S. HRG. 110–1088

GREEN BUILDINGS: BENEFITS TO HEALTH, THE ENVIRONMENT, AND THE BOTTOM LINE

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

MAY 15, 2007

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COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED TENTH CONGRESS
FIRST SESSION

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C O N T E N T S

GREEN BUILDINGS: BENEFITS TO HEALTH, THE ENVIRONMENT, AND THE BOTTOM LINE

TUESDAY, MAY 15, 2007

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The committee met, pursuant to notice, at 10:04 a.m. in room 406, Dirksen Senate Office Building, the Hon. Barbara Boxer (chairman of the committee) presiding.

Present: Senators Boxer, Inhofe, Lautenberg, Alexander, Cardin.

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Good morning, everyone. Just to give you the lay of the land, I am really pleased that we are having this hearing today. We have two members of this committee who have been real leaders on green buildings. One of them has been Senator Lautenberg and the other has been Senator Warner. So we have had great bipartisan interest in this.

I am going to, if there is no objection, place my statement in the record and just be clear about my intentions with this bill, and say to Senator Lautenberg and Senator Warner's staff if they are here, my intention, working with Senator Inhofe I hope in a cooperative way—we will see where it goes—is to bring a green buildings bill up for a markup very soon.

What we have already started doing here is making the Federal Government a model of energy efficiency. I am very proud that we passed our first such bill which would retrofit Federal buildings, and we did this with the Administration, with Republicans and Democrats working together. We also added as a piece of that legislation a grants program to cities and counties so that they could do the same with their government buildings. There are thousands and thousands and thousands of government buildings, and buildings use a lot of energy. If you look at just greenhouse gas emissions, they are responsible for about 40 percent of those emissions.

So I am very pleased that we are doing this. Senator Lautenberg, I love you for your efforts and I do, as well, Senator Warner. I am excited about this.

Just one last point, over at the Commerce Committee, on which I serve, we were able to get another piece of legislation through which would have the Federal Government now to the greatest extent practicable purchase the most fuel efficient vehicles. So if we do the retrofits of the buildings and, of course, green buildings looks forward, and part of your bill, which I strongly support, are

grants to schools to do the same. We are beginning to make a dent in this issue and we are showing leadership.

My schedule is such that WRDA is on the floor today. We are very anxious to finish work on that bill. I know a lot of you want us to. So I am going to be leaving now. Senator Inhofe, I know, is going to follow after his statement. We are going to meet on the floor and try to get these amendments to WRDA down to a reasonable number, and do our best to do our magic and get this done tonight. If we could get this WRDA bill done tonight, it would be a tremendous accomplishment for both sides.

So with that, I am going to call on Senator Inhofe. I am going to hand the gavel to my good and dear friend, Senator Lautenberg, who has it.

Senator Inhofe, the floor is yours.

And thank you, Senator Lautenberg.

Senator LAUTENBERG [Presiding]. Thanks very much, Senator Boxer. We will try to move this along. It is a very important, as you have acknowledged, piece of legislation, something that needs attention that is almost harmless if we pay attention to it, in helping us achieve a better greenhouse gas record.

Senator Inhofe, I am reminded, the former Chairman, presently just a would-be Chairman.

Senator INHOFE. No, will be.

[Laughter.]

Senator LAUTENBERG. Well, that starts the morning off freshly.

[Laughter.]

STATEMENT OF HON. JAMES INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you very much, Mr. Chairman.

First of all, we went through this exercise a year ago, and we worked things out with Senator Jeffords. There are some good things to come from this that I support. There are some things that I want to watch out for.

Let me do a couple of things. First of all, I would like to submit for the record at the conclusion of my statement the letters from the United Brotherhood of Carpenters and the North American Coalition on Green Building.

Senator LAUTENBERG. Without objection, so ordered.

Senator INHOFE. Then also I do want to submit my statement in its entirety for the record. But I want to say that as this moves along, I want to be a little bit cautious of a couple of things. One is what we are prescribing in the way of grants to school districts or to schools. I want to be very careful, Mr. Chairman, on how we treat the local communities and the zoning regulations. I spent four terms as Mayor of a major city. I can tell you there is nothing more offensive than having the Federal Government come in and say what you can and can't do with your community. So I think we need to have some sanity there and look at it very carefully.

So with those things in mind, I am hoping that we will be able to get something out and get it on the floor for a good debate. I submit my entire statement for the record, and I thank the Chairman.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OKLAHOMA

Thank you, Madam Chairman. I appreciate you holding this hearing today to discuss some of the issues relating to green buildings.

Today we will hear from our panel of five green building experts about some of the benefits that can be realized through following the principles of so-called "green building." Two of the goals of green building that are of particular merit are increased energy efficiency and improved water management.

Increased energy efficiency—along with developing new domestic sources of energy and ensuring a diverse energy supply—is a key component of improving our nation's energy security. Just a few weeks ago, Madam Chairman, we unanimously passed a bill out of this committee—the Public Buildings Cost Reduction Act—that is a sensible, effective step toward improving energy efficiency in public buildings at both the Federal and local levels.

Effective use of green building design can also be used by communities across the country struggling to comply with the federal stormwater management program. These communities within metropolitan districts must take measures to reduce rainwater from coming into contact with pollutants. Green roofs filter, absorb and detain rainwater, reducing the amount being discharged into the municipal stormwater system and thus reducing the burden on the local community.

I look forward to hearing more about these topics from our witnesses today.

I am also interested, Madam Chairman, in learning more about some of the concerns with current green building practices and what we can do to address those concerns in any legislation we may consider in this committee.

One concern I have heard expressed repeatedly by a number of groups and industries is that of establishing a mandate or endorsement for any one particular green building rating system. To date, numerous State and local governments have put in place various mandatory measures that call for the adoption of LEED standards [—the U.S. Green Building Council's Leadership in Energy and Environmental Design rating system for green buildings—] and there is legislation before this committee that specifically refers to LEED. The LEED system, however, was intended to be a voluntary program; additionally, there are other green buildings rating systems on the market. Promoting one system over others in legislation essentially amounts to brand endorsement by law.

