environmental and health goals. Beginning in

2000, however, the district helped initiate the development of a guidance document that would promote such an approach in Wake County and throughout the region.

2. *Development of a high performance building manual*

The development of a manual, titled *High Performance Guidelines: Triangle Region Public Facilities*, has played an important role in the WCPSS high performance schools initiative. While the WCPSS was not the sole or lead agency on this project, district and other officials from Wake County were instrumental in initiating and drafting the guidelines.

In late 1999 and early 2000, the WCPSS facilities planning director began to consider the development of high performance school guidelines as a way of furthering the design and construction of sustainable schools. The Triangle J Council of Governments soon became aware that officials within Wake County were interested in developing guidelines, and TJCOG, through its solid waste program manager, suggested creating a regional guidance document. After initial discussions with officials from Wake County and one or two other governments in the region, TJCOG launched the project in 2000.

According to TJCOG officials, the broad goal of the project was to change building practices throughout the region, with public buildings as a model. The guidelines would therefore cover all public buildings, including schools. To increase support from those who ultimately would be using the document, the founding committee sought broad participation in the process from public officials and the design community. During 2000, approximately 50 people—representatives of 12 local governments and school systems, one university, a few state and federal officials and numerous private sector design and construction professionals—worked together to create the guidelines under the direction of TJCOG’s solid waste/materials resources program. Funding for the effort came from small monetary contributions by the governments working on the guidelines, from TJCOG’s budget (underwritten in part by members’ dues), and from in-kind contributions for the publication of the document itself. In addition, the 50 people participating in the project contributed significantly of their time.

The group met several times as a whole and in smaller working groups to draft the key topics covered by the guidelines—siting, water, energy, materials, and indoor environment. The group used the U.S. Green Building Council’s LEED system as a model, and also used guidance documents published by the state of Pennsylvania and the state of New York. In addition to drafting the sub-

stantive content of the guidelines, the group identified added costs and training needs for each topic covered.

TJCOG published the guidelines in January 2001, a little less than a year after the project was launched. The guidelines are based on a point system. The document discusses a broad range of environmental and health goals and practices, and for each topic assigns a number of points. The guidelines contain six general categories, within which the various topics are presented: Quality Management; Site; Water; Energy and Atmosphere; Materials and Resources; and Indoor Environment. Within these categories are a list of topics incorporating specific goals or practices. The guidelines also include a short discussion of the intent of each requirement and a list of strategies that can be used to achieve it. While the guidelines include some prerequisites that do not earn points, most of the topics are optional.

TJCOG does not engage in any type of certification or recognition system for buildings that achieve high point totals using the guidelines. Rather, the point system is designed as a goal-setting and self-evaluation tool, and it is up to school districts and other governmental agencies to decide how best to use it.

Nine months after the first version of the guidelines was released, a second version was published. The purpose of the revision was to change the point system to “better reflect the significance of the various measures appearing in the document.” High Performance Guidelines at iii. As the guidelines note, once the document was in use “it became apparent there was a need to send better signals regarding the relative significance of the measures in the document.” *Id.* at 11. A day-long meeting was held to redefine the relative values of the various high performance measures. Participants of the meeting included some of the original participants in developing the guidelines, as well as a number of speakers addressing a broad range of environmental and sustainable development issues. Following these presentations, all participants ranked the various issues in importance, and these rankings were used to revise the point totals for corresponding measures in the guidelines.

The guidelines contain a four-page checklist that includes all of the prerequisites, as well as the requirements and their corresponding points. The new point system uses a scale of 1,000 points, instead of the original 103-point scale. Whereas most items achieved a single point under the original system, point values fluctuate between 5 (acoustic quality) and 120 (water use reduction) for individual topics under the new system. The point breakdowns for the six categories are: Quality

The development of a high performance building manual has played an important role in the district’s initiative.

Management (20); Site (244); Water (197); Energy & Atmosphere (207); Materials and Resources (157); and Indoor Environment (95).

Following publication of the guidelines, TJCOG obtained a grant from the state Energy Office to organize workshops on the guidelines in different locations around the state. Over the course of a year, about a dozen presentations were made to school boards and county officials. In addition, four full-day workshops and eight two-hour workshops were presented to government officials and design professionals. TJCOG then received a second grant from the Energy Office to provide technical assistance on a state pilot program using the guidelines. (See Section IV.)

3. WCPSS implementation of the high performance guidelines

WCPSS now requires the use of the Triangle J High Performance Guidelines for every school construction or renovation project. The school system has attached the High Performance Guidelines to the WCPSS Design Guidelines. According to district officials, the standard WCPSS agreement for architecture and engineering services contains a clause that references the WCPSS Design Guidelines, thus requiring that A/E teams follow the high performance guidelines as well. Once PLAN 2000 schools are completed under this new approach, district officials intend to conduct a post-construction review to make sure the buildings function as designed.

For each project, WCPSS requires a high performance plan, although the district does not require a certain set of design features or a minimum number of points from the High Performance Guidelines. Early in the project, the WCPSS project manager meets with the A/E firm and all other consultants to review the High Performance Guidelines' checklist and discuss how the project can incorporate sustainable design features. Several designs from PLAN 2000 schools have been included in the High Performance Guidelines as case studies. See <http://www.tjcog.dst.nc.us/hpgtrpf.htm> (last visited: Aug. 8, 2003). For example, the design for Apex Elementary School incorporates features relating to the siting of the building, recycling of building materials, daylighting, and indoor air quality (e.g., low-VOC materials, temperature/humidity monitoring systems, pre-occupancy ventilation). See <http://www.tjcog.dst.nc.us/hpgtrpf.htm> (last visited: Aug. 8, 2003). Another example is the design for Knightdale High School, which is expected to open in 2004. The design includes a 30 percent reduction in energy use, water use reduction, and various indoor air quality features (e.g., low-emitting materials, monitoring for temperature, humidity, and carbon dioxide). *Id.* This design would achieve the second

highest (silver) rating under the High Performance Guidelines.

In addition to creating new school designs, WCPSS is modifying some of its prototype school designs to incorporate high performance features. WCPSS traditionally has made extensive use of prototype designs, and for PLAN 2000, WCPSS officials identified certain prototype designs that would be revamped to include high performance features. See <http://www.wcpss.net/auxiliary-services/prototypes.html> (last visited: Aug. 8, 2003). For example, the 1996 design used for Durant Road Middle School, which had originally incorporated daylighting and other energy conservation features, was used to design Heritage Middle School (expected completion in 2004). See <http://www.wcpss.net/auxiliary-services/prototypes.html> (last visited: Aug. 8, 2003). The new design, which achieves a "gold" rating under the High Performance Guidelines, incorporates a broad range of high performance features, from solar photovoltaic water heating and daylighting to rainwater collection and use of recycled building materials. See <http://www.tjcog.dst.nc.us/hpgtrpf.htm> (last visited: Aug. 8, 2003). In addition, an elementary school design that WCPSS had used five times was modified for the new Heritage Elementary School to incorporate the High Performance Guidelines. See WCPSS, Triangle Designs High Performance Guidelines, *available at* <http://www.wcpss.net/auxiliary-services/sustain.html> (last visited: Aug. 8, 2003).

As noted earlier, the Wake County Board of Education has been supportive of the WCPSS efforts to use high performance design. Following the publication of the Triangle J High Performance Guidelines, WCPSS staff made a presentation on the guidelines to the Board. During the course of an individual school project, the district obtains board approval of the schematic design, construction drawings, and bid documents. WCPSS staff generally make a presentation to the board during the schematic design phase of a proposed project, and will note high performance features of the building such as energy efficiency or daylighting. According to WCPSS and School Board officials, the board has consistently supported the inclusion of high performance features.

IV. RELATED STATE AND LOCAL HIGH PERFORMANCE BUILDING ACTIVITIES

A. STATE-LEVEL ACTIVITIES

In 2001, as part of legislation strengthening the requirements for performing life cycle cost analysis, the state legislature addressed the use of the Triangle J High Performance Guidelines. House Bill 1272 explicitly rec-

ognized the importance of energy conservation in state construction and renovation activities, and stated that:

The General Assembly promotes the use of the Triangle J Council of Governments' High Performance Guidelines to achieve these goals and encourages any State entity to rate itself in accordance with these guidelines for the design, construction, operation, maintenance, or renovation of any State-assisted or State-owned facility.

N.C. House Bill 1272, Sec. 7. In addition to providing this general statement of support, the legislation established a pilot program to test the guidelines in 10 state building projects. *Id.* The projects were to be carried out by the University of North Carolina, the State Board of Community Colleges, and the Office of State Budget, Planning and Management.

The State Energy Office is taking the lead in implementing this program, which currently has 15 pilot projects, mainly at state universities and community colleges. The Energy Office provides technical assistance to the projects through a contract with the Triangle J Council of Governments. TJCOG's principal role is to coordinate review of each project at the schematic design and design development stages, although it also provides training on specific topics such as daylighting and energy modeling, as well as "goal-setting" sessions for individual projects. State Energy Office, *Review of High Performance Guidelines: Triangle J Public Facilities* (Draft, April 2003) (on file with Environmental Law Institute). Although the program is still in mid-course, early feedback provided by the pilot projects indicates that the guidelines are providing a useful common framework and resource for achieving high performance buildings. The collaborative development of the guidelines and their North Carolina-specific focus have helped to enhance the credibility of the document. *Id.*

B. WAKE COUNTY ACTIVITIES

Wake County has incorporated elements of high performance design in the past, such as installing enhanced HVAC systems that increase energy efficiency. These efforts have gained momentum over the past few years, due in part to increasing general awareness of the benefits of high performance design and in part to the development of the Triangle J High Performance Guidelines. A more immediate factor is the creation of a report (still under development), titled *Strategies to Optimize the Planning, Design, Construction, Repair, and Maintenance of School and County Facilities*. The document has been drafted by the staffs of the Wake County Government and

the Wake County Public School System, as directed by the Board of Commissioners and the Board of Education. See *Strategies to Optimize the Planning, Design, Construction, Repair, and Maintenance of School and County Facilities* (Executive Summary), *available at* <http://www.wcpss.net/auxiliary-services/joint.strategies.html> (last visited: Aug. 8, 2003). A study committee of staff members from the county and the school system made numerous recommendations, including the following, which specifically address facility design guidelines:

- Develop comprehensive joint energy design guidelines for school and county government facilities.
- Select at least two projects each at the county and school district level as a pilot test program to determine the benefits of applying the Triangle J High Performance Guidelines to all future projects.
- Prepare a consolidated general guideline of basic materials standards which meet life cycle cost objectives for use by both school and county government staff in the planning, designing, and construction of their respective facilities.

Id. The recommendations also called for collaborative planning and development of public facilities for joint use, and for the expansion of opportunities for community involvement in the development, community use, and maintenance of school and county facilities. *Id.*

The efforts of WCPSS to implement the Triangle J Guidelines were discussed above. Wake County, in response to the study, has worked to apply the guidelines to two projects: a fire station and a regional government services center. According to officials, the county is also working with WCPSS on revising energy guidelines (*Guidelines for the Design and Construction of Energy Efficient County Facilities*) that were published approximately 10 years ago. The goal is to strength energy efficiency guidelines applicable to public buildings and schools within the county. Finally, county officials note that they are working on developing materials standards that can be used to guide all public building projects in the county.

V. BARRIERS TO HIGH PERFORMANCE SCHOOL DESIGN AND CONSTRUCTION IN WAKE COUNTY

A. FINANCIAL CONSIDERATIONS

While the perceived financial implications of high performance design and construction are among the most significant barriers to achieving change generally, financial barriers have not played a significant role in the WCPSS'

efforts to date. The approach of the district has been to incorporate high performance features to the extent possible without the benefit of additional resources targeted for that purpose.

WCPSS officials note that the potential for higher first costs has not been a significant barrier because the district has sought to balance costs and environmental goals by considering the project as a whole. Where desired environmental or health-related features in a specific project cost more than anticipated in the initial project budget allocation, the district has sought to identify trade-offs by looking at other features of the project. Thus, the district has incorporated features such as daylighting, whose additional initial costs are offset by the need for smaller HVAC equipment resulting from lower mechanical loads. In addition, the School Board has expressed general support for considering long-term costs as well as up-front costs in approving school design and construction plans. State and district policies requiring life cycle cost analysis also support this approach. The district has not experienced significant cost increases as a result of incorporating high performance strategies. Indeed, staff point out that the district has designed schools to achieve silver and gold ratings under the guidelines without increased budgets.

B. EDUCATION AND AWARENESS

The main obstacle faced by the district in implementing its high performance schools initiative was a lack of awareness and understanding of the benefits of this approach. Having a “champion” in the director of facility planning, who had a background in and commitment to sustainable design, was a key factor in advancing high performance goals within the WCPSS school building program.

Implementing those goals has required educating a range of stakeholders, including: WCPSS design, construction, and maintenance staff who were not accustomed to using a high performance design approach; Wake County School Board members; and the design community generally. The district has emphasized working closely with maintenance staff in order to ensure that design features requiring new maintenance or operations practices are well understood. WCPSS officials observe that more architects in the area are now taking green building training courses and becoming familiar with high performance design. The Triangle J High Performance Guidelines, which provide a framework and a metric for achieving health and environmental goals on a regional basis, are an important vehicle for educating about high performance design and ensuring that those involved have a common basis for moving ahead. Finally, district officials also note the critical importance of devel-

oping skills and knowledge of high performance design in the construction contractor community, since the best design features are of little value if they are not built or installed properly.

VI. SUMMARY AND OBSERVATIONS

The Wake County Public School System’s building program is still underway, and the end results of these efforts—how the schools serve the students, staff, district, and community generally—are not yet known. However, the program has succeeded in changing the way schools are built to incorporate a range of health and environmental goals. This has been accomplished not through a high-profile policy or formal initiative, but rather through the efforts of staff within WCPSS who are committed to sustainable design and construction.

A. STRATEGIES USED

High performance guidelines and metric. The main strategy used by the Wake County Public School System to institutionalize high performance design and construction was the development of a guidance document and metric, and the application of the guidelines to all school building projects.

Though based on the LEED model, the guidelines were created specifically for use in this region of the state, and they include case studies from the region. The guidelines are fairly succinct, setting forth performance-based goals for each topic, providing a summary of suggested technologies/strategies for achieving the goals, and listing required deliverables. The guidelines emphasize energy and water conservation, as well as certain siting issues. Indoor environmental issues are included in the guidelines, although they account for a relatively small number of points (95 out of 1,000). The guidelines include an example of a local project that implemented approximately one-third of the topics covered by the guidelines.

WCPSS Facilities Guidelines. The WCPSS undertook a review of its mandatory Facilities Guidelines to determine opportunities for addressing high performance goals. The resulting changes were significant, particularly with respect to indoor air quality issues. The guidelines now require “environmentally safe, low odor adhesives” for carpeting; low-VOC adhesives and sealers for wall coverings; and water-based solvents and mercury-free paints with low or no VOCs. The WCPSS Facility Guidelines thus complement the Triangle J High Performance Guidelines in an important respect. The result can be seen in a comparison of projects undertaken before and after the WCPSS Facility Guidelines were revised:

Wakefield High School (completed in 1999) did not utilize low-emitting materials; by contrast, all schools designed in 2001 and 2002 do incorporate this feature. See High Performance Guidelines: Triangle Region Public Facilities (Case Studies, at C9-10), available at <ftp://mail.tjcog.org/pub/webftp/casestd3.pdf> (last visited: Aug. 8, 2003); see also <http://www.tjcog.dst.nc.us/hpgrtpf.htm> (last visited: Aug. 8, 2003).

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

School district leadership. Wake County School Board policies on energy efficiency and life cycle cost analysis established important priorities. Nevertheless, the district's broad high performance schools initiative has been led by WCPSS staff. The hiring of a new director of facility planning, who in turn received support from upper management within WCPSS, was the main impetus for change in the district.

Regional collaboration. The regional focus of the Triangle J guidelines and the region-wide collaboration in developing the document, are noteworthy for a few reasons. As WCPSS officials point out, the district was able to accomplish more by pooling resources with TJCOG and others in the region than it could have on its own. More importantly, the resulting product had the imprimatur of a wider group of individuals and agencies, thus creating a more solid foundation for its application in Wake County and throughout the region. The regional nature of the undertaking also likely contributed to the adoption of a state law creating a pilot program using the document.

Role of the state, the public, and the private sector. Though the state participated in the development of the Triangle J High Performance Guidelines, the role of the state in decisions about local school planning, design, and construction is fairly limited in North Carolina. Recent state legislation expanded home rule in this area. Even when the state does provide funding for school building projects, the state education agency does not approve designs, and its recommendations are not binding. The state does provide considerable information on school design and construction, however, and thus has a potentially significant role to play in assisting school districts in advancing high performance goals.

Although the Triangle region is home to some design firms that are well-known leaders in sustainable design, the WCPSS effort was driven mainly by the school system rather than by the private sector. While many design pro-

fessionals were involved in the development of the Triangle J High Performance Guidelines, only a few of those participants were experienced in this area. Indeed, school officials feel that the district's incorporation of high performance design requirements has helped increase the level of awareness of and expertise in these issues among the design community.

While design professionals were formally involved in developing the High Performance Guidelines, other members of the community were not. The process was perceived and carried out as a technical undertaking and was aimed primarily at reaching out to public officials and architects. It is an open question whether the priorities established in the guidelines would have been characterized

differently—*e.g.*, with greater emphasis on indoor environmental issues—had broader community input been solicited. Similarly, within Wake County, the impetus for incorporating high performance design has not come from the community—either generally or with respect to individual school projects. On individual school projects, the district has not emphasized community input on high performance design issues; rather, WCPSS staff communicate primarily with the design team regarding how the guidelines are being incorporated.

C. IMPLEMENTATION CHALLENGES

Absence of formal written policy. The WCPSS has made notable progress to institutionalize sustainable school design and construction. This progress has involved changing the approach to school building in a large district in which many staff people are involved in school facilities. Nevertheless, the WCPSS use of the Triangle J High Performance Guidelines in every new project is not backed up by formal policy of any sort. It is thus possible that the turnover of one or two key facilities managers within the district could lead to a change in this practice. WCPSS staff indicate that they will seek to address this in the next bond referendum. WCPSS plans to include high performance goals in the preparation of the next building program document, PLAN 2004. This could be a significant step in ensuring that environmental and health goals are considered in future school building projects.

Use of a metric. The Triangle J High Performance Guidelines present a broad array of strategies that could be incorporated in any given project. While this provides a potentially useful and flexible framework within which to consider health and environmental goals throughout the

The district plans to include high performance school goals in its next major building program.

district, it does not ensure that any particular issues will be addressed, or that the design process will consider these issues in an integrated fashion. The guidelines present very few “prerequisites,” and the WCPSS does not require any particular minimum point total. Thus, one challenge facing the school district is to exercise sufficient oversight to ensure that the guidelines are being used in a meaningful way. The district has lessened this burden in an important respect by revising its School Facilities Guidelines to incorporate certain priority issues such as low-emitting materials. Thus, while the High Performance Guidelines may not include many pre-requisites, standard practice in the district does address a number of health and environmental goals.

Community participation. A related challenge is to ensure the participation of the community in decisions about individual school building projects. Thus far, it appears that the community has not played a major role in discussions during the design process about how to incorporate high performance features. Given the trade-offs inherent in using a framework such as the Triangle J guidelines, community participation early in the design process is important both for incorporating health and environmental goals in the school building and for enhancing the community’s connection to these issues.

Participation at the district level could also be important in further institutionalizing the WCPSS-led efforts to date. There are both formal and informal mechanisms of community participation in education policy in Wake County. For example, the school board has adopted a formal policy requiring the establishment of nine “board

advisory councils” (from each board member’s district) to advise the board on a broad range of school policies and procedures. Wake County Board of Education Policy 1800. Another mechanism for community input is the annual Wake Education Summit, a community-led forum for discussion of “change to foster ongoing quality improvement in the public schools.” See <http://www.wakeeducationsummit.org/> (last visited: Aug. 8, 2003). The May 2003 forum, attended by over 800 community, business and parent leaders, was held in conjunction with a year-long community survey of educational priorities. The results of the both the survey and the summit are being presented to the Board of Education. See http://www.wakeeducates.org/voices_choices/index.html (last visited: Aug. 8, 2003).