At this point, I would like to submit for the record letters from the United Brotherhood of Carpenters and the North American Coalition on Green Building stating their concern with referencing only the LEED system in green building legislation.

I am pleased to welcome Mr. Ray Tonjes from the National Association of Home Builders today. I look forward to hearing your perspective on this matter, in addition to learning about your involvement in green building programs. I also look forward to hearing from Mr. Ward Hubbell, president of the Green Building Initiative, about the Green Globes rating system and what your organization is doing.

We should pursue the goals of energy and resource conservation. During our consideration of green building legislation, however, we need to bear certain questions in mind.

It's my understanding that buildings built "green" don't always perform as intended—what research still needs to be done on the actual benefits of green buildings? What standards and benchmarks are currently being used for various aspects of building design and certification? What mandates might we be creating, and what would be the consequences of those mandates? While many of the goals of green building are worthwhile, I am concerned about the possibility of legislating mandates—intended or otherwise—that would be costly and burdensome to our taxpayers and communities.

I look forward to our panel addressing these issues today. Thank you, Madam Chairman.

[The information referred to follows on pp. 100–104.]

STATEMENT OF HON. FRANK LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Senator LAUTENBERG. Thanks very much, Senator Inhofe.

While there is nothing more offensive to communities than getting mandates from Washington, I don't hear that same objection when it comes to grants from Washington, but I guess that is understandable.

I take the Chairman's gracious gavel turnover, and I therefore assume the status of Chairman and I welcome everyone to today's hearing.

When most people consider what hurts the environment and harms public health, they don't consider buildings. Our thoughts immediately turn to transportation, which is responsible for about one third, it is believed, of greenhouse gases, but buildings have an impact on the health of the environment and the health of nearly every American. That is because buildings from single family homes to skyscrapers are responsible for nearly 40 percent of America's greenhouse gases.

Those emissions advance global warming and threaten the health of our planet and our children. Poorly designed schools can have an unhealthy air quality. This poor air quality can cause an increase in childhood asthma. More than 67 percent of schools have at least one building design condition that contributes to asthma, according to a recent study. The Health Schools Network ran this study, and I look forward to their testimony on their report.

In comparison to standard buildings, the average green building uses 30 percent less energy, emits nearly 40 percent fewer emissions, and has far better air quality. Green buildings also have smaller electric bills, which save owners and tenants on the cost on their bottom line. But if we want the private sector to go green, the Federal Government needs to take a leadership role and go green also.

The Federal Government is the largest owner and renter of buildings in the Nation, and one of the largest emitters of greenhouse gases in the entire world. So I have a bill that I first introduced with Senator Jeffords in the 108th Congress, and have recently reintroduced to get government to lead on this issue, the High Performance Green Buildings Act.

So I appreciate the support that Chairman Boxer, and Senators Snowe, Cardin, Clinton, Kerry, Lieberman, Menendez, Sanders, Klobuchar and Whitehouse have shown by cosponsoring my bill. This legislation would blend sustainable design into Federal buildings, help our buildings on the course to earn leadership in energy, environment and design. The acronym is LEED. They issue a silver rating.

It would also provide grants, as Chairman Boxer noted, that model development guidelines to schools to improve the quality of the air that they breathe there. Tom Friedman, noted author and journalist, wrote in The New York Times, "Green is the new red, white and blue." Many private companies are doing their part to show this new patriotism. We will hear from the architect of a new Bank of America green building today.

The States are doing their part. New Jersey and 21 other States have signed bills similar to my legislation and it is time for the Federal Government to show its new colors. So we want to promote the environment and public health by working toward green buildings.

Senator Alexander, please, if you want to, make a statement within a 5-minute period. Please do so.

STATEMENT OF HON. LAMAR ALEXANDER, U.S. SENATOR FROM THE STATE OF TENNESSEE

Senator ALEXANDER. Thank you, Mr. Chairman. I congratulate Senator Lautenberg on his leadership on this piece of legislation. I simply wanted to come by and say that.

One way to create a green building is through solar photovoltaic cells, which produce electricity at the building. That is important to us in Tennessee because we have pretty big clean air problem. We have problems with sulfur, nitrogen and mercury. Solar energy doesn't produce any of that.

On the other end of our State in Memphis, Sharp, which came to Tennessee to make television sets when I was Governor 20 years ago, is now the leading manufacturer of solar photovoltaics and the market leader in the United States. Its manufacturing facility is that old television factory. They build the television sets now in Mexico, but they have employed even more people building solar photovoltaics. So I hope Tennessee will become the center of solar cell manufacturing in the United States.

Another point, Mr. Chairman, a lot of people assume that only places like Arizona or similar locations can be useful places for solar. Germany, which has about 40 percent less solar energy available than the Tennessee Valley region, is the world's leader in the use of solar power. So we believe that technology is likely to show us that in buildings and in other ways that solar energy can be very helpful.

As far as renewable power, I myself prefer it to the huge 300-foot giant wind turbines with flashing red lights. I like the solar energy better and I am very hopeful that it works.

Oak Ridge National Lab, TVA, Habitat for Humanity, the Department of Energy, are building zero-energy houses in Lenoir City. The John J. Duncan Federal Building in Knoxville is a great example of creative retrofitting of an 18-year-old Federal building that is making an extraordinary environmental impact.

So Mr. Chairman, your legislation and this hearing are very helpful in helping us in the Tennessee Valley look for new ways to have clean air, produce more of our own renewable energy, and create jobs, especially in Memphis at the Sharp manufacturing plant. I thank you for the chance to make these opening remarks.

Senator LAUTENBERG. Senator Alexander, it is encouraging to have your positive view on this. I appreciate it.

Senator ALEXANDER. Thank you.

Senator LAUTENBERG. Senator Cardin.

STATEMENT OF HON. BENJAMIN CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Senator CARDIN. Thank you, Mr. Chairman. Let me ask that my entire statement be put in the record.