These avenues for public participation at the district level do not seem to have played a role thus far in the WCPSS high performance schools activities. One potential opportunity for enhancing the role of the community in sustainable schools issues is captured in the recent report of the Citizens’ Advisory Committee for School Facilities Planning and Funding, which was charged with recommending strategies to the Wake County Commissioners and the Board of Education for broader inclusion of the community in capital spending plans. See http://www.wcpss.net/citizens_advisory/final_report.html (last visited: Aug. 8, 2003). The report recommended putting in place “an ongoing advisory group that will work to monitor the WCPSS’s progress. . . and provide the School Board and County Commissioners with a steady stream of information about the community’s concerns and perceptions of the schools.” *Id.*

CHAPTER 7

ELK RIVER AREA SCHOOL DISTRICT, MINNESOTA

Over the past few years, the Elk River Area School District has changed its approach to building schools. Recognizing the need to improve the quality of facilities in order to enhance learning and maintain financial integrity, the district has developed high performance principles that emphasize an integrated approach to design, enhanced resource efficiency, improved indoor environmental quality, and lower life cycle costs.

Sustainable building efforts also have been gaining momentum at the state level in Minnesota. These efforts have focused on state buildings, although there have been a number of legislative and regulatory measures that relate to high performance school design and construction. These relatively new state-level policies were not the impetus for change in Elk River, but are discussed here both because they provide general background for understanding the Elk River initiative and because they may play a significant role in local school building programs in the future.

The chapter begins with an overview of the principal state laws and regulations that apply to local school building projects. Section I describes briefly the state's funding scheme for school construction, as well as the state education, construction, procurement, and environmental laws that relate generally to health and environmental issues in school design and construction. Section II describes the sustainable building activities that are being developed at the state level and that provide a foundation for the state to play a larger role in local high performance school initiatives in the future. Section III discusses the strategies used by the Elk River Area School District to change the way it designs and builds schools to achieve high performance goals. In Section IV, the chapter notes some of the barriers overcome by Elk River in pursuing this new approach. Finally, Section V summarizes the components of Elk River's initiative, notes the key factors in its success and identifies some of the challenges ahead as the district develops further its high performance approach to school design and construction.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

There were approximately 856,000 K-12 students housed in over 2,300 schools in Minnesota in 2000. National Center for Education Statistics, *Digest of Education Statistics: 2002* (Tables 37 and 97), *available at* <http://nces.ed.gov/pubs2003/2003060b.pdf> (last visited: June 23, 2003). Nearly all of the state's 415 school districts serve under 7,500 students, and only one (Minneapolis) is among the 100 largest districts in the United States. *See* NCES, *Characteristics of the 100 Largest School Districts in the United States: 2000-2001*, at Table 5, *available at* http://nces.ed.gov/pubs2002/100_largest/table_05_1.asp (last visited: June 23, 2003); *see also* <http://nces.ed.gov/pubs2002/overview/pdf/tableA-5.pdf> (last visited: June 23, 2003).

The Elk River Area School District serves about 40,000 residents from several cities and towns in a fast growing part of Minnesota located about 25 miles northwest of Minneapolis. With over 10,000 students in 17 school buildings, Elk River is the 13th largest district in the state. *See* Elk River Area School District, *Who We Are*, *available at* <http://www.elkriver.k12.mn.us/district/who.html> (last visited: August 26, 2003).

A. STATE ROLE IN FUNDING AND REGULATING SCHOOL CONSTRUCTION

The state of Minnesota provides funding for school construction and renovation projects, and the state Department of Education (formerly the Department of Children, Families and Learning) oversees compliance by school projects with a limited array of state requirements. Other state agencies ensure compliance with the state's principal regulatory requirements for school design and construction—the state building code, procurement laws, and certain environmental standards. Though not discussed in this report, the state also has established requirements related to indoor air quality in existing schools, which are linked to the state's funding program for capital repair projects. Both the Department of Health and the

Department of Education play important roles in that area.

1. Funding

School construction in Minnesota is supported by a combination of local and state funds. During 1999-2000, the combined state and local funding for school construction totaled nearly \$733 million. National Education Association, School Modernization Facts: Minnesota, available at <http://www.nea.org/lac/modfacts/MNfacts.html> (last visited: August 25, 2003).

The state provides a variety of funding programs for school construction projects. See generally Minnesota Department of Children, Families & Learning, Guide for Planning School Construction Projects in Minnesota at 4-12 (rev. 2003) [“hereinafter Minn. School Construction Guide”]. State law establishes funding for school districts’ operating capital revenue, which may be used to acquire land and repair or construct buildings. Minnesota Statutes § 126C.10 subd. 13, 14. Another important state funding program establishes two levels of capital facility aid—in the form of debt service equalization payments—to qualifying districts that exceed 15 percent of their adjusted net tax capacity in annual debt service payments. Minn. Stat. § 123B.53. In addition, certain districts that require greater state funding may receive state assistance through the state’s capital loan program. Minn. Stat. § 126C.69. This program allows the state government to issue bonds for local school construction projects in districts that do not have a sufficient local tax base to pay for new school construction. To be eligible, a district’s debt service equalization payments (after state equalization aid) must be more than 40 percent of its adjusted net tax capacity. Minn. School Construction Guide at 9.

2. Regulation and oversight

a. Education laws

The Department of Education administers the state’s education code. The “review and comment” process established in the code is the primary means by which the department oversees school facility design and construction. Any school district proposing a school construction project with a budget over \$250,000 must “consult” with the department “before developing any plans and specifications.” Minn. Stat. § 123B.71. As part of this initial consultation, the department may require a school district to submit preliminary and final plans for approval. The agency must approve or disapprove the plans within 90 days of their submission. Following completion of the project, the local school board must certify to the state

that the project was completed according to the approved plans. *Id.*

Schools facility projects exceeding \$500,000 require additional state review. A school district may not “hold a referendum for bonds, nor solicit bids for new construction, expansion, or remodeling of an educational facility” with an anticipated budget of over \$500,000 prior to undergoing review and comment by the state. Minn. Stat. § 123B.71, subd. 8. The state education code lists a number of items that must be submitted to the Department of Education as part of this process, including information about the proposed facility, the need for the facility, and the financing of the facility. Minn. Stat. § 123B.71, subd. 9. The department must then provide review and comment about the “educational and economic advisability of the school construction project proposal.” Minn. Stat. § 123B.71, subd. 11. During the review and comment process, the state also determines whether the school district will be eligible for debt service equalization aid once a local bond issue referendum is approved.

The state may issue a positive, negative or unfavorable decision on a project. If a project receives a “positive” review from the Department of Education the school board may proceed with construction. Minn. Stat. § 123B.70. If the state proposes to issue a “negative” review and comment the state must hold a public meeting in the school district to discuss the proposed negative finding; if the state then issues a final negative review and comment the school district may not proceed with construction. *Id.* An “unfavorable” review and comment requires the school district to reconsider the proposal; if the district decides to proceed with construction it must obtain the approval of at least 60 percent of the voters for the issuance of bonds. *Id.* The state considers a negative or unfavorable review for only a few projects each year. Minn. School Construction Guide at 16.

To determine the educational and economic advisability of a proposed project, the state reviews the required information about the project provided by the school district and applies the requirements and recommendations contained in the state’s facility guidelines (*Guide for Planning School Construction Projects in Minnesota*). *Id.* The guidelines are focused mainly on ensuring adequate educational facility spaces, but also describe other aspects of school planning, design, and construction. At the end of the guidelines, the state has included information on several issues that may be of interest to school districts, including indoor air quality and sustainable school design.

The state’s education law, which governs the review and comment process, contains a few specific requirements for new school projects that relate to health and

environmental goals. These requirements are generally incorporated into the review and comment process and are referenced in the state's facilities guidelines.

HVAC systems. In 2001, the state's major education funding legislation established requirements relating to minimum HVAC systems in new and renovated schools. The education code now requires that all projects subject to the review and comment process must be designed to provide for the monitoring of outdoor air flow and total airflow of ventilation systems, as well as to provide a filtration system in accordance with current ASHRAE standards. Minn. Stat. § 123B.72. A system inspector must verify compliance with these requirements. *Id.*

Commissioning. The 2001 education funding bill also added a commissioning requirement for projects subject to review and comment. Prior to occupying or re-occupying a school facility, the HVAC system must be inspected to ensure that it "has been installed and operates according to design specifications and code." Minn. Stat. § 123B.72. The statutory requirement is less extensive than the industry standard for a full commissioning process, as it applies only to the major components of the HVAC system and requires only that the system be inspected prior to occupying the building. The Department of Education produced a guidance document explaining the requirement and recommending that districts take additional steps to ensure a fuller quality assurance program. *See* Minnesota Dep't of Children, Families & Learning, Minnesota Statutes § 123B.72 School Facility Commissioning (2002), *available at* http://education.state.mn.us/stellent/groups/public/documents/translatedcontent/pub_intro_facilities_guide.jsp (last visited: June 23, 2003).

Sustainable school design. The 2001 K-12 Education Funding Bill included a provision aimed at encouraging school districts to develop high performance school facilities. House File 0082 required the Department of Education to "provide technical assistance to a school district interested in providing environmentally sustainable facilities." That year, a separate education funding bill included an additional requirement related to high performance design and construction. The law requires that as part of the review and comment process, school districts include in their proposals to the Department of Education "a specification, if applicable, of how the facility will utilize environmentally sustainable school facility design concepts." Minn. Stat. 123.71 subd. 9.

Community use projects. In addition to submitting information to the state on sustainable design, school districts must include "a specification of how the project will

increase community use of the facility, and whether and how the project will increase collaboration with other governmental and non-profit entities." Minn. Stat. 123.71 subd. 5.

b. Pre-design review requirements

According to state law, any recipient of a state appropriation for a building project—including any "local government unit" such as a school district with a proposed project over \$1.5 million—is required to submit pre-design materials to the State Architect's Office within the Department of Administration (DOA). Minn. Stat. 16B.335. The law requires "review and recommendation" by DOA before the project proceeds with design activities. *Id.*

The DOA has incorporated sustainability—including an emphasis on life cycle cost analysis—in the pre-design process through its *Predesign Manual for Capital Budget Projects*. The manual describes the materials that must be submitted by a school district, including information about the project's goals. DOA, *Predesign Manual for Capital Budget Projects* at 14, *available at* <http://www.dsbc.admin.state.mn.us/pdfs/predesign-manual.pdf> (last visited: June 23, 2003). Appendices to the manual contain the DOA's Sustainability Guidelines for Consultants, as well as a pre-design checklist that requires applicants to: identify high performance goals; include a life cycle cost analysis for the building and its major components; indicate recycled materials that will be used in the project; and indicate how the project will meet a new state requirement of exceeding the energy code by 30 percent (see below). *Id.*, at Appendices M, Q. DOA officials note that the agency seeks to ensure that school building projects identify sustainability strategies and goals as part of this process, however, the agency does not conduct an extensive review or monitoring of the pre-design requirements for school projects.

c. State Building Code

School construction projects exceeding \$100,000 must undergo review for compliance with the State Building Code. *See* Minn. Stat. § 16B.60, 61. This review is carried out either by the state (through the Building Codes and Standards Division of the Department of Administration) or the local municipality. The code includes the Minnesota Energy Code, which has been revised over the past several years to include requirements for higher-efficiency building envelopes, lighting, and HVAC systems. The current code exceeds ASHRAE 90.1-1989. *See* Minn. Rules, c. 7676; *see generally*, U.S. Dep't of Energy, Minnesota DOE Status of Energy Codes, *available at* http://www.energycodes.gov/implement/state_

codes/state_status.cfm?state_AB=MN (last visited: June 23, 2003). The State Building Code also incorporates the Uniform Mechanical Code, with amendments. See Minn. Rules, c. 1346.

d. Environmental impact review and other environmental laws

Under state law, major governmental actions (projects financed, assisted, approved, or permitted by governmental units) that may have a significant effect on the environment must undergo review by the Environmental Quality Board. Minn. Stat. 16D.04, sub.1, 2a. Local government units (in the case of schools, the local agency responsible for planning and zoning approvals) must submit to the board either an Environmental Assessment Worksheet or a full Environmental Impact Statement. See Minnesota School Construction Guide at 29. The local government unit may not approve the project until the environmental impact review has been completed. Minn. Stat. 16D.04, sub.2b.

State law governs a variety of individual environmental aspects of school construction projects, including lead paint or asbestos abatement. See Minn. Rules chapters 4761 and 7025; Minn. Rules Part 7011.9920. State law also establishes restrictions on construction in sensitive areas such as shorelands and floodplains. See Minn. Rules Parts 6120.2500, *et al.*; Minn. Rules Parts 6120.5000, *et al.*

e. Procurement laws

Minnesota state law allows school districts to use single or multiple prime general contracting, as well as agency construction management as project delivery methods. State law does not provide for design-build or construction management at-risk methods for K-12 construction, although recent legislation authorized state projects (including colleges and universities) to use design-build for projects specifically designated by the legislature. That measure is in effect until 2004, at which time the legislature will evaluate further use of the design-build approach. See Minn. Stat. 16B.31. Contracts for goods or services provided to the school district, including design and construction, must be publicly advertised according to the process set out in state law, and contracts must be awarded to the “lowest responsible bidder.” See Minn. Stat. § 123B.52; Minn. Stat. § 471.345.

B. LOCAL ROLE IN FUNDING AND REGULATING SCHOOL CONSTRUCTION

Funding. Minnesota state law authorizes school districts, after receiving approval of a majority of the voters,

to issue general obligation bonds for school construction and renovation. Minn. Stat. § 475.52 subd. 5, 475.58. Districts are authorized to levy taxes to make payments for bonds issued and for interest on the bonds. Minn. Stat. 123B.55. School districts may increase their general fund revenues—which may be used for school construction and repair—by holding a voter referendum to increase operating funds. Minn. Stat. 126C.17.

In November 2000, Elk River Area School District voters approved a \$108.85 million bond issue to construct a new high school and elementary school, build an addition to a junior high school, and renovate six schools. The referendum included budgeted amounts for each of the projects. In addition, the referendum increased the operating budget by \$2.1 million each year for 10 years to operate the new schools. See Elk River Area School District, Important Bond and Operating Levy Election, *available at* <http://elkriver.k12.mn.us/district/bond00.htm> (last visited: June 23, 2003).

Regulation. In addition to implementing its local planning and zoning ordinance and issuing building permits, Sherburne County administers the state’s Floodplain Management Act and Wetlands Conservation Act, and the county issues permits for construction projects involving any alteration to shoreland property. See generally Sherburne County Planning and Zoning, *available at* <http://www.co.sherburne.mn.us/zoning/default.htm> (last visited: June 23, 2003). Incorporated cities, including the city of Elk River, may have their own planning and zoning ordinances, issue building permits, ensure compliance with the state building code for construction projects within the city limits, and administer floodplain management and shoreline protection requirements.

II. SUSTAINABLE BUILDING ACTIVITIES AT THE STATE LEVEL

State sustainable building activities did not play a central role in the development of the Elk River high performance schools initiative. This section describes recent state policies and programs on sustainable building as general background for Elk River’s initiative, and as a potentially important factor in the development of other local high performance schools initiatives in the future.

A number of state agencies and programs have addressed sustainable design and construction over the past several years. These programs have sought to promote high performance building practices generally and within state agencies. There has been considerable legislative activity over the past few years as well, including the passage of bills establishing requirements relating to sustainable school design. Other bills—*e.g.*, proposing a high

performance school facilities pilot program and proposing a high performance grants program to aid districts in covering pre-design costs—were not successful. A new initiative, also established by state legislation, has developed draft high performance building guidelines that will eventually apply to most state-funded building projects.

A. STATE HIGH PERFORMANCE BUILDING GUIDELINES

Context: Smart Building Partnership. In 1999, Minnesota Planning—a state planning agency that has recently merged with the Department of Administration—convened the first meeting of the Smart Building Partnership. The partnership included representatives from six state agencies: the Department of Administration, the Department of Finance, the Department of Commerce, the Pollution Control Agency, Minnesota Planning, and the Office of Environmental Assistance. According to officials involved in the partnership, one impetus for a high performance building approach was recent criticism over the state's backlog of deferred maintenance projects.

In 2002, Minnesota Planning published *Return on Investment: High Performance Buildings*. The report presents the information gathered by the Smart Building Partnership and suggests policy changes to encourage the use of high performance building strategies in state funded buildings. The report explores the benefits of and barriers to high performance building and the state and federal efforts to encourage this approach.

The Smart Building Partnership's discussions led to the formulation of sustainability goals for state buildings. These goals have been incorporated into the Department of Finance's FY 2002-2007 Capital Budget Instructions, which are instructions for state agencies and local government units that are applying for state funds for capital projects. The 2004 instructions list as guiding principles both "smart growth and high performance building practices" and "integration of capital and operating budgets with full consideration of operating cost impacts." Dep't of Finance, 2004 Capital Budget Instructions at 1, *available at* http://www.budget.state.mn.us/budget/capital/2004/04instructions_agency.pdf (last visited: June 23, 2003). Although the instructions do not set forth a specific framework for evaluating projects based on high performance criteria, they do state that projects receiving state funding "will be expected to employ high performance building practices. In general, this means designing buildings, sites and infrastructure that are energy- and resource-efficient, healthy for occupants, durable and adaptable to future uses, and less costly to operate and maintain. *Id.* at 6. The instructions encourage agencies to use the pre-design phase of a project to integrate the high

performance goals listed in the instructions, to include energy modeling in the design stage, and to integrate at least those energy strategies with a 10-15 year payback. *Id.* at 14.

Development of high performance building guidelines. Recent state legislation has given added momentum to these state sustainable building activities and has established sustainable design and construction requirements applicable to state funded school building projects. The state's 2001 Omnibus Energy Bill provides for the development of new sustainable building guidelines for state owned and funded buildings and for energy benchmarking of all public buildings in the state. *See* Minn. Senate File 722. The legislation has set in motion a process which has become known as Building, Benchmarking, and Beyond (B3).

According to the new law, the new sustainable building guidelines (to be developed by an inter-agency effort led by the Departments of Administration and Commerce), must require new buildings to exceed the existing state energy code by at least 30 percent, ensure that buildings achieve the "lowest possible lifetime cost," "encourage continual energy conservation improvements in new buildings," address "air quality and lighting standards that create and maintain a healthy environment and facilitate productivity improvements," include "specific ways to reduce material costs," and consider "renewable energy sources" and clean energy. Minn. Stat. § 16B.325.

A preliminary, beta version of the new Design Guidelines, developed by a team that included representatives of state agencies, universities, and private sector engineering and consulting firms, was released on January 15, 2003. *See* State of Minnesota, Sustainable Building Guidelines, *available at* <http://www.csbr.umn.edu/B3/index.html> (last visited: June 23, 2003).

Although they build on state and national models—including the DOA's Sustainability Guidelines for Consultants and the University of Minnesota's Sustainable Design Guide—the new draft guidelines go beyond existing guidance in this area. One key difference is the inclusion of numerous requirements, reflecting regional and state-specific priorities. As the draft explains: "Guidelines are required when they clearly contribute to the desired life cycle cost, human, community or environmental outcomes. This simplifies the decision making process when compared to point based systems where every item must be evaluated." State of Minnesota, Sustainable Building Guidelines—Beta Version Summary, at 8. For example, the guidelines require projects to specify low-emitting materials and to design buildings for moisture control. For practices whose benefits were less clear to the agencies drafting the document, the guidelines present a recommendation

rather than a required practice or goal. For example, the guidelines make recommendations for developing on a brownfields site and for siting a building near public transportation.

The broad topics included in the guidelines are performance management; site and water; energy and atmosphere; indoor environmental quality; and materials and waste. For each individual measure within these areas, the Guidelines provide performance criteria, tasks by phase, tools and calculations, and resources. The guidelines emphasize establishing and documenting performance measures—for example, agencies are directed to estimate health, well being, and productivity improvements resulting from indoor environmental quality design requirements, and to translate those benefits into financial terms.