First, let me just congratulate you for your leadership on this issue. This is a very important subject dealing with green buildings, particularly with the Federal Government exercising leadership. As you pointed out, I am a cosponsor of your bill and I think we need to move legislation in this area.

I am going to suggest that we modify your proposal with two additional provisions to strengthen green buildings, with the Federal

Government exercising the leadership. I think as was pointed out by Senator Boxer and yourself, the Federal Government really needs to step up to the plate and provide the national leadership for green technology and for energy savings.

We need to become energy independent. We need to do that for the sake of our security, as well as the sake of our environment.

Buildings consume, as you pointed out, such a large amount of our energy needs. The LEED-certified buildings in the United States are an aggregate savings of 150,000 metric tons of carbon dioxide. That is the equivalent to 30,000 passenger cars not driven for 1 year. So as you can see, there is a significant advantage if we have green buildings in this country.

I have introduced S. 1165 that would require new Federal buildings to meet the LEED's silver standard, which I think we should do. We have that technology and it is the right policy and it shows the right leadership.

My legislation would also add one additional area of concern in Federal buildings, and that is to deal with the runoff issues. Let me just give you one example in the Chesapeake Bay. Development is increasing faster than the population. Population growth in the Chesapeake watershed, for example, increased by 8 percent during the 1990's, but the rate of impervious service increased by 42 percent. Putting pollutants into our streams, rivers and oceans imposes a significant problem for the Chesapeake Bay.

So my suggestions would be that we have the Federal Government really exercise leadership in this area by a commitment for new construction to meet the LEED's silver standard and that there be standards in our Federal construction that deal with the runoff issues. I think if we did that, we would really be sending the right signal to the private sector that we really can make a significant reduction in the use of energy, which will help us with energy independence, and a significant reduction in carbon dioxides which will help us with the global climate change issue.

Once again, Mr. Chairman, I thank you for holding this hearing, and I thank you for your leadership in bringing this issue to the attention of the U.S. Senate.

[The prepared statement of Senator Cardin follows:]

STATEMENT OF HON. BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Madame Chairman, thank you for holding this hearing. We need to make this country energy independent, and to enact a comprehensive, long-term energy policy that will give Americans the energy they need, while protecting our environment and our national security.

Senators Lautenberg and Warner have both introduced legislation that I support, and I have introduced legislation that compliments these bills—the American Green Building Act, S. 1165. We can do more.

Our Federal Government is the largest single energy consumer in the world.

Buildings account for over a third of America's energy consumption.—Buildings also account for 49 percent of sulfur dioxide emissions, 25 percent of nitrous oxide emissions, and 10 percent of particulate emissions, all of which damage our air quality. Buildings produce 38 percent of the country's carbon dioxide emissions—the chief pollutant blamed for global warming.

Federal buildings are a large part of this problem.

Energy used in Federal buildings in FY 2002 accounted for 38 percent of the total Federal energy bill.—Total Federal buildings and facilities energy expenditures in FY 2002 were $3.73 billion.

The American Green Building Act would require all new Federal buildings to live up to green building LEED (Leadership and Energy in Environmental Design) Silver standards, set by the United States Green Building Council. These standards were created to promote sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

The average LEED-certified building uses 32 percent less electricity, 26 percent less natural gas and 36 percent less total energy.—LEED-certified buildings in the United States are in aggregate saving 150,000 metric tons of carbon dioxide reduction equivalent to 30,000 passenger cars not driven for one year. A single LEED-certified building is designed to save an average of 352 metric tons of carbon dioxide emissions annually, which is equivalent to 70 passenger cars not driven for one year.

In the American Green Building Act, the LEED Silver standard would only apply to federal buildings for which the design phase for construction or major renovation is begun after the date of enactment of the provision. The General Services Administration or relevant agency may waive this requirement for a building if it finds that the requirement cannot be met because of the quantity of energy required to carry out the building's purpose or because the building is used to carry out an activity relating to national security.

My bill will also require that significant new development or redevelopment projects undertaken by the Federal Government plan for storm water runoff.— The hardened surfaces of modern life such as roofs, parking lots, and paved streets, prevent rainfall from infiltrating the soil. Over 100 million acres of land have been developed in the United States. Development is increasing faster than population: population growth in the Chesapeake Watershed, for example, increased by 8 percent during the 1990s, but the rate of impervious surface increased by 42 percent. Development not only leads to landscape changes but also to contamination of storm water runoff by pollutants throughout the watershed. Storm water runoff can carry pollutants to our streams, rivers, and oceans, and poses a significant problem for the Chesapeake Bay.

Every other pollution source in the Chesapeake is decreasing, but pollution from storm water runoff is increasing.—In urbanized areas, increased storm water runoff can cause increased flooding, stream bank erosion, degradation of in-stream habitat and a reduction in groundwater quality. For these reasons, as the Federal Government moves forward with development, we need to plan for how to manage storm water runoff. The storm water provisions in the American Green Building Act will be used to intercept precipitation and allow it to infiltrate rather than being collected on and conveyed from impervious surfaces.

The Federal Government must take the lead if we are to achieve our energy and environmental goals.

Senator LAUTENBERG. Thank you very much, Senator Cardin.

Now we have a panel of witnesses, all with whom have expertise on different elements of green buildings, including residential, commercial and schools. I welcome them to the table.

Bob Fox, Peter Templeton, Claire Barnett, Ray Tonjes, and Ward Hubbell, I thank all of you for joining us. I would, as the witnesses take their seats, mention that Mr. Fox is the architect who led the development of the Bank of America building in midtown Manhattan. It is a fantastic accomplishment. The building will be the first ever high rise office building to achieve the prestigious LEED platinum rating. Mr. Templeton is the vice president for LEED at the United States Green Building Council.

Ms. Barnett is executive director of the Health Schools Network. Mr. Tonjes is chairman of the Green Building Subcommittee of the National Association of Home Builders. Mr. Ward Hubbell is president of the Green Building Initiative.

I thank all of you for joining us. I now ask you to present a summary of your testimony. Please do that within 5 minutes. We will try to get through and have a chance to interact with some questions.