The guidelines are to be used in several pilot projects in 2003. They may then be altered before becoming a required part of the DOA Pre-Design requirements for any building receiving funding from the state's bond proceeds fund after January 1, 2004. Department of Administration officials note that the guidelines will eventually be applicable to school building projects that seek state funding. Although the new guidelines will be incorporated into the pre-design review process, it is unclear precisely how the state will seek to ensure compliance with the guidelines for state building projects or for school projects. According to state officials, a significant challenge in implementing the guidance is the Department of Administration's lack of resources to undertake complete reviews of every building project.

B. OTHER STATE ACTIVITIES

A number of individual state-level programs promote sustainable building in Minnesota. Following are three examples of programs that could potentially play a role in local school construction activities.

Office of Environmental Assistance. The Office of Environmental Assistance (OEA), an agency that helps governmental and non-governmental entities address environmental problems, but does not regulate or enforce environmental laws, has promoted sustainable buildings for the past several years. The agency provides technical assistance to state and local governments interested in incorporating sustainable building practices, and also provides a broad array of educational resources through its new sustainable buildings web site. *See generally* <http://www.moea.state.mn.us/greenbuilding/index.cfm> (last visited: June 23, 2003). The OEA runs a grant program designed to help non-profits, local governments, school districts, and others move toward more sustainable

practices. The agency is also developing a directory of non-toxic and low-emitting building materials.

University of Minnesota, Center for Sustainable Building Research. The Center for Sustainable Design, formally established at the University of Minnesota in 2001, undertakes research and education on sustainable design, energy-efficient buildings, windows and glazing, building design process and evaluation, human factors, and building science. The center serves as a resource for the state, the design professions, and the building industry, and has worked closely with state agencies on a number of the state's sustainable design activities. *See generally* <http://www.csbr.umn.edu/howeare.html> (last visited: June 23, 2003).

State Energy Office and energy efficiency incentives. The state Energy Office, within the Department of Commerce, runs Rebuild Minnesota, which works with school districts and other sectors to improve energy efficiency, facilitate partnerships with private sector firms, and help to find grant money for energy efficiency projects. All program activities are focused on energy, including design features such as super insulation, daylighting, and glazing.

In addition to state-led energy programs, state law requires utilities to devote a certain percentage of their revenue to energy conservation programs. Minn. Stat. 216B.241. Xcel Energy, for example, runs an Energy Design Assistance program that provides consultation, energy modeling, and performance verification design teams to help implement energy efficiency strategies. For some projects, the program could provide design fee reimbursements to offset the costs associated with participating in the program, as well as owner incentives to help offset the cost of the energy efficiency improvements. *See* <http://www.theweidtgroupenergy.com/Analysis/MNUtilityProgam.htm> and http://www.xcelenergy.com/XLWEB/CDA/0,2914,1-1-1_537_2243-3071-0_0_0-0,00.html (last visited: June 23, 2003).

III. ELK RIVER AREA SCHOOL DISTRICT HIGH PERFORMANCE SCHOOLS INITIATIVE

A. BACKGROUND

The Elk River Area School District (ERASD) high performance schools initiative has been motivated by both the need for new classrooms and the recognition by district officials that existing facilities were in poor condition. According to the district, over the past decade student population has increased more than 3 percent annually, or at least 300 additional students each year, and is

expected to continue to grow. In 2000, district officials anticipated needing new space for approximately 1,000 additional high school students and 1,000 elementary students. Moreover, during the past several years the district has been dealing with a variety of facilities problems—including mold and other indoor air quality issues—due to inadequate construction and maintenance. *See* ERASD, Important Bond and Operating Levy Election, *available at* <http://elkriver.k12.mn.us/district/bond00.html> (last visited: June 23, 2003). District officials were aware that the former approach to building schools needed to be fundamentally reconsidered.

In 2000, the district's director of business and operations (the official responsible for capital projects) began discussing opportunities for promoting high performance facilities with area design firms that had considerable sustainable design expertise. One of the firms, which had offices in Europe, arranged a trip to Europe so that district and school board officials could observe successful models and approaches to sustainable building. The district's business director and two school members went with members of the firm to several successful high performance school projects in Germany in order to explore and evaluate high performance practices. These early discussions and the site visits set in motion a number of activities to institutionalize a high performance approach to the district's school building program.

B. COMPONENTS OF THE INITIATIVE

1. *High performance schools manual*

In 2000, the district began working with area sustainable design firms in the development of a high performance manual for local decision makers in the school construction process. One of the firms had applied for and received a grant from the state Office of Environmental Affairs for the project. The manual, titled *High Performance Schools for Higher Performing Students*, was published in 2001 as a collaborative effort among three firms (LHB Engineers & Architects; Factor 10, LLC; and AW Consulting/Intep Munich) with participation from the Elk River Area School District.

The manual aims to increase the awareness of high performance schools on the part of decision makers in the school construction process—school board members, superintendents, staff, and students—so that these decision makers can establish clear goals and directions for school building projects. The document is focused on the pre-design process, emphasizing both early community involvement in setting goals, and the use of consultants to help in identifying and implementing the goals. The manual discusses a variety of high performance practices aimed

at achieving six major goals: community integration, low construction cost, simple building maintenance, healthy environment, healthy indoor environment, and low operating cost. The manual also emphasizes the need to consider long-range costs and benefits of facilities projects, including student performance, staff performance, operational and maintenance costs, systems replacement costs, and retained value.

The participation of the Elk River Area School District was an important part of the development of the manual. The state grant that supported the manual also supported the sustainable design firm's work with the district to set clear goals for the district's building projects. The goals for Elk River's new high school are listed as an appendix to the manual. According to the manual's authors, district officials provided valuable insights as to what was needed at the school district level to change school design and construction practices to achieve sustainable outcomes.

2. *School Board resolution*

In January 2001, after beginning to collaborate with local sustainable design experts on the manual, district officials worked with the school board to develop a resolution to affirm the district's commitment to a high performance approach to the new school building projects. On January 16, 2001 the Elk River School Board adopted Resolution 00-194, recognizing the district's work on the manual and the "leadership role" undertaken by the district to achieve sustainable schools. *See* Resolution of the Elk River Area School Board Supporting the Implementation of Sustainable Design Strategies in the Design of the New High School in Rogers and the New Elementary School (on file with the Environmental Law Institute). The Board specifically directed the district, "within the limits of the project budget, district personnel time limitations and project schedule," to establish a building committee for the new high school project and to work with the committee and with the district's sustainability consultants to develop and adopt a set of performance goals for the project. The resolution also affirms the district's efforts to solicit additional funding for the project. Thus, the School Board gave the district explicit support for continuing its efforts to advance health and environmental goals in the new building program.

3. *Applying a high performance approach to current building projects*

Following the site visits in Europe, district and school board officials decided to apply high performance principles to two major construction projects underway, the

new Rogers High School and the new Zimmerman Elementary School. The high school project, which was already in the concept design stage, was designed somewhat ahead of the elementary school, and the elementary school project has benefitted from the lessons learned. Collaboration with a sustainable design consultant was a key element of the initiative. The consultant worked with the district to identify high performance goals and with the design team to modify and develop the designs to include a variety of high performance strategies.

Another important aspect of the project was community education concerning the district's high performance building goals. District officials note that they placed an emphasis on raising high performance issues with the community building committees established for each of the new projects. According to officials, one factor that helped solidify general public support for the new approach is the high level of activity in Elk River around energy efficiency and renewable energy technologies. In 1996, Elk River was designated as an "Energy City" through a program of the non-profit Minnesota Environmental Initiative. The goals of the program are to provide the state's energy industry with "a geographical focal point to demonstrate energy efficient and renewable energy technologies, services, and products" and to promote energy efficiency and renewable technologies through consumer education. See <http://www.elkriverenergycity.org/history.html> (last visited: June 23, 2003). The city's activities as part of this initiative include a wind generator, a landfill gas-to-electricity project at the local landfill, and an environmental learning center. See <http://www.elkriverenergycity.org/demonstrations.html> (last visited: June 23, 2003).

District officials also noted the importance of developing an effective way to communicate its expectations to the A/E firms working on the projects. The school district did not seek to use an existing design guide, scoring system, or checklist to integrate high performance features into the two new projects. Rather, the district and its sustainability consultant drew upon their experience, the models they viewed in Europe, and a variety of technical resources to develop a project-specific "duty book" that included specific and measurable performance goals for the new building in areas such as energy efficiency, daylighting, and selection of materials.

Both the high school and elementary school, which are scheduled to open in fall 2003, emphasize a variety of high performance goals, particularly daylighting and thermal protection of the building envelope. The district also addressed other areas such as HVAC, materials, and com-

missioning. For example the district used terrazzo flooring and an HVAC system that provides displacement ventilation and desiccant dehumidification. These features are linked to both resource efficiency and indoor environmental quality goals, in light of recent concerns over poor air quality in some existing schools. Commissioning of mechanical and electrical systems has been ongoing throughout the design and construction in the new projects, and the district included in its commissioning contract a requirement that the contractors return one year after the school opens to verify that the systems are working properly.

According to district officials, the new high school was completed within the original budget of about \$40 million. The district received a rebate from the local utility, Excel Energy, after the company performed an analysis of the building's high performance features. District officials estimate that

District officials consider the high performance approach used in recent projects to be standard practice for the district in the future.

the district will save over \$150,000 per year in heating and electricity costs as a result of the high performance design. In the end, the design for Elk River's new elementary school required \$300,000 more in architect's and consultant's fees than prior "off the shelf" designs, due largely to the decision to change direction mid-way through the design process. According to officials, though, the school has been completed within its budget of about \$12 million, and the district expects considerable energy savings.

4. Applying a high performance approach to future projects

Based on their experience with the high school and elementary school projects, both of which were completed within budget, the Elk River Area School District is planning to incorporate a high performance approach in future building projects. A new bond referendum is planned for fall 2003, and the district anticipates building at least two new elementary schools as part of that new building program.

Best practices for high performance design. Elk River Area School District has not created written specifications or otherwise formalized high performance requirements for future projects. Nonetheless, district officials consider the high performance approach used in recent projects to be standard practice for the district in the future.

This approach emphasizes integrated, whole building design and aims to create a simpler, more durable build-

ing. Some of the strategies that the district will incorporate include:

- Building envelope—using highly insulated exterior walls, windows, and ceilings;
- Daylighting—incorporating natural lighting in occupied spaces;
- Energy efficiency—using insulated building envelopes, strategic building orientation, high efficiency electric lighting, daylighting, appropriately-sized HVAC systems, and other techniques, and using the cost savings to pay for other high performance features;
- Ventilation—designing HVAC systems for energy efficiency, thermal comfort, and indoor air quality;
- Materials—specifying low-emitting materials and using flooring products such as terrazzo; and
- Commissioning—using commissioning throughout planning, design, construction and post-occupancy.

According to school officials, the Board and the district are planning to create a written document setting forth expectations to guide future building projects, and they anticipate that the document will include high performance goals and strategies.

Sustainable design professionals. While the need for sustainability consultants may be less important in future building projects, the use of these consultants was vital to the early projects. According to those involved in the recent projects, it is critical to bring in these consultants at the earliest planning stages, rather than after some of the design decisions have been made, as was the case with both the high school and elementary school projects. It is also important to ensure that consultants who help set high performance criteria be separate from those hired to meet the criteria. In the new high school project, one of the district's sustainability consultants also served as the mechanical and electrical engineer in the design development stage. Allowing the same firm to set performance standards and design systems to achieve those standards was later viewed by the consultant as a less than optimal arrangement.

District officials note that they are considering an alternative approach to hiring design teams in the future. In the first two high performance school projects, the district found that the architects and engineers were reluctant to adopt a high performance approach in lieu of using off-the-shelf designs. The district is considering using the high performance parameters developed for the new elementary school and high school as the basis for performance criteria to be included in design competitions for future district construction projects. By including high

EARLY PLANNING FOR HIGH PERFORMANCE DESIGN: KASSON-MANTORVILLE SCHOOL DISTRICT

Like Elk River, the Kasson-Mantorville School District, a small district in southeastern Minnesota, hired a sustainability consultant to assist the district in planning for a new high school building project. In Kasson-Mantorville, high performance design was considered from the very outset of the planning process, even before the design team was retained. Motivated in part by health and safety problems in existing facilities, the School Board adopted a resolution expressing the district's commitment to high performance design and established several high performance goals for the new high school, as well as for the renovation of another school. The goals addressed: life cycle cost analysis; daylighting; resource efficiency; occupant health and safety; using the building as a teaching tool; and using a simple, dynamic design that anticipates future uses. See Resolution of the Kasson-Mantorville ISD #204 School Board Supporting the High Performance Building Design Goals, available at <http://komets.k12.mn.us/Main/schools/New%20High%20School/docs/designgoals.asp> (last visited: June 23, 2003).

From the high performance goals articulated in the School Board resolution, the district worked with its consultant to develop educational and performance goals for the project. With these goals set as the criteria by which proposals would be judged, the district invited proposals from architecture and construction management firms. From the initial 19 firms that submitted proposals, three were invited to participate in a six-week design competition for which they were all compensated. The three designs were placed on public display, and the district's sustainability consultant reviewed and summarized the proposals for the School Board, which selected a winning design. See <http://komets.k12.mn.us/Main/schools/New%20High%20School/docs/design%20comp%20eval.pdf> (last visited: June 23, 2003). According to district officials, the district spent approximately \$150,000 on the pre-design process and design competition.

Although the district expects to use the winning design in the future, district voters have not yet approved a referendum supporting the proposed building program. A November 2002 school bond referendum was defeated.

performance criteria in the Request for Proposals for design competitions, the district hopes to avoid resistance on the part of architects and engineers during the project. The district plans to offer selected firms compensation for developing competition designs and to include that cost in the construction program budget in this year's bond referendum. District officials expect to easily recoup the added design costs in life cycle cost reductions.

Another district in Minnesota—the Kasson-Mantorville School District—recently created a model for

using a design competition process to achieve sustainable results. [See box.]

IV. BARRIERS TO HIGH PERFORMANCE SCHOOL DESIGN AND CONSTRUCTION IN ELK RIVER

A. EDUCATION AND AWARENESS

According to those involved in Elk River's building program, lack of awareness of the benefits of high performance design and resistance to changing traditional design and construction processes are significant barriers to adopting a high performance approach. One challenge to the district lay in persuading School Board officials of the need for a new approach. The district met this challenge through interaction between the district officials and Board members, including a trip to view model high performance schools in Europe. This process of educating key officials set the stage for changing the district's framework for building schools.

Although the school board and the district moved quickly to adopt high performance goals, district officials still had to work to ensure that their existing project design team (which was not experienced in sustainable design) embraced an integrated, high performance approach. The district accomplished this primarily by hiring a sustainability consultant and developing a clear set of performance goals to guide the design process—*i.e.*, by creating the demand for a high performance approach. For Elk River and other school districts, making sure that these goals are carried out in construction is a greater challenge still.

B. TECHNICAL EXPERTISE

A related issue raised by many of those working on Elk River's high performance building projects is the need for greater technical expertise and experience in sustainable design on the part of design and construction firms. As noted above, the lack of familiarity with high performance goals and practices created a reluctance to vary from past design approaches. The district's hiring of a consultant and development of performance goals helped the district address this problem to some extent. District officials note that smaller school districts would benefit from more readily available and explicit technical information to guide the high performance design process from pre-design through commissioning.

C. FINANCIAL CONSIDERATIONS

Higher first costs have not posed a significant obstacle to Elk River's high performance initiative, largely because the district has kept its two projects close to budget and has been willing to view slightly higher design costs in the context of longer-term operating cost savings. Nevertheless, the lack of dedicated funding during the pre-design stage (before the school bond referendum) poses a challenge for Elk River and other school districts that seek to integrate high performance goals early in the planning process.

In Elk River, the first two building projects were already in the concept design stage when the district began to consider incorporating high performance practices. In the future, the district will consider funding design competitions—with clear, high performance goals—at the outset of the planning process. This approach, however, would require the district to set aside funds from its operating budget prior to holding a school bond referendum. The Kasson-Mantorville School District took the significant step of investing in high performance pre-design by funding a design competition before holding its school bond referendum. One recent state legislative attempt to establish funding for early design costs failed; in 2001, House Bill 1534 would have provided funding to Elk River and another school district for their high performance school facilities pilot projects, and would have also provided funding to the Department of Education to evaluate the pilot projects.

Financial concerns also limited the duration of the district's collaboration with its sustainability consultant. A state grant helped to fund the consultant's work with the district in the initial phases of the project. The district and the firm sought a grant from the U.S. Department of Energy to fund the consultant through construction, but the grant was not approved and the district did not retain the consultant through completion of the projects.

Another significant financial barrier for advancing high performance school design and construction are the serious constraints on the state budget. Minnesota has enacted policies related to sustainable design that could be used to help local school districts incorporate health and environmental goals into all state-funded school building projects. However, neither the Department of Education nor the Department of Administration have had adequate staff or financial resources to fully implement these policies. For example, following recent staff cuts, the Department of Education has not had sufficient staff resources to use the review and comment process to assist in incorporating sustainable building goals into proposed school projects. The problem of limited state resources will be particularly important in the coming months and

years as the state uses its new high performance guidelines. The extent to which the state can provide technical assistance, financial incentives, and other programs will likely have a significant impact on how its high performance guidelines and other related policies are implemented at the school district level.

V. SUMMARY AND OBSERVATIONS

Over the past two years, the Elk River Area School District has changed the way it designs and builds schools to incorporate a range of environmental and health goals. The district-led, board-supported initiative has included two new construction projects that provide models and lessons for other building projects anticipated in the coming years.

A. STRATEGIES USED

Use of a sustainability consultant. Vital to the success of the district's efforts has been the use of an outside sustainability consultant to be the "district's advocate"—helping the district to establish high performance goals and to communicate those goals throughout the design process. The district found that it is best to engage the consultant during the initial planning stage and to retain the consultant through construction if possible.

Development of high performance design practices. The main strategy used by the Elk River Area School District was to identify general high performance goals—community integration, simple building maintenance, healthy indoor and outdoor environments, and low construction and operating costs—and then to guide the implementation of a whole-building design approach that includes specific design strategies and features to meet the general goals. The key design strategies and features incorporated in the district's two recent construction projects will become a baseline that can be developed further by design teams in future projects. These strategies include daylighting, a well-insulated building envelope, energy efficiency, a desiccant/displacement HVAC system, low-emitting materials, and commissioning.

Although Elk River has not yet made use of a design competition model, the district is considering adopting this approach in the future in order to ensure that the design process is focused on sustainability rather than lowest first cost. While this will require dedication of district funds, the district expects to recoup those costs quickly in

lower operating expenses. The pioneering effort by the Kasson-Mantorville School District to emphasize pre-design planning provides lessons for Elk River and other districts.

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

Problems with existing school facilities. Widely recognized problems with both indoor air quality and energy inefficiency were key factors in leading the district to explore a new way of building schools. Recognition of the health and economic costs of these problems helped to strengthen community and the School Board support for a building program that would improve the quality of district facilities.

School district leadership. The interest and persistence of Elk River's business manager was central to the success of the district's high performance schools initiative. This official worked to gain support from a variety of stakeholders within the district, the School Board, the community, and area design firms. He emphasized the importance of maximizing the district's large investment in school facilities and urged careful planning to ensure that new facilities are both educationally effective and financially sound over the life of the buildings.

A key to the development of a high performance approach in Elk River was the opportunity to work with sustainable design experts from the surrounding area.

School Board support. Two Elk River Board of Education members were particularly interested in high performance design from the outset of the new building program, and the Board as a whole has been supportive of the district's initiative. According to district officials, the Board facilitated a high performance approach through its general expectation that there would be continual improvement in the quality of facilities built and renovated by the district. More specifically, the Board issued a resolution recognizing and supporting the district's effort to advance high performance goals. District officials also note that the Board made project-specific decisions to support a high performance approach—*e.g.*, by approving the re-design of the new elementary school.