I would ask you, Mr. Fox, to testify first. Thank you.

STATEMENT OF ROBERT F. FOX, JR., PARTNER, COOK+FOX ARCHITECTS

Mr. FOX. Thank you, Senators. I consider this a privilege and an honor to be invited here today to speak with you.

I am a partner in the architectural firm of Cook+Fox in New York City. I have spent my 40-year career working in and around New York City. I am privileged to have worked on buildings like Four Times Square, the first green high rise building, the Battery Park City guidelines, and the Bank of America Tower that you mentioned. I also serve on the Mayor's Sustainable Committee for the new 2030 Plan for the City of New York.

One Bryant Park is a partnership between the Bank of America and the Durst family. It is 2.2 million square feet and it will cost $1.3 billion. We started designing this building as a high performance building, wanting to produce the absolute best building we could. I was convinced when we started that we could never have gotten LEED platinum, so we just put our heads down and went to work. After we finished our design and then looked at LEED, we were delighted that in fact we were a LEED platinum building.

In terms of the energy of this building, it will consume about one half the energy of a normal building. We are doing that primarily with a large cogeneration plant of 5 megawatts that we are locating in the building. It will produce 67 percent of the building's annual energy, and at night when we don't need that energy, it will make ice, which we will melt during the day to supplement the air conditioning system.

We also have a daylight dimming system throughout the building. The brighter the sun, the dimmer the lights. We are saving 50 percent of the water. I just read in the paper today that the cost of water has gone up 40 percent in New York City since we started the design of this project in 2003. We will harvest all of the rainwater. We will use that water to flush the toilets. We also have waterless urinals for the first time in a high rise building in New York City.

We are using blast furnace slag instead of half the cement for this building. It is a waste product of the steel industry and it makes wonderful cement, actually better than using 100 percent cement. The ceiling in our lobby will be made of bamboo, a rapidly renewable resource.

The indoor air environment will be second to none. It will be like a hospital. We will have 95 percent filters on the incoming air. Thirty-five percent is the normal. We will be delivering the air from under the floor with individual controls for every occupant in the building, and every employee in the building will have access to daylight. They will all be able to see out and see what the weather is.

We have found that LEED for us is the common language of the green building industry. It is an amazing product because it is the result of a volunteer effort by architects, engineers, builders, and manufacturers that have donated to the U.S. Green Building Council over 600,000 hours of volunteer time creating this document. It is being revised as we speak. If you think about the cost of that and just assign a $200 per hour cost, that is $120 million of professional volunteer time. That is some standard.

So I thank you very much for this opportunity.
[The prepared statement of Mr. Fox follows:]

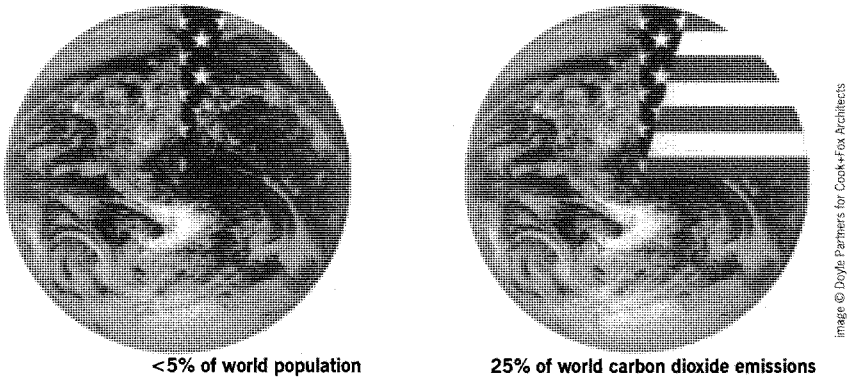
STATEMENT OF ROBERT F. FOX, JR., PARTNER, COOK+FOX ARCHITECTS

Good morning. Thank you very much for the opportunity to be here today.

My name is Bob Fox, and I am a Partner at Cook+Fox Architects in New York City, a firm known for designing beautiful buildings that save energy and resources, While enhancing health and improving the bottom line. This has been the focus of my 40 year career. Beginning in 1995 I was the Architect for Four Times Square, which was the country's first green skyscraper, and which was designed when the industry had no common standard for defining a "green building." In 1999 I led the team that created Residential and Commercial Environmental Guidelines for the Battery Park City Authority, a public-private entity that controls 92 acres of Lower Manhattan. Since then, The Guidelines have been followed by all projects built in Battery Park City, which by 2010 will result in over 5 million square feet of LEED Gold buildings. Currently, I serve on the Advisory Council for Mayor Michael Bloomberg's Office of Long-Term Planning and Sustainability, which in April released PlaNYC, a comprehensive agenda for sustainable growth over the next 30 years.

Cook+Fox is the Architect for the new Bank of America Tower at One Bryant Park, a 2.2 million square foot, $1.3 billion commercial headquarters, developed jointly by the Bank of America and the Durst Organization. It is currently under construction on 6th Avenue and 42nd Street in Midtown Manhattan. When completed in 2008, it will be the 2nd tallest building in New York City, standing 945 feet to the top of its roof. Most importantly, it will be the first high-rise office tower in the country to achieve a LEED Platinum rating, the highest possible certification from the U.S. Green Building Council.

Computer simulation of the Bank of America Tower from Rockefeller Center



<5% of world population 25% of world carbon dioxide emissions

I am here to speak today because buildings are leading consumers of energy and emitters of the greenhouse gases responsible for climate change. Nationwide, the building sector accounts for 43 percent of carbon dioxide emissions, and buildings consume 71 percent of all electricity generated.[1] In dense urban areas, buildings can represent the dominant source of emissions. When New York City recently completed its first comprehensive Inventory of Greenhouse Gas Emissions, it was found that 79 percent of the city's carbon dioxide emissions come from its buildings.[2]

The United States, with only 4.5 percent of the world's population, is responsible for 25 percent of worldwide carbon dioxide emissions.[3] Buildings represent a large part of the problem, because as currently designed and operated, they waste enormous amounts of energy as well as clean water and other resources. Green buildings make it possible to create offices, homes, and institutions that perform better than conventional buildings on all levels, saving energy and water, improving health and productivity, and saving money.

The green building industry has grown steadily, and then rapidly accelerated over the last 10 years. Both the public and the private sector are witnessing the benefits of green building, and momentum is growing for the transformation of architectural and engineering practices, real estate markets, local building codes, and building services and suppliers. In 2006, the American Institute of Architects challenged practicing professionals to immediately cut fossil fuel consumption by 50 percent in the buildings they are designing. They further challenged the industry to increase reductions over the next 30 years, resulting in carbon-neutral buildings by 2035 Cities States and U.S. Government agencies have been among the first to experiment with and experience the operational cost savings and superior indoor quality of high-performance green buildings.

In large cities like New York, green buildings are being recognized as an essential part of planning for future growth, maintaining the urban infrastructure, and protecting health and quality of life. With urban populations growing rapidly, cities across the United States face great challenges, but can also benefit from urban density. Because of the density of apartment buildings and reliance on mass transit, New Yorkers produce 71 percent less CO_2 per capita than the average American.[4] Cities, therefore, that invest in sustainable growth can be an important part of the solution.

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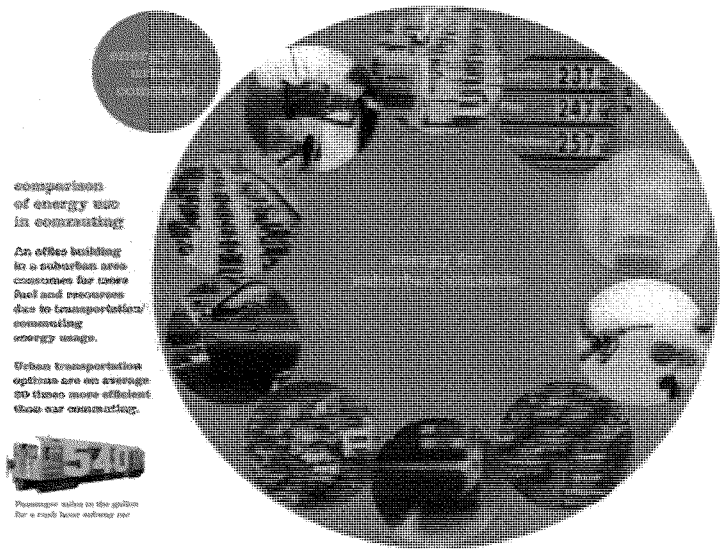
[1] Oak Ridge National Laboratory. Towards a Climate-Friendly Built Environment. Arlington: Pew Center on Global Climate Change, 2005.

[2] New York City. PlaNYC: A Greener, Greater New York. April, 2007. (http://www.nyc.gov/html/planyc2030/html/plan/plan.shtml)

[3] World Resources Institute. 2007. EarthTrends: Environmental Information. (http://earthtrends.wri.org). Washington, DC: World Resources Institute.

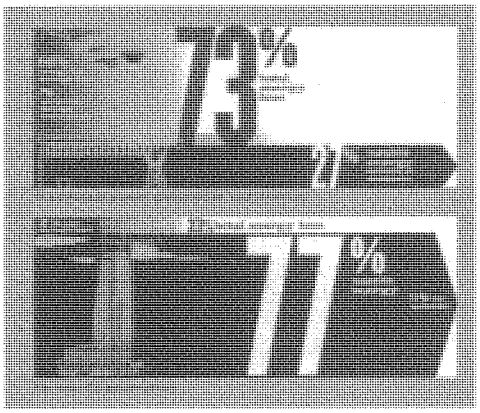
[4] New York City. PIaNYC: A Greener, Greater New York. April, 2007. (http://www.nyc.gov/html/planyc2030/html/plan/plan.shtml)



The Bank of America Tower, with 2.2 million square feet of premium office space, will consume about half the energy and water of a typical building of its size, while creating the healthiest most productive possible work environment for its occupants. It was designed to take advantage of a world-class public transit system: in getting to work, the tenants of the building will generate only $\frac{1}{20}^{th}$ the energy of the average suburban commute. With 8000 workers arriving each day, the building will have zero parking spaces.

The Bank of America Tower will earn a LED Platinum certification through an integrated approach to green building practices and technologies. When we began the project, the goal was to create the most high performance building possible: one that would use far less energy, far less water, create a high quality interior environment, use materials with high recycled content and no Volatile Organic Compounds (VOCs), and recycle all construction debris. After we had finished our basic design we turned to LEED, the industry standard and clearly the most advanced measuring tool, to see how well we had done. We were delighted to learn we had the potential to earn a Platinum certification.

Energy efficiency in buildings can be drastically improved with today's strategies and technology. Typically, when power is generated in our country, approximately $\frac{2}{3}$ of the energy goes directly up the smokestack in the form of waste heat. After additional transmission losses, what arrives at the typical building is only about 27 percent of the total energy created. Instead, the Bank of America Tower will have an on-site, 5 megawatt power plant producing clean energy from natural gas at 77 percent efficiency. Using cogeneration technology, this giant turbine will produce electricity, then use the waste heat to generate even more power. It will be enough to provide approximately 67 percent of the building's annual energy needs with clean, efficient supply.



co-generation

Cape Breton Fuels is an efficient power generator

Co-generation provides 73% of the building's total power consumption.