Role of the private sector. A key to the development of a high performance approach in Elk River was the opportunity to work with sustainable design experts from the surrounding area. With state grant funds, these firms initiated the development of the high performance manual and worked with the district to articulate goals and strategies for the district's new building projects.

C. IMPLEMENTATION CHALLENGES

Formalizing high performance practices or principles. If the Elk River Area School District's 2003 bond measure is approved, the district intends to continue its high performance approach to school building, even without the benefit of a formal written policy or guidance document to this effect. The continuity of key district officials and Board members, in addition to the small size of the district generally, makes it likely that district will continue its high performance schools initiative, incorporating the environmental and health goals developed over the past two years. Nevertheless, a written Board or district policy would not only strengthen those efforts but also help to institutionalize a high performance approach over the long term. The district's intention to develop guiding

principles in connection with the 2003 bond referendum could provide the template for such a policy.

Training for design professionals. Although Elk River's use of clear performance goals succeeded in creating schools that incorporate a variety of high performance design strategies, the district did encounter resistance to changing traditional design practices. Familiarity with high performance design will increase as school districts and state agencies continue to ask for high performance buildings. In the short term, greater training and education opportunities for area design professionals would facilitate the efforts of Elk River and other districts. In light of its current focus on high performance building activities, the state could potentially play a greater role in providing training and technical information.

CHAPTER 8

EDMONDS SCHOOL DISTRICT, WASHINGTON

The Edmonds School District includes several small cities and some unincorporated areas in Snohomish County, located on Puget Sound just north of Seattle and King County. The county's 1998 population of about 568,100 reflects 22 percent growth since 1990 and 68 percent growth since 1980. About two-thirds of the county is forest land. See <http://www.co.snohomish.wa.us/whatisgov.htm> (last visited: June 30, 2003). Edmonds School District is the eighth largest in the state, serving about 21,000 students in 34 schools. See Edmonds School District, *Citizen's Guide to the General Fund Budget*, available at <http://www.edmonds.wednet.edu/business/Citizen's%20Guide/Introduction.htm> (last visited: June 23, 2003).

Over the past several years, during the course of two major school building programs, the Edmonds School District has put in place an innovative planning, design, and construction process that emphasizes extensive community participation. The process focuses on developing and implementing goals to ensure that new facilities meet the present and future educational needs of students. Through this process the community has provided considerable support for incorporating health and environmental goals into the building program. As a result, the district has built schools that include an array of high performance strategies and that establish a model for future building programs.

At the state level, Washington has taken a variety of steps to promote high performance building. Until recently, these activities were somewhat fragmented and did not focus specifically on schools. The state's efforts to facilitate high performance schools gained momentum in 2003 with the passage of a bill appropriating funds for high performance schools pilot projects and for the development of a guidance document. These activities, while significant, are still to be implemented and have not had an impact on the Edmonds School District initiative discussed in this chapter. The state's activities are described here because they are potentially significant for future local school building programs.

This chapter is organized into five sections. The first section provides an overview of the state and local framework for funding and regulating school construction—the policy context within which Edmonds and other school

districts develop their school building programs. Section II describes state-level activities that are related to sustainable building, including recent activities that will likely have a considerable impact on future school design and construction. Section III discusses the background for and key components of the Edmonds School District's sustainable school building initiative, while Section IV describes some of the barriers that the district faced in integrating health and environmental goals into its program. Finally, Section V provides a review of the initiative, including some of the challenges the district will face in continuing the initiative.

I. GENERAL POLICY FRAMEWORK FOR SCHOOL DESIGN AND CONSTRUCTION

A. STATE ROLE IN FUNDING AND REGULATING SCHOOL CONSTRUCTION

There were just over one million K-12 students housed in about 2,300 schools in the state of Washington in 2000. National Center for Education Statistics, *Digest of Education Statistics: 2002* (Tables 37 and 97), available at <http://nces.ed.gov/pubs2003/2003060b.pdf> (last visited: June 23, 2003). About 90 percent of the state's 296 school districts serve under 10,000 students, and only one (Seattle) is among the 100 largest districts in the United States. See NCES, *Characteristics of the 100 Largest School Districts in the United States: 2000-2001*, at Table 5, available at http://nces.ed.gov/pubs2002/100_largest/table_05_1.asp (last visited: June 23, 2003); see also <http://nces.ed.gov/pubs2002/overview/pdf/tableA-5.pdf> (last visited: June 23, 2003). The state plays a role in both funding school construction and overseeing compliance with certain requirements relating to school facility design.

1. Funding

In Washington, K-12 public school construction funds are derived from a mix of state and local sources. Local school districts' share of funding may come from the passage of local bond issues, a building fund excess levy, other capital revenue, or a combination of these sources.

See generally League of Education Voters, Realities of Education Funding in Washington State 2002, §2 at 21, available at http://www.educationvoters.org/REF_sec2.pdf (last visited: June 23, 2003). The overall state share of K-12 capital project costs has been declining in recent years, from 48 percent in 1993 to 30 percent in 2001. *Id.* According to state education officials, for the 2001-2003 biennium, the state spent around \$341 million on K-12 capital projects. A variety of sources contribute to state funding of school construction, all of which are dependent on legislative appropriation. *Id.* If the state does not have sufficient funding to meet all school district requests, the state ranks district applications according to a priority system based largely on the numbers of unhoused students and on the condition of facilities in need of replacement. See Washington Administrative Code (WAC) 180-27-500 through 535.

The Office of the Superintendent of Public Instruction (OSPI) administers the state's School Construction Assistance Program, which provides matching funds and technical support for local school district construction projects. In order to qualify for state funding a district must demonstrate that its project is necessary because of: (1) a need for increased capacity for "unhoused students;" or (2) a need to modernize a facility not modernized in the last 20 years. See Washington Office of the Superintendent for Public Instruction, School Facilities Manual § 203 (2000), available at <http://www.k12.wa.us/facilities/SFMANUAL/intro.pdf> (last visited: June 23, 2003) [hereinafter "State School Facilities Manual"]. School districts apply for state construction funds through the "D-Form" process, named for the forms that must be submitted as part of the application. The D-Form process begins with the D-1 form, through which a district may request a grant to conduct advance facilities planning, known as a Study and Survey.

Facilities planning. In order to receive state construction or renovation funds, a school district must complete a detailed review of its existing facilities and expected future needs. Districts may apply to the state for a grant to fund the Study and Survey, and must submit the results to the state along with an application for school facilities funding. See WAC 180-25-020, *et seq.*; State School Facilities Manual, ch. 3. The Survey and Study must provide a wide range of information, including an inventory and area analysis of existing school facilities, a long-range educational and facilities plan, demographic data, a cost/benefit analysis on the need to modernize and/or replace existing facilities, and a determination of the district's time line for completion of the school facilities pro-

ject. See State School Facilities Manual, chap. 3 at 5-6; WAC 180-25-025.

Determination of funding level. The state determines the eligible construction cost of a new school building project by multiplying a cost allowance per square foot (determined annually by the State Board of Education) by a square foot allowance per enrolled student. See WAC 180-27-035, 060. In 2002, the area cost allowance was \$100.32 per square foot. See OSPI, Area Cost Allowance Information, available at http://www.k12.wa.us/facilities/area_cost_allowances.asp (last visited: June 23, 2003). In addition to this construction cost, the state pays a certain amount for a number of separate costs of a building project. These costs include architectural and engineering services, construction management services, building commissioning, furniture/equipment, and the preparation of various documents (educational specifications, an energy conservation report, a value engineering study, and a constructability review). See WAC 180-27-020; State School Facilities Manual, ch. 2, table 2.1.

The state pays a percentage of the eligible costs of a project. This percentage varies by district, according to a regulatory formula based on the district's own ability to pay, and is reviewed annually by the OSPI. See Revised Code of Washington (RCW) 28A.525.166. Matching ratios average about 50 percent of the eligible costs, though districts may receive a minimum of 20 percent matching funds, up to 100 percent state funding of the eligible costs. *Id.*; WAC 180-27-020, 025. See also State School Facilities Manual, § 204. State law provides a construction cost-saving incentive, whereby the district may keep 60 percent of the difference between the actual costs and the area cost allowance. WAC 180-27-085.

State law also establishes requirements for determining the eligible costs for a modernization project. See WAC 180-33-025. The state's modernization funding is limited to projects that cost at least 40 percent of the replacement cost of the facility. WAC 180-33-035. The state modernization funding may not exceed 80 percent of the cost of new construction of a comparable facility and must be at least 40 percent of the cost of a new building. WAC 180-33-030. State regulations governing modernization funding incorporate a maintenance incentive. The state will pay a lower share of the costs of modernizing a facility if the district's total maintenance expenditures for that facility during the prior 15 years were below two percent of the total of the annual building replacement values; if the district's expenditures were below 0.5 percent, the state will not pay any of the modernization costs. WAC 180-33-023.

2. Regulation of design and construction

a. Education code

The Office of the Superintendent of Public Instruction is the state agency that oversees the D-Form process, from school planning through design and construction. School districts are required to submit project documents along the way and to obtain approvals from the state for actions such as selecting the site, selecting the A/E team, opening bids and entering into construction contracts. *See* State School Facilities Manual, chap. 2 at 8-16. The facilities manual created by OSPI describes in detail the various requirements that school districts must meet when building or renovating schools. State law also directs OSPI to provide “consultatory and advisory service in connection with the development of school building programs and the planning of school plant facilities.” *See* RCW 28A.525.176.

The state education law and regulations establish certain design and construction requirements, some of which relate indirectly to high performance goals. For the most part, these requirements address construction management techniques aimed at controlling costs. In 1999, the state enacted legislation requiring that school construction projects include a variety of construction management practices. RCW 28A.525.090. Regulations adopted under the law provide that all school facility projects over 50,000 square feet that are approved by the state must include the following elements, which are eligible for state matching funds.

- Construction manager. Districts must hire or contract with a construction manager.
- Value engineering study. State education regulations define a value engineering study as “a cost control technique which is based on the use of a systematic, creative analysis of the functions of the facility with the objective of identifying unnecessary high costs or functions and/or identifying cost savings that may result in high maintenance and operation costs.”
- Constructability review. Another cost control technique imposed by state law is the constructability review, which consists of the review of project documents by mechanical, electrical, structural, construction, and design professionals prior to a request for bids, in order to identify potential claims, problem areas and deficiencies.
- Commissioning. State regulations define building commissioning as “the process of verifying that the installation and performance of selected building systems meet or exceed the specified design criteria and

therefore satisfy the design intent.” The regulations require that commissioning be performed by an entity not otherwise associated with the project and that it include a physical inspection, functional performance testing, listing of noted deficiencies, and final commissioning report.

See WAC 180-27-080. All recommendations from the value engineering and constructability reviews must be presented to the local school board of directors. If the board rejects a recommendation it must provide a statement explaining its reasons and include the statement in its application for state funding. RCW 28A.525.090 (5)(b).

b. State Building Code

Washington’s state building code establishes minimum standards for residential and non-residential construction throughout the state and is enforced at the local level. RCW 19.27.050. All school construction projects must comply with the code or with local amendments to the code that are at least as stringent. RCW 19.27.040. In 1993, the state legislature passed legislation directing the State Building Code Council to adopt the International Building Code, International Residential Code, International Mechanical Code, and International Fire Code in place of the corresponding uniform codes. Wa. Sub. House Bill 1734 (2003). The Building Code also includes water conservation performance standards applicable to schools and certain other facilities. RCW 19.27.170. The State Energy Code provides energy efficiency standards for new and altered residential and commercial buildings in Washington. RCW 19.27A; WAC 51-11. The last code revision, effective in 2002, made a number of changes, including HVAC efficiency standards comparable to ASHRAE/IESNA 90.1-2001. *See* 2001 Non-residential Changes to Energy Code Requirements, *available at* http://www.cityofseattle.net/dclu/news/Nonres_Energy_Code_Changes_2001-2002.pdf (last visited: July 10, 2003). Some local governments, such as Seattle and Tacoma, have developed their own local energy codes.

c. State construction/energy conservation laws

State laws and regulations require that all new public construction projects of at least 25,000 square feet and all renovations exceeding 50 percent of the value of the original facility include an Energy Life Cycle Cost Analysis (ELCCA) during the design phase of the project. RCW 39.35.040, 39.35.050. In 2001, the state enacted legislation modifying the ELCCA process to require that as part

of the energy consumption analysis comparing three or more system alternatives, at least one alternative must comply with the U.S. Green Building Council's LEED Silver standard, or similar design. RCW 39.35.030(11)(a). The Washington Department of General Administration (DGA) has adopted guidelines for conducting the ELCCA. See <http://www.ga.wa.gov/Eas/elcca/intro.html> (last visited: June 23, 2003). According to DGA officials, the agency is in the process of incorporating into its guidelines the recent legislative changes and is also considering how to coordinate the ELCCA guidelines with OSPI's facility guidelines.

According to state regulations, school districts must complete an "energy conservation report" in order to comply with the state ELCCA requirement. WAC 180-27-075. The report, whose cost may be paid through an OSPI grant, is to be based on the DGA guidelines and reviewed by the DGA. See DGA, Energy Life Cycle Cost Analysis, available at <http://www.ga.wa.gov/Eas/elcca/intro.html> (last visited: June 23, 2003); State School Facilities Guidelines § 806. Following this review the school district must approve the report and submit a copy to the OSPI, but the district is not required to adopt particular measures included in the analysis.

d. Environmental impact review and other environmental laws

Washington's State Environmental Protection Act (SEPA) requires that state and local government agencies consider the environmental impacts of their actions and mandates the preparation of an environmental impact statement for "major actions significantly affecting the quality of the environment." RCW 43.21C.020; WAC 197-11-010, *et seq.* If a school district determines that an EIS is not required for a school building project, the district submits a "determination of nonsignificance" and an environmental checklist to the Department of Ecology. WAC 197-11-300 – 390. The district must submit all SEPA-related documents to the OSPI to demonstrate compliance with the law. See State School Facilities Guidelines § 504.

The Department of Ecology may also be involved in certain school construction projects through laws governing specific environmental issues, such as hazardous waste cleanup. See RCW 70.105D. In addition, state law establishes natural resource management programs that are potentially relevant to school construction projects and that are administered primarily at the local level. See, e.g., RCW 90.58 (Shoreline Management Act); RCW 86.16 (Floodplain Management Act).

e. Health laws

Washington state health regulations establish basic minimum environmental standards for school facilities. See WAC 246-366. The requirements include general sanitary criteria—e.g., local exhaust of air pollutant sources, easily cleanable floors, and rooms that area reasonably free from objectionable odors, excessive heat, and condensation. See WAC 246-366-050—120. Although the code does not contain separate standards for new facilities, the code mandates that prior to construction or renovation the local board of education must submit final plans and specifications to the local health department. The school board must obtain the health department's recommendations and written approval that the plans meet the general environmental health standards. Local health departments are directed to conduct a preoccupancy inspection of the facility to determine whether it conforms with the approved plans and specifications. WAC 246-366-040.

The health regulations also establish a local approval process for school sites. Before construction or renovation takes place, the local board of education must obtain written approval from the local health agency that the "proposed development site presents no health problems." WAC 246-366-030. The regulations do not provide a process for obtaining this approval, nor do they set specific standards other than for noise from sources located at or near the proposed site. *Id.* The state education regulations provide generally that school districts must conduct a "site review or predesign conference. . .with all appropriate local code agencies in order to determine design constraints." WAC 180-26-020.

Another state law that relates to the siting of school facilities is the Growth Management Act, administered by the Office of Community Development. The Act establishes comprehensive planning requirements for certain high growth counties, including the designation of urban growth areas. See RCW 36.70A. The planning requirements include identifying the need for and location of publicly owned facilities, thus potentially restricting where new school facilities may be sited. See RCW 36.70A.070.

f. Procurement laws

Washington state law establishes a qualifications-based system for procuring architectural and engineering services. School districts must publish in advance the requirements for these services. RCW 39.80.030. The school district must select "the most highly qualified" firm, RCW 39.80.040, and negotiate a contract that is "fair and reasonable to the agency." RCW 39.80.050.

What is fair and reasonable depends upon the estimated value of the services as well as their scope, complexity, and professional nature. RCW 39.80.050.

School construction projects greater than \$15,000 require a competitive bid process. RCW 28A.335.190(3). The contract must be awarded to the “lowest responsible bidder.” RCW 28A.335.190(4). State law provides a number of general considerations for determining the lowest responsible bidder. The law directs state agencies to give “first consideration” to the bid with the lowest life cycle cost that complies with specifications, whenever there is reason to believe that applying life cycle analysis “would result in lowest total cost to the state.” RCW 43.19.1911(9).

The most common project delivery method for school construction projects in Washington has been the awarding of lump sum contracts to the lowest bidder. State law allows for the use of alternative methods in certain circumstances, though school districts may use such methods only for projects that are considered and approved by the state’s school district project review board, as established by state law. *See* RCW 39.10.020, 030(1); 39.10.115. According to the law, the board may approve use of the general contractor/construction manager contracting procedure for a limited number of school building demonstration projects, subject to conditions spelled out in the state law. RCW 39.10.067. State law allows design-build for certain public agencies, but it does not appear to authorize this method for school building projects.

B. LOCAL FUNDING AND REGULATION OF SCHOOL CONSTRUCTION

Funding. Edmonds School District has established a Capital Projects Fund to pay for capital projects. The fund is supported by local bonds, other levies and the sale and lease of property. The Fund pays for costs such as land acquisition, construction of new buildings, site improvements, major building renovations, replacement of plumbing, electrical or heating systems, and the equipping of new facilities. *See* Edmonds School District, Citizen’s Guide to the General Fund Budget, *available at* <http://www.edmonds.wednet.edu/business/Citizen's%20Guide/TheGuide.htm> (last visited: June 30, 2003).

In 1994, the district passed a \$117 million bond issue after three failed attempts over the preceding few years. Those revenues were used to build two new high schools, among other projects. Another local bond issue passed in 1998, and the subsequent building program included construction of three primary schools. Over the course of these two bond programs, the district incorporated numerous high performance practices in a process that

involved considerable community involvement. A bond issue to raise an additional \$110 million (primarily for two new high schools) received 53 percent approval in 2002 and 56 percent in 2003, not enough to meet the state’s constitutional requirement of 60 percent approval for school funding measures. *See* Washington State Constitution, art. 7, § 2. Nevertheless, district officials indicate that the community-integrated process and the emphasis on high performance facilities that they have developed over the past several years (see Section III) will be pursued in future building programs.

Regulation. Snohomish County implements a planning and zoning ordinance and administers the building code for unincorporated areas of the county. *See* Snohomish County Code Title 30. The county’s Development Code implements the state’s Growth Management Act through the designation and regulation of critical areas. Snohomish County Code § 30.62. The Development Code includes provisions for protecting fish and wildlife, as well as streams, wetlands and buffer areas. *Id.* The county also has developed and implements a storm water management program. Snohomish County Code Chapter § 25.05. Incorporated cities, including Edmonds and Everett, administer their own planning and zoning ordinances and issue building permits for new construction within the city limits.

II. SUSTAINABLE BUILDING ACTIVITIES AT THE STATE LEVEL

A. GENERAL SUSTAINABLE BUILDING ACTIVITIES

Although the state of Washington has not undertaken a comprehensive high performance building initiative for state facilities, some state agencies have been addressing sustainable design issues. For example, the Department of Ecology has created a “Sustainable Design Toolbox” that provides links to a wide range of resources on sustainable building. *See* <http://www.ecy.wa.gov/programs/swfa/cdl/index.html> (last visited: June 30, 2003). The Department of General Administration, the state’s building agency, has developed information on sustainable building, including sample specifications on construction waste management. *See* DGA, Construction Waste Management, *available at* [www.http://www.ecy.wa.gov/programs/swfa/cdl/res_specs_GA.HTM](http://www.ecy.wa.gov/programs/swfa/cdl/res_specs_GA.HTM) (last visited: June 30, 2003). The DGA also provides limited technical assistance to state and local governments on sustainable building issues—*e.g.*, by participating in design charettes or by speaking about high performance schools at meetings or conferences. *See generally* www.ga.wa.gov/Eas/green/help.html (last visited: June 30, 2003).

The Washington Utilities and Transportation Commission (WUTC) authorizes and oversees the application of utility surcharges to fund energy conservation programs. *See generally* WUTC, Energy Conservation Measures Adopted by WUTC, *available at* <http://www.wutc.wa.gov/rms2.nsf?Open> (last visited: July 10, 2003). Pacific Power's Energy FinAnswer is one example of an investor-owned utility program that offers information, technical assistance, and cash incentives to enhance the efficiency of building energy systems in new construction projects. *See* <http://www.pacific-power.com/Navigation/Navigation925.html> (last visited: July 10, 2003). Similar programs are also offered by utilities that are not regulated by the state. For example, the city-owned Seattle City Light operates energy efficiency programs, as well as a significant sustainable building effort that is coordinated with the city's sustainable building program. The utility manages a web site on sustainable building and helps fund Seattle's LEED incentive program. *See generally* <http://www.cityofseattle.net/light/conservesustainability/> (last visited: July 10, 2003). Another utility not regulated by the state, the Snohomish Public Utilities District, also operates a financial incentive program that provides reimbursement of up to 70 percent of the project cost for installing energy-efficiency measures in commercial facilities, including schools. *See* <http://www.snopud.com/?page=55> (last visited: July 10, 2003).

Utilities in Washington also help to support a non-profit organization known as the Northwest Energy Efficiency Alliance, which runs a number of energy efficiency programs. One of these, Better Bricks, provides information to architects and builders to assist in incorporating energy efficiency measures into school building and commercial construction projects. *See generally* <http://www.nwalliance.org/projects/projectdetail.asp?PID=48> (last visited: July 10, 2003).

A recent executive order may provide the impetus for greater state-level activity in this area. In September 2002, Governor Gary Locke issued an executive order requiring each state agency to "establish sustainability objectives and prepare a biennial Sustainability Plan to modify its practices" in a number of areas, including "facility construction, operation and maintenance." Wa. Exec. Order No. 02-03 (Sept. 18, 2002), *available at* http://www.governor.wa.gov/eo/eo_02-03.htm (last visited: June 30, 2003). The order created a Sustainability Coordinator within the Office of Financial Management to assist state agencies in meeting the goals of the order. Agencies were required to complete their initial Sustainability Plans by September 1, 2003. The order "invites" elected officials, public schools and others to participate in implementing the order. Since OSPI is headed by an elected official, that office may not be subject to the order, however OSPI offi-

cial note that the office anticipates preparing a Sustainability Plan.

B. SCHOOL-SPECIFIC ACTIVITIES

Although the OSPI plays a role in overseeing numerous aspects of the school planning, design, and construction process, state and local officials note that OSPI historically has had only limited involvement in the review of school district building plans and has not actively used the review process to address sustainable design and construction. Recent changes in personnel within the agency, in addition to legislative changes and private sector initiatives, may lead to greater involvement by OSPI in this area. Another agency, the Department of Health, has done considerable work on school indoor environmental quality, and could also play an important role in the state's future activities to promote high performance school construction.

School Indoor Air Quality Manual. In 1993, Washington enacted a law providing funding for the Department of Education to work in conjunction with the Department of Health to develop best management practices for use by schools in addressing indoor air quality in new or modernized school facilities. In response to the legislation and to the perceived need for practical guidance on addressing IAQ issues in schools, the Department of Health created the *School Indoor Air Quality Best Management Practices Manual* in 1995. *See* <http://www.doh.wa.gov/ehp/ts/School/SchoolAirBMP.pdf> (last visited: September 10, 2003). The Department of Health received funding for the project from the Superintendent of Public Instruction. The 175-page manual provides a detailed discussion of a wide range of IAQ considerations for school design and construction, including: assembling the design team; preparing an indoor pollutant source control plan; complying with codes and standards; assessing budget and scheduling impacts; site and facility planning; HVAC design recommendations; selection of materials, interior finishes, and furnishings; and design documentation.

Development of high performance schools guidelines. The Northwest Energy Efficiency Alliance and the Washington chapter of the Council of Educational Facilities Planners International (CEFPI) are in the process of developing a high performance schools guidance document. The two organizations have convened an advisory committee composed of representatives from state agencies, school districts, and the design community to review different models, such as CHPS and the LEED rating system, and to adapt those models as necessary to

fit Washington's climate and policy framework. This project could also be strengthened by incorporating the state's indoor air quality guidance for schools. According to the Alliance, by the end of 2003 the advisory committee expects to have finished a set of voluntary standards that will provide guidelines and information on how to construct a high performance school. The Alliance has contributed \$160,000 to the project and has helped to facilitate the development of the guidelines. Though the guidelines are intended to be voluntary, many in the state anticipate that they will become part of a new state policy promoting high performance schools.

In June 2003, the Washington state legislature appropriated \$1.5 million for a high performance schools pilot program.

High performance schools pilot projects. There has been growing interest in high performance building in the state legislature over the past two years. Following the work of a legislative green building task force, legislation was introduced in early 2003 that would have required that most new state building and public school construction and renovation projects be certified under the LEED rating system. Washington House Bill 1171. The bill, which was not enacted, called for school districts to complete the U.S. Green Building Council's certification process. According to state officials, representatives from several of the state's largest school districts opposed the measure because LEED is not specifically tailored to schools and because the reporting and certification costs associated with LEED would add to school construction costs.

In June 2003, the state legislature did enact a different bill promoting high performance schools. The measure, part of the 2003-2005 Capital Budget, appropriated \$1.5 million for a high performance pilot program. Substitute Senate Bill 5401, Section 603. The legislation provided that the funds be used as follows:

- \$1.35 million for "costs directly associated with the design and construction of five public K-12 schools that meet or exceed comprehensive design standards for high performance and sustainable school building standards;" and
- \$150,000 for (1) developing a technical manual to facilitate the use of high performance school building standards by K-12 schools and integrating that manual with other applicable policies and documents, and (2) developing incentives for school districts participating in this program to construct buildings that achieve significant life-cycle savings over current practices.

The state has not yet formulated its program for implementing the new legislation, but OSPI officials note that the state is likely to use these funds to field test the high performance guidelines being developed by the advisory group convened by the Northwest Energy Efficiency Alliance. In addition to creating several models for sustainable school design within the state, the new program has the potential to advance the development of state and local policy to institutionalize a high performance approach to school building projects.

III. EDMONDS SCHOOL DISTRICT SUSTAINABLE SCHOOLS INITIATIVE

Edmonds School District's sustainable building activities are to a significant extent the result of community participation in the facilities planning and design process. The district has created a process that emphasizes community involvement and that has resulted in broad support for the consideration and inclusion of a range of environmental and health goals. This section discusses the development of this process in 1994 and its refinement in the most recent school building program of 1998.

A. BACKGROUND

School Board facilities policies. The Edmonds School Board has not adopted a policy specifically promoting a high performance approach. In the 1980's, though, the board adopted two policies that provide support for key aspects of the district's recent initiative. One policy states broadly a facilities goal of ensuring that "building design and construction will lend themselves to low maintenance costs and the conservation of energy." District Policy 5000—Facilities Development Goal #4, *available at* <http://staff.edmonds.wednet.edu/users/kernsj/1sbpolicyindex.html#5000> (last visited: June 30, 2003). A second policy addresses facilities planning, requiring that planning for new facilities "shall be accomplished by teams of individuals closely connected with the facility, its use, construction and maintenance. . . ." District Policy 5100, *available at* <http://staff.edmonds.wednet.edu/users/kernsj/1sbpolicyindex.html#5000> (last visited: June 30, 2003).

Community involvement in facilities planning. The Edmonds School District began developing a community involvement process for all of its major construction projects in 1989 through the creation of a Citizen Planning Committee. The committee includes parent representatives from each school and five members appointed at

large, and it has three standing committees addressing education, enrollment, and facilities. The facilities subcommittee recommends projects, priorities, and policies to the school board.

In 1994, following passage of the \$117 million facilities bond issue, the district placed an advertisement in the local newspapers to recruit people to participate in the design process. Bond issues had failed in the preceding few years, and the district's executive director for planning and community relations, the head of facilities, and project managers believed it was important to include the community throughout the entire design and construction process rather than waiting until another bond issue was put forward. Officials viewed community integration in the process as an opportunity to develop public understanding of facilities needs and increase support for the district's capital programs.

The district interviewed those who expressed an interest in participating in the design process, to see what background they would bring to the work and to ensure that they were willing to put in the required time and effort. The group that was created, known as the District Facilities Design Team, was composed of about 50 parents, teachers, staff members, and community members at large. The team spent four months learning about architecture, technology, sustainable design, and education reform before they began discussing programming for the new buildings. The district's capital projects managers invited speakers to make presentations to the group and organized field trips to sites around the region. The group held eight to 10 full-day workshops and had homework in between. Although about one-third of the members dropped out because of the time commitment, those who remained were well informed and very dedicated to the projects, according to district officials.

As a result of the community design process, sustainability became part of the district's design goals for the projects completed in the 1994 building program. The community-oriented process and the district's experience incorporating various high performance design features created the foundation for the district's emphasis on sustainable design in the 1998 school building program.

B. COMPONENTS OF THE INITIATIVE: 1998 BUILDING PROGRAM

As part of the 1998 bond measure, the Edmonds School District completed several major building projects. While the staff of the district's Capital Projects Office took a leading role in promoting a sustainable design approach, community support for this approach was a key factor in the planning and design process.

1. Use of community design teams

The community participation process established in 1994 was again put in place following passage of the 1998 bond measure, with new community design committees formed for all five major projects. In a written document setting forth the roles of various decision-makers in the school building process, the district explains the responsibilities of the community design team during the planning and design stages. For example, during the pre-design phase, the group

- establishes the "vision for educational facility design;"
- researches and develops direction on major issues; and
- "recommends District-wide Design Goals" to the Board of Education.

See Shared Decisionmaking for Capital Facilities Planning and Design, *available at* <http://www.edmonds.wednet.edu/cpo/pages/MISC/shared.htm> (last visited: August 25, 2003). The community design committee develops a list of 10-12 general District-wide Design Goals to guide the district's building programs. The goals are modified with each new program and new community participation process, and each community design committee has a great deal of latitude in developing its own set of design goals. Nevertheless, the district's Capital Projects office guides the committees through the pre-design process, ensuring that certain key issues are addressed and that the process is efficient.

According to district officials, at the completion of each phase of the design process (schematic design, design development, and construction drawings) the project manager and the design team present the design to the School Board. The community design committee's goals are included in the materials that are given to School Board members to review before each meeting. During the meetings the design team and project manager brief the Board on the highlights of the design and describe how the design furthers the goals set out by the community design committee. Throughout the process, the committee "serves as communicators with constituent groups." See Shared Decisionmaking for Capital Facilities Planning and Design, *available at* <http://www.edmonds.wednet.edu/cpo/pages/MISC/shared.htm> (last visited: June 30, 2003)

2. Development of design goals

The community design committees devote considerable time and effort to creating the educational vision for the new school facilities. For example, the K8 Facilities Resource

Group, established for two of the larger K-8 projects, undertook a series of site visits and workshops, during which participants explored the relationship between the facility and various educational issues. *See generally* K-8 Pre-Design and Programming, *available at* <http://www.edmonds.wednet.edu/cpo/> (last visited: June 30, 2003). From this process, the group developed a set of goals that were incorporated into the District-wide Design Goals and used to guide the architects in designing the new projects. Sustainability was emphasized as part of the committee's goals. Many in the school district community favor strong environmental protection activities generally, and the K8 Facilities Resource Group, along with other community design committees, reflected this sentiment. The design goals were framed in general terms—*e.g.*, stating that the design team should ensure that the buildings' methods and materials are sustainable and demonstrate model stewardship. They established a set of basic principles for the design team, but did not include specific design strategies to be included in the buildings.

According to district officials, in addition to developing these goals, the committee participated in early design charrettes with the A/E team. School officials viewed the charrettes as an opportunity to assure the committee that the district would not impose a design that the community did not want, and to help familiarize the committee with some of the complex issues that arise in the school design and construction process. Nevertheless, it is primarily the responsibility of the project manager to ensure that the design of a facility proceeds in accordance with the general goals developed by the committee. Because the committee's goals do not give specific direction on design features, the ways in which sustainability is taken into account has varied somewhat from one project to the next, depending in part on the individual project manager in charge of a given project.

3. Selection of high performance design features

The community-based planning process employed in the K-8 and other 1998 bond referendum building projects resulted in the inclusion of a variety of high performance strategies. The specific features incorporated into these projects were identified primarily through the interaction of the district's project managers and design teams, which had experience in sustainable design. The district had gained experience applying some sustainable design features (notably daylighting) in the 1994 building program, but they wanted to incorporate additional health

and environmental features in the 1998 projects. The district hired a consulting firm with extensive sustainable design experience to assist in the process of incorporating high performance strategies into some of the 1998 building projects. Early in the design process, the consultants led "eco-charrettes" in which a district project manager and the design team worked together to identify measures that could be incorporated.

The community-based planning process used in recent building projects resulted in a variety of high performance design strategies.

The three K-8 schools (Maplewood, Cedar Valley, and Terrace Park) and two K-6 schools (Chase Lake and Meadowdale) built following the 1998 bond issue demonstrate the district's emphasis on sustainable design. These schools are unique in their design, reflecting the different geographical and architectural characteristics of the surrounding communities. Nonetheless, they all incorporate a number of core high performance goals that emerged from the district's planning and design process. *See generally*, Edmonds School Districts, Capital Projects, *available at* <http://www.edmonds.wednet.edu/cpo/> (last visited: June 30, 2003); Seattle Post-Intelligencer, "Mountlake Terrace School is a Textbook Case of Inspired Thinking" (Sept. 27, 2002), *available at* http://seattlepi.nwsource.com/visualart/88753_architecture27.shtml (last visited: June 30, 2003); Seattle Daily Journal of Commerce, "Washington State Top Public Projects" (Jan 25, 2001), *available at* <http://www.djc.com/special/00top20/h24.html> (last visited: June 30, 2003).

Daylighting. All of the schools emphasize natural lighting to enhance learning, health, and productivity. For example, at Terrace Park, the district worked with a Seattle lighting design firm to improve daylighting through use of light shelves and other design features.

Energy conservation. In addition to the use of daylighting, all of the schools have energy efficient HVAC systems.

Materials efficiency and conservation. The district included construction waste recycling goals in the bid specifications for some projects, but did not set specific requirements for contractors. The contractors in the projects used crushed concrete from existing buildings in the structural fill for the new buildings and used crushed asphalt as fill for the new parking areas.

The Terrace Park and Maplewood schools incorporated some sustainably-harvested (certified) wood, and Terrace Park included timber that was salvaged from existing buildings. In addition, both schools used a composite

wood flooring product called Granwood (made of clay, linseed oil, and wood fiber).

Indoor air quality. To ensure healthy indoor air, the design teams stated in the bid specifications that all five schools were to include low-emitting materials whenever possible. According to school officials, the specifications writer employed by the district was familiar with this issue and required low-emitting products in key sections of the specifications. In addition, the district ensured that the walls and the substrate beneath each building's slab were protected from moisture during the building process and that the air in the buildings was flushed out for a week prior to occupancy. The district uses carbon dioxide sensors in high occupancy spaces such as auditoriums.

Commissioning. All five schools utilized a full commissioning process for all mechanical systems. According to officials, commissioning contractors were brought into the process in the first few months of construction and the district's design team met with the commissioning team regularly throughout the process to ensure that they fully understood the building systems. The district routinely performs its post-occupancy evaluations two years after the building is first occupied to ensure that it receives useful accounts of how the building is working.

Building as a teaching tool. All five schools aimed to integrate the school building with the surrounding environment and to use the building as a teaching tool. Typically, the projects incorporate outdoor learning areas and use exposed mechanical, electrical, and structural systems throughout the building, as well as visible stormwater systems.

All five schools are organized into clusters of classrooms, and at Terrace Park all of the clusters have gardens and terraces that integrate the school into the surrounding green space. The school's wood structure is exposed in each classroom, and the roof demonstrates the collection and distribution of rainwater into sculptural cisterns and landscaped drainage swales. The design also includes other outdoor learning spaces that make use of native plants and butterfly gardens.

The other schools have similar features. For example, Cedar Valley developed its stormwater detention pond as an interpretive area, and Meadowdale was organized around a central courtyard which permitted the district to preserve an enormous evergreen on the site.

Community use. Community use has been an important element of school design in Edmonds since the 1994

building program, which included two high schools with a variety of joint use features. School officials note that in all five of the recent schools, the gymnasiums and cafeterias are available to the community after hours. Schools are located adjacent to local pools and playfields, with shared use of those recreational facilities. At both Cedar Valley and Terrace Park, the district partnered with the respective cities to fund enlarged gyms for community recreation programs.

4. Lessons Learned: Applying a high performance approach to future projects

The Edmonds School District's high performance school building efforts have been driven not by formal written policy, but rather by the efforts and experience of the Capital Projects Office staff, the design teams hired for individual projects, and the community groups assembled to guide those projects. The district's capital projects staff note that the office remains committed to continuing the extensive role of the community in the design process, as well as the emphasis on high performance design as an integral part of the educational mission of the district. According to officials, the district is considering ways to institutionalize high performance building practices to a greater degree.

One possibility for formalizing this approach is the current revision of the Uniform Design Standards, the district's specifications for all building projects. The current version of the standards was developed as part of the 1994 building program, through consultations between the Capital Facilities Office, maintenance staff, and design professionals in each discipline. Although the Uniform Design Standards do not emphasize sustainable design strategies, district officials note that they are considering including daylighting and other provisions in the revised standards. Recent studies on the educational benefits of daylighting have helped convince the district that such standards are essential for ensuring that the district's school buildings fully support student learning. In addition to daylighting, it is possible that the district will include in the new Uniform Design Standards some of the sustainable materials and products that have been incorporated into recent projects.

District officials are also considering the adoption of the new Northwest Energy Efficiency Alliance/CEFPI high performance school guidelines. Even if those guidelines are not adopted by the state, the district may incorporate some or all of them into the design process.

IV. BARRIERS TO SUSTAINABLE SCHOOL CONSTRUCTION IN EDMONDS

A. AWARENESS AND EDUCATION

Several individuals involved in school building at the state or school district level in Washington emphasized the barrier posed by the lack of awareness of the relationship between facilities and learning, and of the benefits of high performance practices. Outreach, education, and training are needed to overcome the reluctance to change traditional practices on the part of state and school district officials and private design professionals. District officials in Edmonds underscored the importance of working with maintenance and operations staff during the design process. Considerable efforts were required to ensure that those staff accepted new materials and technologies that were being used and could adapt their practices to the new systems.

A related issue noted by some school officials was the lack of information about and experience with certain sustainable products, which made it more difficult for the district to persuade others to use the products.

B. FINANCIAL CONSIDERATIONS

A number of financial issues pose obstacles to Edmonds and other school districts in Washington. The time and money needed for incorporating sustainability into the pre-design and design process is perhaps the most significant challenge. Edmonds has addressed this issue to a considerable extent by establishing a community participation model that emphasizes goal setting in the pre-design process. According to officials, for the high school projects completed as part of the 1994 bond measure, the process cost \$250,000 out of the total \$117 million bond issue. Because the process took some time, there were some inflationary costs associated with it as well. District officials note that the relatively small cost involved in the process is an acknowledged component of the building program. Officials also pointed out that the 1998 pre-design process was considerably more efficient in terms of both time and cost.

According to some Edmonds officials, the problem of higher first costs constrains district decisions about certain sustainable design strategies. Nevertheless, officials have incorporated a number of features that do involve higher first costs—*e.g.*, outdoor learning areas, use of certified lumber in certain parts of the projects, and use of an alternative flooring systems. The district was able to incorporate these features for a number of reasons. First, the integrated design process led to cost savings in other areas, such as reduction in the overall square footage of the

building. In addition, district officials and the School Board supported these features because the community design groups gave legitimacy to the sustainability objectives.

In order to ensure that the district's sustainability goals were not compromised during the value engineering process mandated under state law, the district used value engineering firms that understood the district's school building process and values. District officials ensured that certain priority features were not considered for cost-cutting measures. According to officials, the Capital Projects Office stayed within budget for all of its individual projects.