Generating our own energy is 100% more efficient than tapping into the traditional power grid.

image © Doyle Partners for Cook+Fox Architects

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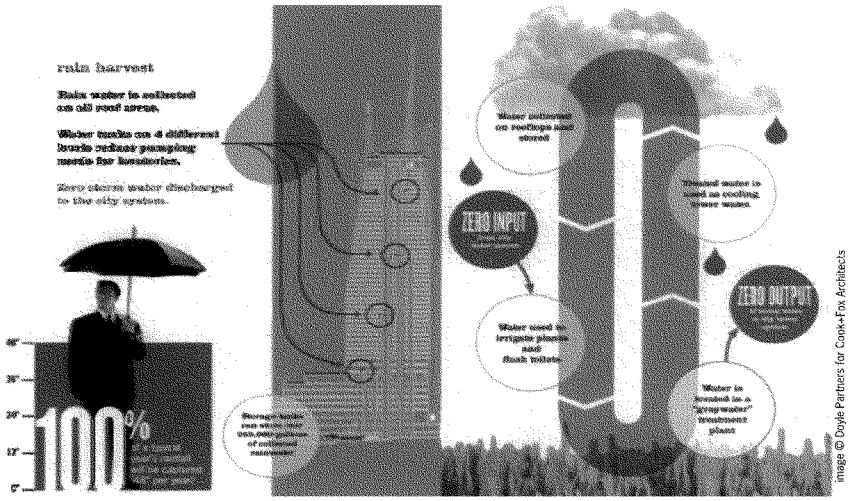

Like most large cities, New York has an electric grid that struggles to keep up with demand during peak times. At these times, the power utility is forced to turn on its oldest, dirtiest "peaks" plants. It has been estimated that 90 percent of the air pollution in the city comes from just 50 percent of its power plants. One of the goals at the Bank of America Tower was to ensure the building did not contribute to this burden on the city's infrastructure. The building will have a thermal storage plant in the cellar, with 44 large tanks making ice at night, when energy demand is low and the cogeneration plant is producing more power than the building needs. During the day, the ice melts to supplement the air conditioning system, reducing the peak demand and creating a much more even level of power consumption. Like most utilities, Con Edison charges its customers a rate based on peak demand, so the building tenants will save money.

Water and wastewater are also critical issues impacted by the building sector. New York, like Washington, DC, has a combined sewer and stormwater system. During significant rains, sewage treatment facilities routinely become overwhelmed by the volume of wastewater, and discharge partially treated sewage into our waterways. The Bank of America Tower, in contrast, will make zero stormwater contribution to the municipal system. The building will do this by collecting all rainwater that falls on its roofs, about four feet a year, and storing it in four tanks staged throughout the building. Water that condenses from mechanical equipment and drains from lavatory sinks will also be collected, treated, and used to flush toilets and supply the cooling towers. Nearly every office building in the United States today uses clean, drinking-quality water for these purposes. The building is also installing waterless urinals, a technology that alone will save three million gallons of water every year. Thanks to these combined strategies, the building will consume less than half the potable water of a typical office building.

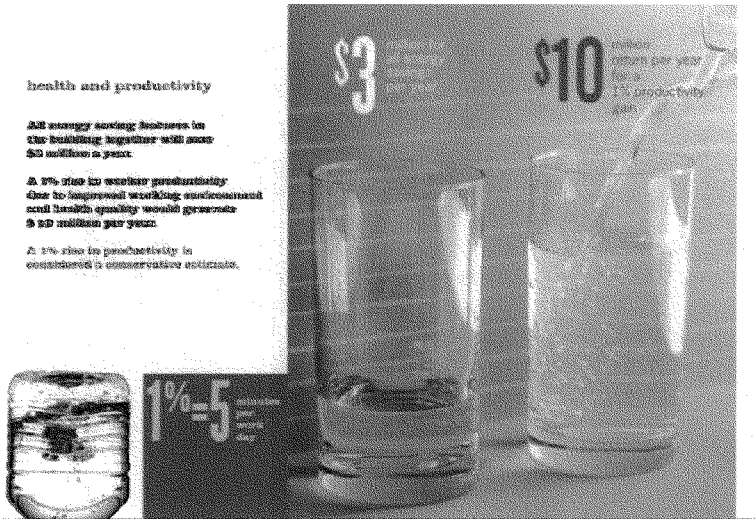

image © Doyle Partners for Cook+Fox Architects

To the Bank of America, constructing a building that offered 50 percent water savings, 50 percent energy savings, drastically reduced greenhouse gas emissions, and added an iconic element to the New York City skyline was of great interest. But what really caught the Bank's attention was the quality of the indoor environment, and the potential impacts on employee health and productivity. Like other organizations, especially those in a knowledge-based industry, the Bank could expect to spend around 10 percent of its operating budget on rent and utilities, but more than 80 percent on salaries and benefits.[5] Even by rough calculations, a 1 percent increase in productivity—the equivalent of 5 minutes a day—would amount to $10 million a year. Fewer sick days and overall reduced absenteeism translate into real benefits for any organization. For the Bank, enhancing the ability to hire and retain the best talent was also extremely important.

A high-performance work environment addresses natural light, artificial lighting, thermal and acoustic comfort, air quality, and other design factors. The first priority for the Bank of America Tower was to design a daylit environment that would let tenants work by natural light as much as possible. Enclosed in highly transparent, floor-to-ceiling glass, the workplace also provides a direct connection to the outdoors—a complex set of environmental cues whose impacts on human well-being are just starting to be understood by psychologists and designers, through a field known as biophilia.

According to the U.S. Environmental Protection Agency, indoor air is often more polluted than outside air, and many people spend 90 percent of their time indoors.[6] Whereas the typical code-compliant building in New York is designed to filter out only 35 percent of particulates from the mechanical ventilation system, the Bank of America Tower will filter 95 percent of particulates, as well as ozone and VOCs. In effect, the air that is exhausted from the building will be cleaner than the air coming in. In addition, in virtually all U.S. office buildings, air is ducted in through the ceiling and then blown downward, where it mixes with all the air in a room, evenly distributing dust, germs, and allergens. Instead, the Bank of America Tower will have an under-floor air distribution system. Rather than forcing conditioned air down from the ceiling, heat from occupants and computer equipment will draw fresh air upward, at warmer temperatures and lower pressure. Individual air diffusers in the floor will allow workers to adjust the flow of as around their desks, minimizing the circulation of airborne pathogens and resolving the chief complaint among office workers of being too hot or too cold.

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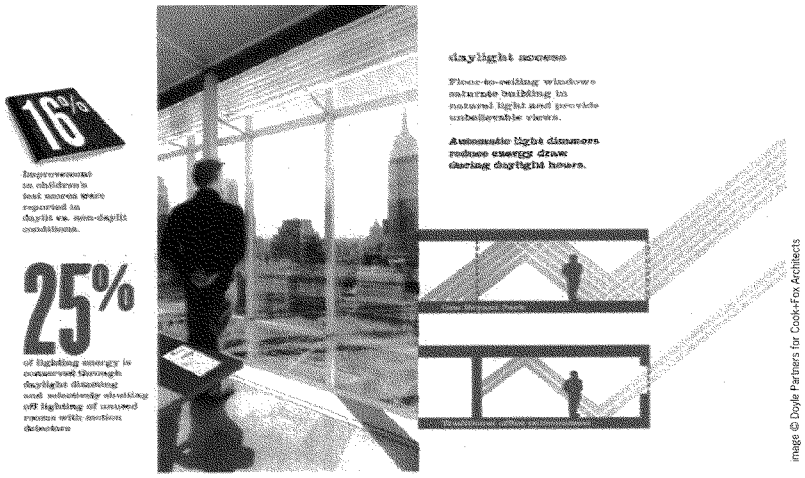
[5] Wilson, Alex. "Productivity and Green Buildings." Environmental Building News 13.10, October 2004.

[6] U.S. EPA and U.S. Consumer Product Safety Commission. "The Inside Story: A Guide to Indoor Air Quality." April 1995.



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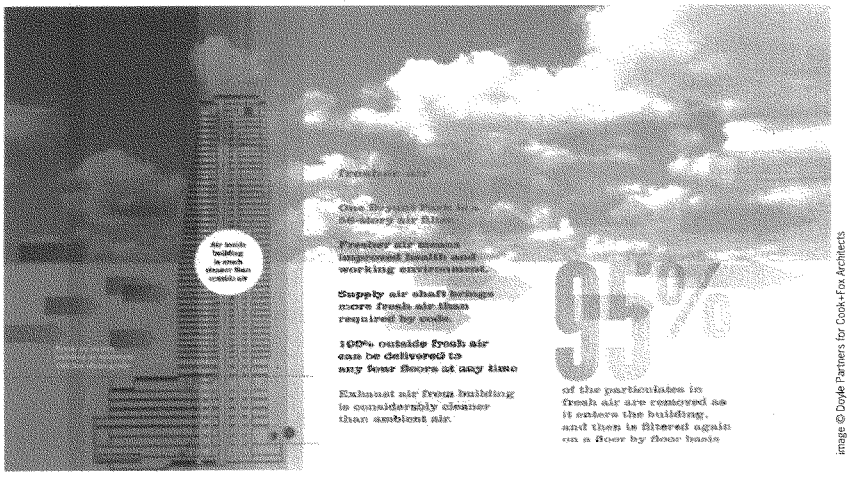

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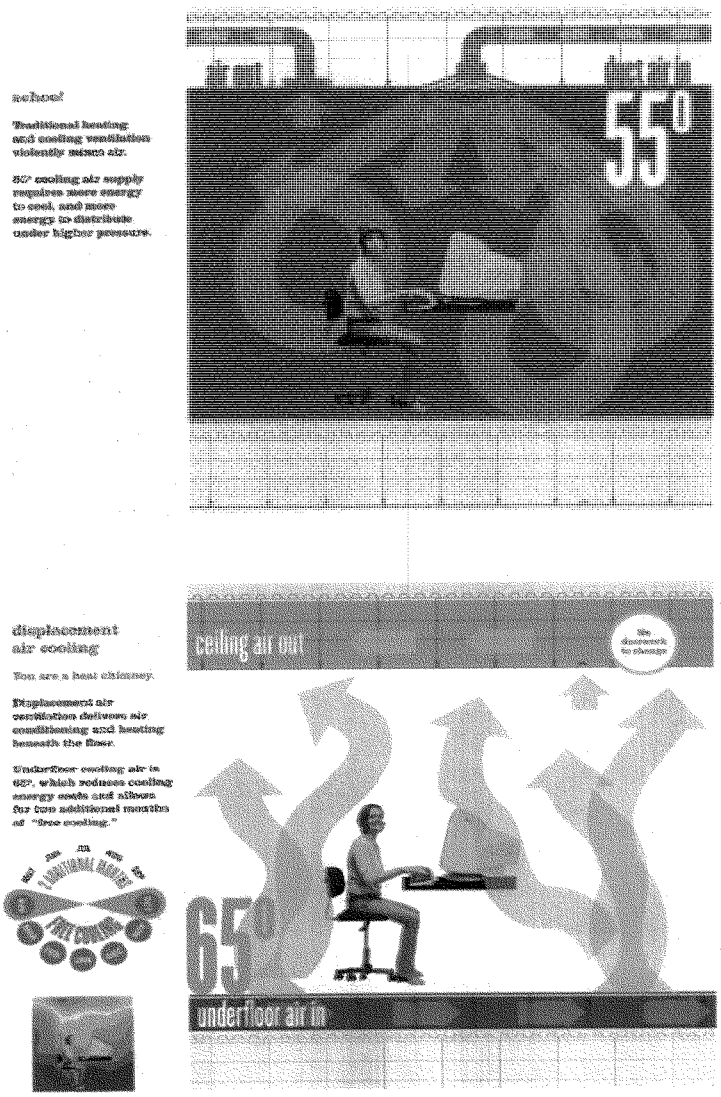