A different financial issue that poses a barrier to advancing local high performance schools initiatives is the limited availability of state resources for these activities. State funding could ease the financial burden of hiring consultants to implement sustainable design goals in local school building programs. The state could also help districts by providing technical assistance or information. While utility companies provide energy efficiency incentives, these programs appear to have a somewhat limited reach with respect to school construction. Some state and local officials anticipate the development of state financial incentives for incorporating high performance goals, and such a program could address an important obstacle for many school districts.

V. SUMMARY AND OBSERVATIONS

A. PRINCIPAL STRATEGIES USED

Ensuring community involvement. The Edmonds School District's high performance school building initiative is notable for its community-led planning process. A community design committee, consisting of a broad range of stakeholders, is created at the very early stages of planning for a group of building projects. Through meetings and workshops, the committee develops a set of general goals to guide the building projects, and then monitors the design process to ensure consistency with the goals. The district's capital projects staff facilitate this process by raising certain key issues for consideration, while ensuring that the committee has the opportunity to pursue new ideas.

Establishing sustainability as a goal. The central focus of the design committees is on creating facilities that support student learning and future learning trends. During the past two building programs, and in particular the most recent program, the community design committees incorporated environmental and health goals into its educational vision, establishing sustainability as part of the district's design goals.

Identifying high performance design strategies. Building on the general goal of sustainability established by the community design committees, district project managers worked closely with A/E firms to incorporate a range of high performance strategies into their building projects. Using “eco-charrettes” to guide the process, the district identified a number of specific priorities that were incorporated into multiple projects—*e.g.*, daylighting; energy efficiency; materials efficiency/conservation; indoor air quality; commissioning; using the building as a teaching tool; and community/joint use.

B. KEY FACTORS IN DEVELOPING THE INITIATIVE

Community support. Community support for high performance design and construction has been vital to the district’s initiative. The community at large is generally supportive of environmental protection initiatives, and these environmental values were reflected in the planning and design process. Because the design committees involved a range of stakeholders from throughout the community, the district capital project’s office had a considerable mandate to incorporate a sustainable design approach.

School Board support. Although the Edmonds School Board has not created policies that address high performance design explicitly, the Board has supported the district’s initiative. The Board reviews each project at several stages throughout the design and construction process to ensure that it is consistent with the needs of the district and the community design committees goals. District officials note that the Board’s support stems from the fact that the Capital Projects Office has delivered facilities that reflect community goals and has done so at or below budget.

District and private sector experience. Although community and School Board support for sustainable design was vital, the extent to which the community’s support was translated into high performance school buildings depended heavily on the district project managers and the design firms it hired. The inclusion of high performance features in several projects reflected the considerable experience and interest of the district, its design team, and its sustainability consultant. District staff also note that dur-

ing the initial development of the community design process, the district’s superintendent actively supported the exploration of innovative approaches to facility planning, and this facilitated the pursuit of high performance building strategies.

C. IMPLEMENTATION CHALLENGES

Financial constraints. The most significant obstacle to further implementation of the district’s sustainable school building approach is the lack of funding for a new building program. Cyclical economic problems have temporarily halted new building projects in the district. When the district’s building program resumes in the future, officials anticipate continuing the community planning process and incorporating sustainable design strategies as central elements in developing high quality learning environments.

Creating formal high performance guidelines or policies. The community planning process and the use of high performance design features are fairly well established in Edmonds. Nevertheless, the district’s sustainable design efforts are highly dependent on individual facilities staff and on private A/E firms. In a small district, the departure of key staff can break the continuity of the team that has led a high performance initiative. The Edmonds initiative can be strengthened through the development of a written policy document, such as those being considered by district officials—*e.g.*, revision of the current Uniform Design Standards or use of the CHPS-based high performance guidelines under development at the state level. Another alternative, not currently being considered, would be the adoption of a School Board policy. Such a policy could build directly on both the Board’s existing policies from the 1980s, and the community design team’s articulation of sustainability as a general design goal.

Training and education. One of the reasons for the district’s success is the time and resources devoted to community training and education during the school planning process. One challenge in implementing the district’s sustainable schools initiative has been and continues to be working with maintenance and custodial staff so that they can participate effectively in the design process and adapt their practices to new building features.

CHAPTER 9

ANALYSIS AND OBSERVATIONS

Over the past several years, government, the private sector and non-profit organizations have dramatically increased their efforts to ensure that the building process minimizes environmental harm, enhances indoor environmental quality, and maximizes facility operating efficiencies. While not yet mainstream in application, healthy, high performance design and construction is gaining ground. School buildings present perhaps the most compelling case for accelerating the adoption of sustainable building practices. Tens of billions of dollars will be spent on school renovation and construction over the next few years. Schools are not only the places where children spend the greatest amount of time outside of the home, but are also the workplaces of millions of adults. School buildings can enhance the health, well being, and productivity of children and adults alike. In many cases, school facilities themselves can become interactive tools for learning. Regardless of the size of a school building program, careful planning can produce facilities that support learning and affirm the importance of schools in communities throughout the United States.

The purpose of this report is to identify and analyze policies, programs, and practices that can be adapted in states and school districts to put in place a framework for building healthy, high performance schools. This study describes the high performance school building initiatives of seven jurisdictions—three states and four school districts—that have succeeded in changing the way they design and construct school facilities. The preceding chapters presented a snapshot of these initiatives, many of which are ongoing and evolving rapidly. Because the report focuses on a limited number of case studies, it cannot capture all of the challenges faced by school districts in pursuing a high performance approach, nor can it include all of the sustainable building activities being undertaken by school districts around the country. Other districts are making strides in building model high performance schools, changing individual building practices, and working to enhance existing buildings.

The strategies used in the selected initiatives vary somewhat, but all reflect efforts to institutionalize comprehensive change within local school building programs. The report does not begin with a fixed definition of a healthy, high performance school facility; rather, the

report explores the process of considering and achieving health and environmental goals to the greatest extent possible within the constraints and opportunities presented by individual school building programs. The jurisdictions discussed here—along with others not included—represent the potential for change, but not the current state of school building activities. Recent governmental and non-governmental studies have documented the state of disrepair in a large percentage of the nation's schools and the billions of dollars needed for their repair and renovation. As states and local governments rebuild these facilities and construct new schools in the coming years, they have a tremendous opportunity to provide better learning environments that cost less to operate.

This chapter highlights the strategies used to advance several high performance school building initiatives and synthesizes the lessons learned from these initiatives. The first section reviews the principal challenges faced by school districts, based on the experiences of the districts and states included in the report. Section II highlights the key strategies used by school districts to create and implement their high performance school building initiatives, while Section III discusses state efforts to advance local initiatives. The chapter concludes with observations about the ways in which federal and non-governmental parties can help states and school districts address the challenges to making high performance design and construction standard practice.

I. KEY BARRIERS TO BUILDING HEALTHY, HIGH PERFORMANCE SCHOOLS

Since this report focuses on jurisdictions that have succeeded in establishing high performance school building programs, the case studies emphasize the steps taken to achieve sustainable results, rather than the barriers to doing so. Nevertheless, the states and school districts profiled in the report faced a variety of challenges in developing a high performance approach and in implementing that approach over time.

This section summarizes the most common challenges, while the following sections discuss strategies used to overcome those difficulties. It is important to note that the report does not address what is likely the biggest bar-

rier to building high performance schools: the shortage of funding at the federal, state, and local level to meet the nation's needs for school maintenance, rehabilitation and construction. Rather, the report takes as a starting point the existence or anticipation of funds for a local school building program and examines strategies for changing the way schools are designed and constructed within that program.

Education and Awareness. By far the most common theme sounded by those working to advance state and local high performance school building initiatives was the importance of raising awareness of the benefits of high performance design and the tools available for using this approach. All of the school district initiatives examined had “champions” from within the district who understood and affirmed the importance of pursuing a high performance approach. District leadership is a critical component of a high performance initiative. Yet these leaders also recognize the need to work continuously to educate other key stakeholders both within and outside the district—district project managers and maintenance/operations staff; school board members; private design and construction professionals, community residents, etc. The complexity of the school construction process, the pressure to complete projects on time and on budget, and the traditional separation of school facilities and educational goals all contribute to a reluctance to change existing approaches to building schools.

While each district included in the report sought to address the need for greater basic awareness and understanding, these outreach efforts focused mostly on school officials and private design professionals. Outreach was particularly challenging with respect to two groups—construction contractors and community residents. It is vitally important to include these groups in the high performance initiative. Without contractor participation, the best design strategies may not be realized in the final school buildings. Without community participation, a school project may miss key opportunities to serve local needs and to promote sustainability on a broader basis.

Technical Assistance and Information. Related to the importance of general education is the need for technical information, training and assistance for school district officials and staff, and for private design and construction professionals. Most school officials who are responsible for managing the construction process lack the expertise to oversee the integration of high performance strategies. Another important problem is the lack of training of district staff on how to *use* the building once it is constructed.

Some district officials interviewed for this report noted the need for more explicit technical information that can be applied directly to school building projects—*e.g.*, detailed specifications and product information to facilitate the use of building materials that are healthier and more environmentally sustainable. In addition, although school districts included in the report have been able to draw on the sustainable design expertise of local consultants, they also face the challenge of working with A/E firms and builders that do not have experience in this area.

Financial Considerations. It is widely recognized that school construction projects proceed on tight budgets, from planning through design and construction. State reimbursement for the costs of a project is frequently capped at a fixed dollar amount per square foot. Within this general context, concern over the possibility of added costs contributes to the financial challenge of institutionalizing a high performance approach at the school district level. Added design costs may result from additional time and analysis of alternative strategies, and added materials or systems costs may result from strategies to achieve healthier and more environmentally responsible facilities.

Although the financial integrity of school building projects was a top priority for all of the jurisdictions studied in this report—and many officials underscored the need for increased funding for planning and design—financial considerations did not prevent districts from adopting a high performance approach. Some states and school districts developed specific policies or practices to address the potential for higher costs, and these are discussed in the following section of this chapter.

The fundamental approach to addressing the issue of cost, however, was the school districts' acceptance of two core principles of high performance design and construction. First, the districts emphasized *integrated design* as a technique for ensuring that a project incorporates health and environmental strategies while staying within budget. Through integrated design, districts saw the opportunity to create more efficient designs—*e.g.*, greater investment in the building envelope and in daylighting led to downsizing of mechanical equipment. Districts also viewed the integrated design process as a mechanism for making trade-offs; highly valued health or environmental strategies could be incorporated while other design features with lower priority were eliminated. Second, school districts embraced the general notion of *life cycle cost analysis*. In addition to creating specific policies and practices in this regard, districts emphasized the general benefit of reduced operating costs (mainly with respect to energy costs) as an important component of their high performance initiative.

Financial constraints, however, have posed a significant challenge for state-level action in this area. In addition to the financing of local school construction programs, states face challenges in funding state agencies to oversee and assist those programs. Even states with policies in place to support sustainable building practices lack the staff resources to carry out those policies. The financial constraints facing state education agencies today are heightened by the historical lack of involvement of these agencies in the school design and construction process. Most state education agencies that are involved in local school building programs oversee only the educational adequacy of proposed projects. State education agencies studied in this report generally lack the institutional capacity and commitment to provide technical assistance or review of designs in order to promote environmental and health goals in individual projects. Some states have made considerable progress on sustainable school building initiatives through the work of other state agencies that are involved in school design and construction—state architect’s offices, building agencies, health departments, energy and environmental programs, and independent school construction authorities. A significant challenge for states that seek to support local high performance building initiatives is to coordinate and maximize the resources of education and other agencies.

Time Pressures. School districts and their project teams are typically under considerable pressure to complete projects as quickly as possible. Time pressures extend throughout a project because of the need to relieve overcrowding and to open schools quickly. In addition, state funding schemes may lead schools to forego additional time for planning a project—an important aspect of a high performance approach—in order to submit applications for available state funding as quickly as possible. For school districts that are seeking to develop and implement a new high performance initiative after a school building program has already been launched, the need to move forward with many different projects while simultaneously changing the district’s approach to the design and construction process is a big task.

Regulatory Constraints. In general, laws and regulations governing the design and construction process do not expressly facilitate a high performance approach. At the same time, most of the jurisdictions studied here did not emphasize regulatory constraints as a significant challenge to developing their high performance initiative. While not creating a barrier to sustainable design and construction, the following regulatory provisions were noted as making it more difficult to achieve those goals.

Project delivery. State law typically establishes the framework within which local school districts contract for design and construction services. Most of the states included in this report require that school districts award construction contracts on a lump sum, low bid basis, and they prohibit or restrict alternative forms of project delivery such as design-build. Most of the laws require that contracts be awarded to the lowest responsible bidder, but may explicitly provide for consideration of factors other than price. Some districts have taken steps to include sustainable design-related factors in establishing qualifications for bidders. Many school officials interviewed for this report noted that the lack of flexibility in selecting project delivery methods was not ideal for developing high performance facilities, but that they were able to achieve sustainable results nonetheless. School districts are likely to begin experimenting with methods such as design-build, as states modify their laws to permit alternate project delivery methods.

Procurement. Many of the state laws discussed here prohibit school districts from using sole-source specifications for building materials and products. The laws typically require that districts list multiple brands, provide product descriptions that can be met by multiple brands, and/or allow bidders to propose equivalent products. Although regulatory restrictions on sole-source specifications protect the integrity of the building process, the restrictions are also likely to slow down the process. Districts deal with these limitations by drafting appropriate performance specifications for materials and by establishing adequate processes for determining equivalency of products. Some laws allow school boards or other local governing bodies to authorize the use of sole-source specifications, and district officials and their project teams have pursued local political approval for specifying sustainable products. Though not discussed in this report, some states and districts around the United States are also taking steps to facilitate the use of healthier, greener products in the operation and maintenance of schools.

II. SCHOOL DISTRICT STRATEGIES FOR CHANGING THE DESIGN AND CONSTRUCTION PROCESS TO INCORPORATE HIGH PERFORMANCE GOALS

The school districts highlighted in this report differ in size, location, socio-economic characteristics, and regulatory frameworks. They all have at least two things in common: they recently undertook substantial school building programs, and they sought at an early phase of the program to adopt a high performance approach. The districts followed different paths to making this vision a reality, but

they used a number of similar strategies along the way. This section synthesizes the various local policies, programs, and practices that were used to change the school building process, as well as some of the state strategies employed in New Jersey to implement the state-managed school construction program. Following this discussion, Section III reviews how state governments have worked to promote local high performance building initiatives.

A. BUILDING SUPPORT FOR THE INITIATIVE

As noted above, each of the four school districts examined here had a “champion” who believed that a high performance approach was important and who took the lead in advancing the initiative. These individuals held important positions in the district’s school facilities program—managers of one of more facilities-related departments, project managers, and business officials in charge of capital projects. Most, but not all, came to their districts with a background and interest in sustainable design issues. Some were motivated to pursue a new approach largely because of the poor health, safety, and financial performance of existing facilities. In some cases, private design professionals with sustainable design expertise were instrumental in cultivating this district leadership.

Having one or more leaders within the district is a critical factor in the success of a local high performance schools initiative. In all cases, though, these individuals realized quickly that they needed to build support among many different groups involved in the building process—district staff, school board members, community residents, and private design and construction professionals. Following is a summary of the strategies adopted by the districts to raise awareness and build support among two important constituencies, the school board and the community.

Strategy: Build School Board Support. All of the high performance initiatives described in this report had the support of local school board officials. District officials worked to inform school board members of the benefits of a high performance approach and of the importance of achieving health and environmental goals in the district’s current building program. School officials in Los Angeles and Wake County made presentations to their school boards, while Elk River Area School District officials participated with school board members in site visits to model sustainable schools in Europe. In some cases, school board members had an existing interest in health and environmental issues. In a number of districts, from Los Angeles to Milton, Massachusetts, school board members were keenly aware of health and safety problems in existing schools and were receptive to an approach that

would address these issues in a comprehensive, yet efficient manner.

The role of the school board in supporting a high performance approach varied somewhat. In general, the boards offered support but did not play a lead role in developing the initiative. School board officials regularly reviewed and approved projects throughout design and construction and, in some cases, were called on to approve district actions that related specifically to high performance goals. For example, the Elk River School Board approved the re-design of one school in order to incorporate high performance strategies, even though the re-design would result in added costs. Other boards made decisions to approve the use of sustainable materials or product specifications.

One strategy used by a number of districts to promote a high performance initiative was to obtain the support of the school board through a formal board resolution. The adoption of a school board resolution was particularly significant in Los Angeles, a district with numerous project managers and other staff involved in a very large school building program. The LAUSD School Board’s resolution supports high performance goals generally and calls on the district to develop resource-efficient design criteria consistent with the CHPS framework. The resolution also addresses the formation of an advisory body and requires accountability in the form of a report back to the Board. Other districts in California have passed similar resolutions supporting the CHPS approach to school design and construction. In New Jersey, where the state is managing a tremendous volume of school building projects, the governor’s executive order requiring incorporation of the LEED design criteria is roughly analogous to a school board policy in a large district. The executive order is specific in identifying the LEED system, but gives the state considerable leeway in implementing the order to incorporate health and environmental goals.

Smaller districts also have benefitted from formal resolutions supporting high performance school facilities. The Elk River School Board, for example, passed a resolution that explicitly supported the district’s early efforts to pursue a high performance approach in its new building program. The School Board in nearby Kasson-Mantorville adopted a resolution that affirmed a high performance approach and established several high performance goals for two new building projects. In Milton, Massachusetts, the School Committee adopted an environmental and health policy that endorsed healthy and sustainable design practices in new and renovated school facilities. The Chapel Hill-Carrboro (N.C.) School Board adopted an even more detailed policy and regulations, including numerous performance requirements related to health and environmental goals.

These board policies vary in content and provide models that other districts can adapt to the particular needs and goals of their building program. By establishing a high performance approach as policy, a board resolution can help to ensure that environmental and health goals will be carried out in individual building projects. Depending on the district, a board policy can provide general support for the district's efforts, or it can formalize some of the specific goals and components of the initiative. In all cases, the resolution should be crafted to serve the core function of board policy in this area: to ensure continuity in applying a high performance approach to both current and future school building projects.

Strategy: Facilitate Community Support and Involvement. The participation of community residents and school staff in school planning, design, and construction is important to achieving sustainable facilities and can be a powerful driver of local initiatives. New and renovated school facilities are central institutions in a community, from both an educational and civic perspective. As parents and neighbors, community members have a vital role to play in developing the vision of the school. Moreover, community and staff involvement can help achieve the broader goal of creating facilities that teach and inspire sustainability throughout a community. On a practical level, community residents and school groups such as the PTA can assist district officials in identifying materials and resources needed to develop the high performance school building initiative.

There are many challenges to developing an effective community participation framework for school building projects. The design and construction process is a complex one, and most community residents lack the background to understand the technical language and decisions involved. Moreover, an effective public participation process is time consuming, and the pressure to complete building projects on time is considerable. Nevertheless, in some of the jurisdictions studied, community advocacy has already played an important role in addressing certain issues, such as joint-use facilities and school siting. Community participation has also been an important factor in the overall development of some of the high performance initiatives described in this report. The most notable example is the Edmonds School District in Washington. After the rejection of a number of local bond referenda, district officials recognized the importance of involving the community throughout the school building process. The district created community design committees, comprising a range of community stakeholders, to guide the early planning for individual building projects. Tasked with developing the educational vision and general design principles for the facilities, the committees engaged

in a series of workshops and site visits to explore the relationship between the building and student education. The result was a set of design principles that affirmed the goal of sustainability and provided a critical foundation for the district to pursue high performance design strategies.

The emphasis on sustainability in Edmonds was due in part to a general awareness of and support for environmental issues in the community, and in part to the role of district officials in raising these issues during the community design process. These factors were at play in another school district that addressed the need for community support. Elk River Area School District officials worked with school building committees to raise health and environmental issues; indeed, the district's School Board resolution affirmed the role of these committees in developing high performance design goals. As in Edmonds, the city of Elk River's existing activities around energy and other environmental issues helped to solidify support for the district's initiative. In Milton, Massachusetts, a community health and safety committee, which included individuals with experience and interest in the areas of public health and design, was instrumental in crafting a school policy promoting sustainable design. In New Jersey, the Schools Construction Corporation is including a provision in its design guidelines requiring A/E firms to solicit and incorporate community input.

Other jurisdictions can build on the work of these districts by developing a formal framework for ensuring that area residents and staff have a voice in decisions, both at the district level and in individual school building projects. Community and staff involvement is particularly important to ensuring that indoor environmental quality issues are addressed, as these and other health-related problems are experienced most directly by the staff and families who use the school buildings. By establishing a process through which the school community both learns about high performance goals and helps inform decisions to achieve those goals, school districts can strengthen community support for school building programs and create school facilities that better serve the community.

B. DEVELOPING PARTNERSHIPS FOR CREATING AND IMPLEMENTING THE INITIATIVE

While it is critical to have a district champion and other parties supporting a high performance initiative, another important initial consideration for school districts is developing the capacity to create and carry out the initiative. This is true for districts of all sizes—large districts with complex bureaucratic structures and staffs already burdened with existing projects, as well as small districts with few staff members who have training in this area. The districts included in this report have used a variety of

strategies to leverage the resources and expertise needed to shape and implement a new approach to school design and construction.

Strategy: Create Public-Private Working Groups. At the outset of its initiative, the Los Angeles Unified School District set up the High Performance Schools Working Group as an advisory body to assist in developing its initiative. The group has met regularly and has proved invaluable in helping the district to consider different strategies and address challenges that have arisen along the way. The group includes representatives of various departments within LAUSD, a number of private building firms, utility energy efficiency programs, state agencies, and non-governmental organizations.

An internal district working group can also strengthen the district's initiative. In the case of LAUSD, for example, the district established a Sustainability Committee comprising four departments, in order to ensure broad input and effective coordination throughout the large district. In particular, LAUSD and other districts have underscored the importance of working with operations and maintenance staff throughout the development of the initiative and during school building projects. A number of districts worked informally with these staff to ensure that the strategies they developed could be sustained beyond design and construction.

Strategy: Develop Inter-Governmental Partnerships. Some districts have formed partnerships with other local government agencies or public universities to leverage resources and expertise in developing their high performance initiatives. The Wake County Public School System, for example, worked closely with the regional Triangle J Council of Governments to create a high performance building manual that has served as the underpinning of the district's initiative. In New Jersey, the state-managed construction program recently partnered with a public university, the New Jersey Institute of Technology. This partnership led to the creation of NJIT's New Jersey High Performance Schools Information Center, which will assist the Schools Construction Corporation in evaluating its ongoing school construction projects and identifying best practices in sustainable design to incorporate in future projects. The center may be in a position to work with school districts outside New Jersey in the future. The Los Angeles Unified School District also has begun collaborating with the city of Los Angeles and the local community college district to share expertise in this area and to consider how to strengthen their high performance building programs individually and collectively.

Strategy: Hire Sustainability Consultants. A common strategy used by school districts to build their capacity for implementing a high performance approach is to hire a sustainable design expert as a consultant. For many of the school districts described in this report, hiring a sustainable design expert from the local area was vital to formulating general performance goals and specific design strategies to achieve those goals.

For example, in Los Angeles, the district obtained a one-year grant from the state energy agency (which was, in turn, funded by the U.S. Department of Energy's Rebuild America program) to hire a consultant with considerable experience in sustainable design and planning. That expert took on the critical task of translating the district's high performance policy into a program that could be implemented quickly in school building projects. In a district as large as LAUSD, a consultant who was able to focus exclusively on advancing the high performance building initiative helped ensure that the initiative was not lost among competing needs and heavy workloads. After the federal grant expired, the district used its own funds to hire the consultant for a second year.

Smaller school districts also benefitted immensely from hiring sustainable design consultants. The Elk River Area School District worked with local experts to define high performance goals and strategies for its building program and to communicate those goals to the architects and engineers working on the district's new building projects. In this case, the money to pay for the consultant also came from outside the district (through a state environmental grant), although the funds were not sufficient to fund the consultant for the duration of the building projects. Another district, the Edmonds School District, used its own capital funds to hire a consultant to lead "eco-charrettes" that helped the district and its design teams identify design strategies to achieve the broad goal of sustainability endorsed by the community planning teams.

In Edmonds, as in Los Angeles, the district justified the cost of a sustainability consultant by considering this cost in the context of the total building program budget and by taking into account the reduced costs over the life of the new school buildings.

The experiences of the districts included in this report underscore the importance of developing partnerships with outside individuals, agencies and organizations, in order to marshal the expertise and support needed to translate the district's interest in a high performance approach into specific strategies that meet the goals and the needs of the district. Although the nature of the partnership will vary, districts can strengthen their initiatives by exploring the opportunities for developing these relationships from the earliest stages of the building program.

C. CRAFTING THE HIGH PERFORMANCE DESIGN APPROACH

The high performance initiatives reviewed in this report all succeeded in putting in place a framework for considering a broad range of environmental and health goals throughout their building programs. The initiatives varied somewhat in terms of the environmental and health issues they incorporated—*e.g.*, some included renewable energy technologies, some used sustainably-harvested materials, and some emphasized using buildings as teaching tools. There were, however, a number of common priorities, including daylighting and energy efficiency measures, as well as indoor environmental improvements such as low-emitting materials and improved ventilation. Commissioning is another common strategy used in these building programs.

There are numerous possibilities for crafting the decision-making framework within which specific sustainable design strategies can be incorporated into a district's building projects. Fundamental to these various approaches is an integrated design process that aims to achieve the district's clearly articulated high performance goals. The results of individual projects will vary depending on the constraints and opportunities presented by the site, the educational program and other community characteristics. Following are strategies used to establish the contours of the high performance school building process.

Strategy: Encourage or Require Use of a Guidance Document. One approach to advancing a high performance initiative is to create or adopt a guidance document on sustainable design that can be used by project managers and architects working on individual projects. For example, the central component of the Wake County Public School System initiative is the requirement that all new projects use the Triangle J High Performance Guidelines, which set forth numerous design strategies for achieving sustainable results. The district doesn't mandate how projects use the guidelines, but it does require project teams to articulate a high performance plan for the project based on the guidelines. The use of a guidance document—either an existing document or one created or adapted by the district—is helpful both in providing technical resources for project teams and in fostering consistency in approach among different projects. Most districts have combined the use of guidance documents and manuals with a system for measuring the results in a particular project.

Strategy: Require Use of Checklists or Other Metrics. With the creation of the U.S. Green Building Council's LEED system, it has become increasingly common to use a rating or scoring system to gauge the extent

to which a building achieves environmental and health goals. There are advantages and disadvantages to using a checklist to guide high performance design. The principal drawback is the potential for projects to “hunt for points” in order to end up with a higher point total, rather than to consider high performance design strategies in an integrated fashion. This problem can be addressed by combining the use of a checklist or other metric with other efforts to emphasize an integrated, whole-building approach to the design process. This emphasis can be communicated through guidance documents, training courses, or process requirements such as the submission of checklists at several phases of the design process.

A number of the districts included in this report have used LEED in some fashion to help craft their high performance school building initiatives. In New Jersey, an executive order mandates integration of the LEED criteria in all school building projects. The Schools Construction Corporation, while requiring projects to achieve a certain minimum level under the LEED system consistent with the executive order, has adopted a broader definition of sustainability and has developed a design checklist that goes beyond LEED. Other school building programs have used LEED in a more general way, as background for developing their high performance approaches.

One of the most significant developments in promoting high performance school building is the creation of a new, school-specific framework for measuring environmental and health goals in school design. California's Collaborative for High Performance Schools developed a set of criteria that resembles the LEED model, but reflects California's climate and regulatory scheme. The CHPS criteria contain additional requirements and optional criteria relating to indoor environmental quality, an area of particular importance in the school facilities context. The criteria are part of an extensive guidance document that provides school officials and designers with information needed to incorporate high performance strategies. The Los Angeles Unified School District has formally adopted the CHPS approach and has enhanced the CHPS materials by crafting a “scorecard” for evaluating how well a project incorporates the CHPS criteria.

Checklists or other metrics can greatly assist school districts by providing a common framework for setting general goals while allowing flexibility within a given building project. Districts need not create these tools from scratch. The CHPS criteria and scorecard, along with the design manual, have been developed specifically for school building projects and can be adapted for use in states other than California (as discussed in the following section). The LEED system can also be used to help craft a high performance approach, though it is not targeted to school environments and is typically used in other govern-

mental and private commercial projects. The U.S. Green Building Council is planning to create a LEED-based tool for use in school projects, and this may provide another option for districts seeking to incorporate health and environmental goals.

School districts that adopt a high performance design checklist can take a number of steps to encourage use of the metric in the most integrated and effective way. For example, districts can:

- modify existing systems and checklists to emphasize local priority issues by establishing those issues as prerequisites or by raising the point totals associated with related design strategies;
- set a minimum required score, but establish different levels of performance rankings (in lieu of a pass/fail system) in order to encourage project teams to incorporate a wider range of sustainable strategies;
- promote early and ongoing consideration of environmental and health goals by mandating submission of checklists at several points during the design process, a requirement established in both the Los Angeles and New Jersey school building programs;
- ensure that community residents and school staff have a meaningful opportunity to participate in the process of using the metric to determine which high performance strategies to incorporate in a project; and
- amend district facility guidelines to require use of the metric, and/or include a similar provision in A/E contracts.

Strategy: Establish Required Practices or Standards.

Another strategy for ensuring that school building projects address key environmental and health priorities is to establish district-wide design requirements. Some of the jurisdictions studied here have strengthened their minimum design and construction requirements by revising their facilities guidelines and specifications. This is a particularly important consideration for ensuring minimum practices that protect occupant health. The Wake County Public School System has sought to enhance indoor environmental quality by establishing requirements relating to low-emitting materials and humidity control. New Jersey's state-managed building program is also strengthening its design guidelines to address specific health-related issues such as air filtration, low-emitting materials, and acoustics, in addition to including requirements relating to energy efficiency and life cycle cost analysis. In Los Angeles, district officials revised their design guidelines to require measures relating to energy efficiency, daylighting, acoustics, and construction waste recycling, and they are in the process of considering additional changes.

The establishment of specific design and construction practices is an important component of a high performance building initiative. As school districts encourage integrated design to achieve health and environmental goals to the extent possible in individual projects, district-wide requirements ensure that all schools will meet minimum standards in priority areas. The districts included in this report are not the only ones that have developed such environmental and health standards for new construction, but they provide models for integrating individual requirements with a broader focus on sustainable design.

Strategy: Conduct Design Charrettes. Once a district establishes the health and environmental criteria for consideration by the project team, it is important to ensure that a process is in place for making decisions about design strategies. One strategy used by a number of districts is the design charrette, a brainstorming session to develop alternate visions of the school facility. In New Jersey, the school construction agency included in its written policy a requirement that design charrettes be held with the participation of all parties—including the public—to consider how to incorporate high performance goals and other community needs. The Edmonds School District facilitated a series of community meetings to establish the goals of their building program and also convened eco-charrettes among the project team members to focus more specifically on identifying design strategies to advance the goal of sustainability.

D. ASSESSING THE PROGRESS OF THE INITIATIVE

The high performance school building initiatives described here are in the early stages of implementation. Some facilities have been completed and recently occupied. Many others are still under development. Some districts have completed one building program and are preparing for the next. A key to the success of these initiatives over the long run is an assessment of the effectiveness of the strategies that are being used to achieve high performance goals.

Strategy: Evaluate Individual Projects. A number of the initiatives have emphasized the importance of evaluating their building projects and using that information to strengthen the district's practices. In New Jersey, the state's partnership with the New Jersey Institute of Technology is a formal effort to undertake ongoing evaluation of building projects and to use that information to make adjustments to the state's building program. The Los Angeles Unified School District launched its high performance initiative with an evaluation of building projects that were already in the design stage in order to

determine the district's baseline and used that information to refine its goals and approach. Officials in the Wake County Public School System plan to evaluate the schools that have been built and renovated recently, in order to assess the results of their school building program.

Strategy: Incorporate Building Commissioning.

Many of the districts discussed in the report have strengthened their building commissioning requirements to ensure that school facilities are built as designed and are operating effectively. Commissioning can also help educate building users about building systems and about how to recognize when there is a problem.

III. STATE STRATEGIES FOR ADVANCING LOCAL HIGH PERFORMANCE SCHOOL BUILDING INITIATIVES

Although school districts are the front line in school planning, design, and construction, state governments have a potentially significant role to play in supporting local high performance school building efforts. States face a variety of challenges in developing programs to advance high performance school design and construction. Foremost is the uncertainty posed by state budget deficits. Financial constraints have affected the state initiatives included in this report in different ways, though the programs have continued to move forward despite economic conditions. This section highlights the strategies used in the six states covered in the report—the three states with formal high performance schools initiatives, as well as three additional states that have been active in this area to a lesser extent. The states' activities fall into three general categories: capacity-building, regulation, and funding.

A. DEVELOPING STATE CAPACITY TO OVERSEE AND ASSIST LOCAL SCHOOL BUILDING PROGRAMS

Regardless of the type of policies or programs a state creates to encourage high performance school design and construction, state agencies must have the capacity to implement the initiative. Adequate funding for state regulatory and non-regulatory activities is critical. In a time of limited budgets, one of the greatest challenges facing state governments is to maximize the financial and human resources of the various agencies that play a role in the design and construction process. Ensuring communication—much less coordination—among these different offices is a daunting prospect in many states.

Adding to the challenge of building state capacity is the often ill-defined role of the state education agency. The responsibilities of education departments vary from

state to state. All of the state education departments described in this report are responsible for overseeing the distribution of state school construction funds and for ensuring that local school building projects meet certain minimum standards. Those standards, however, concern mainly the educational adequacy of school facilities, and not the environmental or health-related aspects of the school design. A core principle of high performance school building is the notion that design strategies relating to environmental and health protection are intimately related to the educational purpose of the school facility. The historical mission of most state education agencies—and the programs, funding, and staff that support the mission—do not emphasize assisting local programs in pursuing an integrated, high performance approach to facility planning, design, and construction.

The following are strategies used by some of the states included in the report to address directly the need for greater state infrastructure to promote local high performance school initiatives.

Strategy: Create a Public-Private Group to Lead the State Initiative. In California, the state energy agency took the lead in creating a group that would bring together governmental and non-governmental offices working on high performance school building. The Collaborative for High Performance Schools evolved into a non-profit organization focused on helping local school districts change the way they build schools. One key element of the CHPS structure is the hiring of a sustainable design expert to facilitate and house the group. The CHPS model is also characterized by the pooling of state agency and utility company resources to fund CHPS activities and by the inclusion of a broad range of environmental and health interests and expertise. The creation of a formal group has helped to sharpen the state's focus on high performance schools and improve coordination of the various state program resources being dedicated to this goal.

Although CHPS could not easily be duplicated elsewhere, the basic elements of the model could be used to create public-private groups in other states where agencies, utilities and other non-governmental parties are willing to contribute to the effort. In particular, the inclusion of NGOs can help ensure that the group addresses a broad range of environmental and health issues. In Massachusetts, for example, the inclusion of NGOs in an advisory body to the state's Green Schools Initiative helped to bring about a more comprehensive focus on high performance design.

Strategy: Strengthen Inter-Agency Coordination. Whether or not a formal public-private entity is created, and whether or not an outside facilitator is employed,

inter-agency coordination is critical if states are to maximize their resources for assisting local high performance school building programs. Authority over different aspects of sustainable building is distributed among a potentially large number of individual agencies, including education, building services, health, environment, and energy.

In California, CHPS has helped to strengthen the commitment of individual agencies to high performance schools and to channel expertise from across the state government to benefit school districts. A formal inter-agency group focused on schools would be particularly useful in states such as Massachusetts and Minnesota, where there are existing programs and activities to develop high performance state facilities. The expertise developed in creating a high performance approach for state buildings can be an important resource for assisting local school construction programs. It is critical that state education agencies be active participants in any inter-agency working group or task force in this area. The participation of state health agencies—many of which have active indoor air quality programs—is also important to advancing a broad range of high performance goals.

Strategy: Clearly Delineate Oversight Responsibilities.

In some states, specialized agencies have been created to provide some degree of oversight of the design and construction process. In California, for example, the State Architect is responsible for reviewing and approving all new school plans to verify compliance with the state's building codes. The agency is poised to play an increasingly prominent role in overseeing the development and implementation of stronger health and environmental standards for the school building process. In New Jersey, the Schools Construction Corporation is primarily responsible for overseeing state-managed school construction projects, but also plays a role in awarding grants to locally-managed projects. In both cases, while the state education agency also reviews school building plans, the involvement of sister agencies with expertise in design and construction provides an opportunity for a stronger focus on achieving health and environmental goals.

Strategy: Dedicate Staff to High Performance School-Related Activities. Just as school districts can benefit from working with sustainability consultants, state agencies will be most effective if they have staff that focus on high performance school building activities. Many state agencies already have explicit regulatory authority to provide education and technical assistance, and a number of the agencies described in this report have created programs and internet sites that promote high performance design and construction. Few, however, have staff dedicated to this issue.

One notable exception is the Massachusetts Department of Education, which recently hired a full-time Green Schools program manager to conduct outreach and education on high performance schools and to develop regulatory requirements and incentives in this area. Another state agency, California's Division of the State Architect hired a staff person to oversee a newly created environmental affairs office dedicated to advancing the agency's sustainable design work. In times of budget deficits, states will need to be creative in identifying resources to support such a staff position. The three-year funding for the position in Massachusetts was provided by the Massachusetts Technology Collaborative, as part of that public agency's Green Schools Initiative. States might also explore the possibilities for using federal and other grants to hire contractors to help develop the state's high performance schools program.

A greater challenge facing state agencies is securing adequate resources to review individual school building projects for compliance with regulatory provisions. This has been particularly problematic in states such as Massachusetts, where inadequate resources at the Department of Education has precluded oversight of minimum health and environmental standards for school construction, as well as in Minnesota, where state law requires schools to address sustainability during the state review process.

B. BUILDING LOCAL CAPACITY TO PURSUE HIGH PERFORMANCE DESIGN AND CONSTRUCTION

Education and information are critical components of local high performance school building initiatives. Basic information about the benefits of a high performance approach and more technical information about design strategies are needed by district officials, school board members, design and construction professionals, community members, and others involved in the school building process. Much of this information is already available. States can play an important role in disseminating the information and in helping to develop additional resources as needed. Section IV notes a few of the educational tools developed recently at the national level. Some states have also taken significant steps in this regard.

Strategy: Develop State-Specific Materials on High Performance Design. A tremendous amount of general and technical information has been developed to assist school districts and design professionals in incorporating a high performance approach. One challenge faced by school districts is synthesizing these materials and applying them to the local school construction process. While it may not be practical to create extensive materials on a

district level, information that incorporates the institutional and regulatory context at the state level could be of great help to districts.

A prominent example is the development of a detailed high performance schools manual in California. The CHPS Manual includes information about the school construction process in California, as well as sustainable design strategies that reflect California's climate and regulatory framework. It also provides a template upon which other states can create their own manuals through licensing agreements with CHPS. Massachusetts and Washington state are working on versions of the CHPS Manual that are specific to those states. The state legislature in Washington recognized the importance of establishing a state-wide manual by appropriating \$150,000 to develop such a document. Minnesota legislation has resulted in the creation of an extensive set of state high performance building guidelines that are not specific to schools, but may eventually be used in the school building context. One alternative to a state-led high performance manual is a regional effort within a state. The Triangle J Region in North Carolina worked with a variety of local governmental and private parties to develop a regional manual that is being applied within the Triangle region and elsewhere in North Carolina. Indeed, the state has recently undertaken a series of pilot projects to test the manual for broader application to public building projects. By creating these documents, state and local governments have created their own "definition" of a high performance building, and that definition can be used as a benchmark in a variety of state and local programs.

California agencies have played a leading role in developing other types of information as well. The Division of the State Architect recently created a comprehensive list of financial resources for high performance school building projects, and the agency is developing a database of environmentally preferable products for school building programs. State agencies in California and elsewhere are beginning to expand their internet sites to provide information and links to other resources on sustainable building. Areas for further development by states include basic information and outreach to community residents; model specifications or contract documents; and case studies of model high performance school building projects within the state.

Strategy: Provide Training and Technical Assistance. Training and technical assistance are also critical to facilitating broader adoption of a high performance approach to school building. This is particularly the case for district project managers and for the private sector professionals they work with. Training has been a core component of the CHPS initiative in California, where teams of design

experts from state agencies, utilities and private firms have held numerous workshops in school districts throughout the state. State agencies in New Jersey also have conducted high performance building workshops on a smaller scale.

States could also provide support in the form of technical assistance for school district officials and their project teams. The CHPS initiative recently began to address this need by offering "mini-charrettes" conducted by sustainable design experts within the CHPS member network. The California Energy Commission also has developed a program that provides technical assistance—albeit focused mainly on energy efficiency—to school districts that are in the early design phase of a new construction or modernization project. Most of the state education agencies included in this report have explicit legislative or regulatory authority to provide information and technical assistance to school districts, but they lack the resources to do so. In Minnesota, a state law requires the education agency to provide technical assistance to a school district interested in developing environmentally sustainable facilities, but the law does not include additional funding for the task; moreover, reductions in the agency's facilities staff have further diminished the state's ability to provide assistance in this area. State agencies other than education—*e.g.*, the state building agency in Washington or the environmental agency in New Jersey—have sought to provide information on sustainable school building, but they, too, have only limited resources to assist schools.

Considerable efforts have been made across the country over the past few years to communicate the benefits of high performance building and to provide the technical information to make it happen. State governments have an important opportunity to strengthen local interest in and capacity for adopting a high performance approach by synthesizing and disseminating this information, adapting existing materials for use within the state, conducting training sessions, and delivering technical assistance to help districts use the information. With limited resources, states need to be creative about maximizing resources across agencies to develop effective educational campaigns.

C. ESTABLISHING REGULATORY REQUIREMENTS RELATED TO HIGH PERFORMANCE SCHOOL DESIGN AND CONSTRUCTION

One of the roles of state government is to establish minimum requirements for school design and construction throughout the state. The principal mechanism for regulating building standards has been the adoption of building codes that include uniform standards for mechanical, electrical, plumbing, and other building systems. Except in the area of energy conservation, building codes

generally have not served as a vehicle for requiring sustainable building practices. In recent years, however, states have begun to use other areas of the law to establish school construction requirements that achieve specific health or environmental goals. The states included in this report are not the only ones developing policy in this area, but they reflect some typical and innovative uses of regulation to advance high performance school building.

Strategy: Require Consideration of Broad High Performance Goals. One strategy for advancing a high performance approach throughout a state is to create a policy that promotes high performance goals broadly. The most notable example is New Jersey’s executive order calling for all schools building projects to incorporate the LEED criteria. With few words, the order established high performance school design and construction as state policy. The policy did not ensure that specific environmental or health goals would be achieved, but it did set a requirement that every building project consider how to maximize these goals to the extent possible. The executive order also noted the importance of two separate but related issues—community participation in the school building process and the incorporation of community-use features into school projects.

New Jersey’s policy has had mixed results. The Schools Construction Corporation has moved swiftly to implement the policy and to expand on it significantly in the context of a multi-billion dollar, state-managed construction program. On the other hand, the state has not taken formal steps to carry out the policy with respect to building projects being managed by school districts. New Jersey’s experience underscores the difficulty of creating a very general state policy applicable to school districts without providing the state resources or infrastructure to implement the policy. Executive orders that aim to advance local school building initiatives are more likely to be effective if they contain explicit directives for state agency programs to support local initiatives.

State legislation can play an important role in ensuring that school districts consider high performance strategies. Minnesota has enacted laws that use different approaches to changing local practices on a broad scale. One law requires that as part of the state’s school design review process, school districts include in their proposals a description of how the facility utilizes “environmentally sustainable school facility design concepts.” This type of requirement could have an impact state-wide if adequate agency resources are made available for assisting and overseeing local activities. The same is true for a Minnesota law requiring pre-design review through the State Architect’s Office, including the use of a pre-design manual with information and checklists on sustainable design.

Another Minnesota law requires the state to create a comprehensive set of high performance guidelines for state building projects. It is not clear whether or how the state will use the guidelines, currently in draft form, for state-funded school construction projects. In the schools context, successful implementation of guidelines that contain numerous required and recommended practices would depend heavily on the availability of complementary state programs involving training, technical assistance, and financial support.

Strategy: Establish Specific Standards or Practices. While overly prescriptive state design standards could impede the high performance design process, states can play an important role by establishing requirements relating to specific health or environmental issues. Following are some of the areas in which states have mandated minimum standards or practices applicable to the school building process.

Energy. State energy codes for non-residential construction and renovation projects can have a broad impact on energy efficiency in school building programs. The state of California, recognized for its stringent energy standards, is currently developing revisions to strengthen the code further. The CHPS materials reflect California’s high standards and encourage school districts to do even better.

Siting. The siting of school facilities can have a significant impact on both the environment and health. Many states regulate the siting of school facilities through environmental laws protecting sensitive areas such as shorelands and floodplains. States such as New Jersey and California promote sustainable development through laws that require school districts to coordinate their facilities planning with local planning agencies. In addition, states such as New Jersey and Massachusetts establish various regulatory provisions favoring rehabilitation over new construction.

Some states have also begun to put in place more stringent requirements for evaluating and remediating environmental contamination on potential school sites. California recently enacted legislation establishing a regulatory framework for school site assessment, while Massachusetts has just strengthened its regulations in this area.

Indoor air quality. Minnesota is one state that has enacted specific IAQ provisions for school construction and renovation, including ventilation system requirements relating to filtration and air flow. Massachusetts requires that school projects follow industry standards for

protecting IAQ during construction of occupied buildings. New Jersey requires that schools located in areas of high radon potential are constructed to minimize radon gas entry.

Commissioning. Washington and Minnesota are among the states that have enacted laws requiring minimum commissioning practices for all school building projects that undergo state review. In New Jersey, the Schools Construction Corporation also has mandated commissioning for all state-managed projects.

Life cycle cost analysis. Some states, including Massachusetts and Washington, require that school districts consider life cycle costs during the design phase of a project, although they do not mandate the selection of specific design strategies based on those considerations.

Maintenance. Some states use the school construction funding process to help ensure that districts devote adequate resources to school maintenance, in order to avoid health and other problems that arise from deteriorating facilities. California, New Jersey, and Massachusetts, for example, all have laws or regulations that calculate construction funding based on adequate maintenance spending.

Strategy: Address Project Delivery and Procurement. State laws establish rules governing how school districts may contract for services and goods in the school building process. Some laws may pose challenges for school districts pursuing an integrated, high performance approach. Although the states included in this report have not enacted legislation focusing broadly on changing the procurement process to facilitate high performance goals, some have enacted measures that help reduce the regulatory barriers.

For example, state laws typically restrict the use of sole-source product specifications, thereby making it more difficult for school districts to require particular products that meet health and environmental goals. North Carolina law provides for an exception in certain cases if the district obtains local political approval for the alternate specification, while Massachusetts law provides an exception for proprietary specifications that are necessary to serve the public interest and that include an “or equal” clause. In the area of project delivery, California has eliminated its prohibition on using the design-build project delivery method for school construction, and other states have enacted legislation allowing alternative methods on a limited basis. New Jersey’s new school construction law requires pre-qualification of contractors and mandatory uniform performance evaluations of contractors for all school projects managed by the state. These measures help

give more flexibility to district officials in deciding on the best methods for achieving high performance goals.

D. PROVIDING FINANCIAL SUPPORT FOR SCHOOL DISTRICT INITIATIVES

Financial assistance is a core need of school districts in developing high performance building initiatives. Although general school finance is not the subject of this report, the experiences of the jurisdictions studied here underscore the potential for the state funding process to impede high performance initiatives. This is largely due to concerns about overall funding levels, lack of predictability of funding, complexity of the bureaucratic processes used in making allocation decisions, and requirements governing how local districts raise, spend, and account for school facility funds.

A narrower, but also important, issue is the extent to which existing school financing programs provide the financial support needed for schools to adopt a new approach to school building that achieves broad environmental and health goals. Some states have begun to consider and provide direct funding and financial incentives to support such initiatives.

Strategy: Increase State Construction Funding. In light of the challenges posed by higher first costs in many high performance building projects, financial incentives are a potentially powerful tool for encouraging school districts to adopt a sustainable approach. Both California and Massachusetts have created financial incentives related to high performance design and construction and are considering expanding those incentives.

In Massachusetts, the Department of Education established a financial incentive (a 2 percent increase in the state’s share of the cost of a project) for school projects that participate in the states’ Green Schools Initiative and qualify as a “Massachusetts Green School” under the initiative. The agency based its action on existing regulatory authority—the state education law authorizes additional funding percentage points for schools that meet industry energy efficiency standards—and is considering institutionalizing the incentive for future projects. In California, the legislature enacted a requirement that the state increase a new construction or modernization grant by up to 5 percent to cover additional design and other costs related to school facility energy efficiency. The legislature has been considering the possibility of broadening the incentive to apply to school projects that qualify as high performance schools. Washington state agencies may also be considering financial incentives in the near future, as recent legislation directed the education agency to consider developing incentives to encourage districts to make

design and construction decisions based on life cycle costs.

Strategy: Fund Pilot Projects. Grant programs for pilot (or demonstration) projects is one strategy used by states to provide direct funding for high performance school building initiatives. Such programs help to create individual high performance school facilities and to promote a new approach throughout the school district. If the programs include careful and well-publicized documentation of the pilot projects, they can also be a significant resource to other school districts interested in developing a high performance initiative.

The most extensive pilot project funding program is the Massachusetts Green Schools Initiative, which has provided \$13.5 million (through electric utility customer surcharges) to fund planning, design and/or construction activities in over 40 school districts. While focused on renewable energy technologies, the initiative emphasizes integration of a broad range of environmental and health issues. The state of Washington recently enacted legislation appropriating over \$1 million for a pilot program to support the design and construction of five high performance schools. In California, members of the CHPS initiative also have sponsored several demonstration school projects. A somewhat different approach has been taken in New Jersey, where the governor recently created a program to help integrate school construction and community development. The program does not provide separate grant funding, but rather prioritizes and coordinates existing public, private, and non-profit resources to the selected projects. Another New Jersey demonstration program provides enhanced funding for school building projects that include community-use features.

Strategy: Establish Other State Grant Programs. Existing state grant programs in a variety of areas—particularly environmental protection and energy efficiency—could be used to advance local high performance school building programs. Although these programs may not be sufficient to reach a great number of districts, strategic use of the resources could have a considerable impact. For example, in Minnesota, the state agency that provides environmental education and assistance awarded a grant to a sustainable design firm to work with the Elk River Area School District to develop a high performance schools manual and to implement a high performance approach in the district's building program. Another example is New Jersey's smart growth planning grant program which, until recently, included a special focus on school facility planning. One important consideration for state grant programs is ensuring that school districts and

their local partners take the lead in shaping the initiative within the general goals of the state program.

Strategy: Create Financial Incentives. According to one report, almost \$1 billion was spent on utility-run energy efficiency programs in the United States in 1998. American Council for an Energy Efficiency Economy, State Scorecard on Utility Energy Efficiency Programs (2000), *available at* <http://www.aceee.org/pubs/u004.htm> (last visited: August 30, 2003). These programs provide a variety of services to residential and commercial customers to encourage energy savings, including financial incentives and technical assistance for new construction and renovation projects. Many states have ensured the existence or continuation of these energy efficiency programs by enacting legislation requiring utilities to operate the programs, often in the context of the state's restructuring of the utility industry. Typically, states have established funding for the programs through ratepayer surcharges known as public benefits charges. *Id.*

States can facilitate local high performance school building initiatives by requiring the development of utility energy efficiency programs and by strengthening existing programs. Utility incentive programs have played an important role in some of the states included in this report, and programs in other states have the potential to make significant contributions. In California, utilities around the state participate in the Savings by Design program, which is funded by a public benefits charge and provides funding and technical assistance to schools. As partners in the CHPS initiative, the major utilities have explicitly incorporated an integrated, sustainable design approach into the Savings by Design program, and the program has become one of the principal financial and technical resources available to school districts. The Los Angeles Unified School District has amended its design guidelines to require that individual projects register with Savings by Design program at the outset of the project. Other states, such as Massachusetts and New Jersey also have encouraged or required school construction projects to apply for available utility incentives. In Washington, utilities are also playing a role in high performance school construction through individual incentive programs and through a utility-funded, non-profit group that is working to develop a state-wide high performance design manual.

State agencies can also create funding programs to support the use of energy technologies that may involve higher first costs. The Massachusetts Green Schools Initiative is aimed primarily at funding the use of renewable energy technologies, but has addressed this strategy in the broader high performance design context. In California, the energy agency operates more narrowly-

focused programs that provide rebates for use of renewable energy systems or for installation of “cool roofs.”

IV. FEDERAL AND NON-GOVERNMENTAL ACTIONS TO SUPPORT STATE AND LOCAL HIGH PERFORMANCE SCHOOL BUILDING INITIATIVES

The state and school district strategies discussed in this report suggest opportunities for other sectors to advance high performance school building initiatives. Federal agencies and non-governmental organizations have a vital role to play in supporting the work of states and school districts. Although a detailed analysis of that role is outside the scope of the report, the experiences of the jurisdictions examined here illuminate some key areas for federal and non-governmental action. One of the central challenges will be to rethink strict programmatic categories in supporting work that is being done at the intersection of health, environment, and education.

Outreach to Advance Education and Awareness. An important factor in changing the way school districts plan, design and build their schools is the leadership of one or more officials within the district. District officials who have spearheaded high performance initiatives emphasize that the main challenge to getting an initiative off the ground is to increase awareness of the basic concepts and goals related to high performance design. They underscore the importance of communicating the health, educational, environmental and financial results of a high performance building process.

Thus, one of the critical areas for action is an outreach campaign to raise awareness of the benefits of a high performance approach and the tools that exist for making it happen. Outreach to school district officials and school board members is particularly important. Another important constituency are private design professionals, who have been a leading force in developing many high performance school building projects and can play an even larger role in the future. In addition, community residents can exert considerable influence on a school district to consider health and environmental goals in the school building process.

Federal agencies and private foundations already have begun to target resources in the area of sustainable design, but a much more concerted and coordinated effort is needed. Federal and private funding is essential to building the capacity of non-governmental organizations to conduct outreach campaigns at the national, state, and community levels. Included among these organizations are professional associations—groups working directly with architects, school officials, and other stakeholders—

that can play a key role by communicating effectively with their members.

For example, one promising initiative of the Sustainable Buildings Industry Council (SBIC) will make available via the internet a series of educational videos on high performance schools. The videos will help to introduce the subject to a variety of audiences and will also provide on-line training for community leaders who want to educate others about high performance schools. Another national organization that has done considerable education and training on high performance schools is the Council for Educational Facility Planners (CEFPI), a professional association whose members are involved in planning, designing, and building schools.

There is growing consensus about the fundamental elements of a high performance approach to school building. The challenge for federal agencies and NGOs is to achieve some measure of coordination and consistency in their outreach efforts.

Technical Information and Training. Once there is support within a school district for pursuing a high performance approach, district officials and their project teams need technical resources to help develop health and environmental goals and to translate those goals into effective design strategies. In addition to state and local materials, a vast amount of technical information has been produced at the national level to help school districts and architects across the country develop high performance schools. Prominent examples include the *High Performance School Buildings* guide published by the Sustainable Buildings Industry Council and the *National Best Practices Manual for Building High Performance Schools*, based on the CHPS Manual and adapted for a national audience by the U.S. Department of Energy’s Rebuild America/Smart Schools Program. SBIC is also working with design experts to produce a web-based training on high performance design for architects and engineers (scheduled to launch in late 2003), based on the *National Best Practices Manual*.

Leading examples of information at the national level include web sites designed to assist school districts and design professionals. The U.S. EPA’s indoor environments program recently launched the IAQ Design Tools for Schools (www.epa.gov/iaq/schooldesign/), an internet site that contains voluntary guidance on indoor air quality and other high performance school design goals. This web-based resource contains recommendations and tools to help communities and design professionals integrate good indoor air quality practices into the design, construction, renovation, operation, and maintenance of K-12 school facilities.

EPA and other agencies have expanded their existing agency web sites to compile and disseminate educational resources on high performance design and construction. In addition to the web sites of EPA (<http://cfpub.epa.gov/schools/index.cfm>) and the Department of Energy (www.energysmartschools.gov), the Department of Education has funded the National Clearinghouse for Educational Facilities (www.edfacilities.org), which collects and organizes a tremendous range of information resources on school facilities.

The report noted earlier the importance of state efforts to synthesize and disseminate available technical materials for use at the school district level. Federal and non-governmental organizations, including the private foundation community, can help provide needed technical resources in a variety of ways. First, they can provide financial support for state programs to tailor technical information to local school districts. Second, they can develop new research on key technical issues for advancing high performance design and construction. This research might include: assessments of the effectiveness of specific building technologies or practices, particularly in the area of indoor air quality; case studies of school building projects to quantify the benefits of a high performance approach; development of additional planning or design tools, such as life cycle cost analysis or guidance for siting school facilities; and analysis of policy tools for advancing health and environmental goals.

Third, federal agencies and NGOs can sponsor training on high performance design and construction. A considerable amount of training for design professionals and governmental officials is already taking place throughout the country. Additional resources could help support not only the continuation of large-scale conferences, but also the development of workshops that are more strategically targeted to particular parties (school officials, designers, builders, community residents) or that focus on particular school districts that are anticipating new building programs. While professional understanding of and experience with high performance building is increasing, more work is needed to train the design and construction professions.

Technical Assistance. School districts also need technical resources in the form of direct advice and consultation on particular building projects. Existing federal programs, such as the Department of Energy's Rebuild America Program and EPA's Energy Star Schools Program, provide technical assistance for energy efficiency and related improvements. Some EPA regional offices provide more direct technical support for state and local high performance school building initiatives.

Continuation and expansion of these programs—through increased funding and stronger integration of energy and other environmental and health issues—could be of great benefit to building local initiatives. In California, funding from the Rebuild America program enabled LAUSD to hire a sustainability consultant. Non-governmental organizations, supported by private foundations or federal agencies, could create similar programs to coordinate the delivery of technical assistance to school districts that are about to embark on school building programs and do not have access to local expertise or resources. In addition, some universities are serving as important technical resources to states that are developing and implementing high performance building initiatives. Greater investment in these academic centers could facilitate such partnerships in other states.

Financial Assistance. In addition to the need for greater school construction funding generally, states and school districts need financial resources targeted to developing and carrying out high performance school building initiatives. State education agencies need funding to build their capacity to oversee and assist local school building programs, and other state agencies (environmental, energy, building) need funding to strengthen their expertise and programs in this area. School district initiatives would also get a boost from outside funding for higher initial costs, particularly for planning and early design activities that are often incurred before construction funding is secured.

One federal program that could provide funding for capacity-building at the state level has already been authorized—but not yet funded—by Congress. As part of the No Child Left Behind Act of 2001 (Public Law 107-110), the Department of Education was authorized to provide grants to states for planning and developing high performance school building activities. The funding of this program could help change building practices in school districts around country through the creation of new state strategies and programs to support local initiatives. Other federal grant programs—*e.g.*, EPA's Pollution Prevention Grants Program—provide funds to states and tribes to advance different aspects of high performance design and construction. In addition to bolstering those programs, the federal government could help compile and communicate information on the full range of federal resources that are available.

A strong knowledge base for high performance design and construction has been developed by federal agencies such as EPA and the Department of Energy, state initiatives such as CHPS, and numerous individuals and non-

governmental organizations. This report explores how that knowledge is being further developed and applied to transform local school building programs. Opportunities abound at the national, state and local levels to support school districts around the country in adopting a high

performance approach. Strategic action over the next few years can help produce school buildings that better serve children, their communities and society for generations to come.

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