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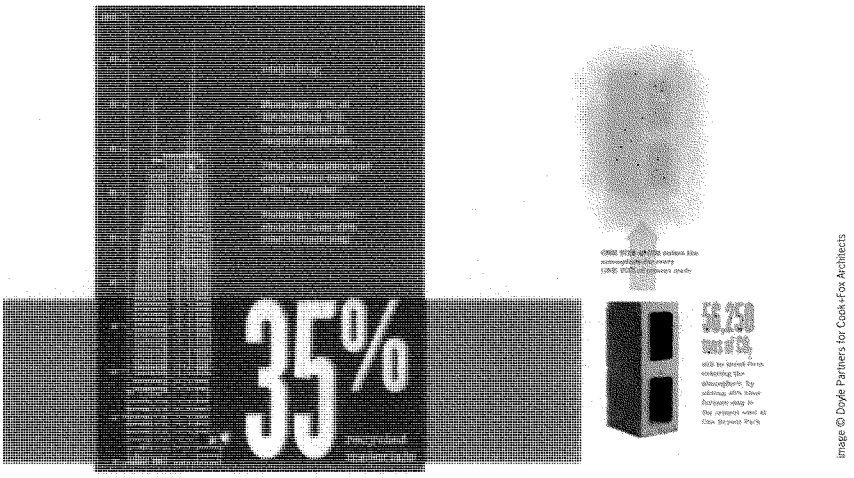
Other issues that have been considered include the impacts of materials over their entire life-cycle, from cradle to grave. The manufacture of cement, for example, results in one ton of CO_2 emitted for every ton of cement produced. This is why worldwide, the cement industry is responsible for more than 5 percent of CO_2 emissions.[7] To minimize these emissions, 45 percent of the cement in the Bank of America Tower is being replaced with blast furnace slag, a waste product of the steel industry. By using an industrial waste product, we have calculated that this practice will prevent 56,250 tons of CO_2 from entering the atmosphere. Other materials-related practices include preferred purchasing of recycled and locally-produced materials, and recycling of 83 percent of construction and demolition debris.

Where green building practices represented an additional cost the costs and benefits were carefully evaluated by the owner and design team. Some ideas were abandoned, and only strategies that represented a reasonable payback were pursued. In total, the added cost of green technologies and practices, including cogeneration, represents approximately 2 percent of the project budget. We have found that building at scale was itself an opportunity to reduce the overall cost of high performance green measures.



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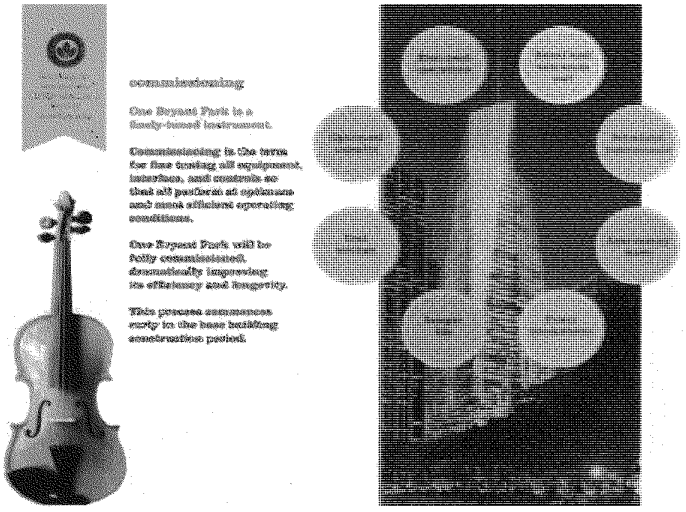

image © Doyle Partners for Cook+Fox Architects

[7] Lawrence Berkeley National Laboratory. "Carbon Dioxide Emissions from the Global Cement Industry." Annual Review of Energy and Environment vol. 26, 2001.

Building in a fundamentally different way is a challenging task. Before an industrywide standard was created, practitioners had to determine for themselves what practices were harmful or beneficial. As a standard developed by a coalition representing all sectors of the building industry, the U.S. Green Building Council's LEED system is now a common language for measuring and validating green buildings. Every LEED certified building must comply with certain requirements, from eliminating Environmental Tobacco Smoke to commissioning all mechanical, electrical and plumbing equipment to ensure it operates at the level at which it was designed to perform. This voluntary standard is designed to evolve over time, and results from a consensus-based process that is inherently robust and inclusive. Some 600,000 volunteer hours have been invested in developing and improving LEED over the past 10 years (had this time been billed at $200/hr, it would add up to $120,000,000). This level of collaboration by architects, engineers, builders, and manufacturers is unmatched in any industry, and has helped accelerate the current transformation of building markets. The opportunities of high performance green buildings are not limited to new buildings. Existing buildings are an extremely important part of the energy equation—in New York City, it is estimated that by 2030, 85 percent of the city's energy usage will come from buildings that exist today. Existing buildings can be upgraded through retrofits to fighting and heating and cooling systems; the resulting energy savings typically amount to a 3- to 7-year payback. Retro-commissioning to optimize mechanical equipment functioning typically pays for itself within 2 to 3 years.[8]

Buildings such as the Bank of America Tower prove that it is possible to create high-performance green buildings on a very large scale. At 2.2 million square feet, large building budgets can afford to make creative innovations—but what about the rest of us?

In fact, buildings at all scales can make a difference in the health and well-being of their occupants, and in the quality of environment we pass on to future generations. In early 2006, Cook+Fox had outgrown its previous office and needed to find new space. Using the same standards for beautiful design and high performance, and with the help of creative engineers, we worked hard to create a LEED Platinum interior space of 12,000 square feet, with a 3600 square foot green roof. We moved in June 2006, and are already enjoying terrific employee and client satisfaction.

The United States has always been a high-performance country and an incubator for innovation. No landlord or developer wants to own a building destined for obsolescence because it locked itself into the thinking of the 20th century. As costs decline and benefits accumulate, high-performance building will become the only way to design the places we live and work. The question now is how to act intelligently and effectively to set a new high standard.

[8] New York City. PlaNYC: A Greener, Greater New York. April, 2007. (http://www.nyc.gov/html/planyc2030/html/plan/plan.shtml)

Green roof of the office of Cook+Fox Architects

Interior of the office of Cook+Fox Architects

Senator LAUTENBERG. Thank you very much. It looks like that building ought to have an opportunity to show off its development perhaps even become a tourist attraction, Mr. Fox.

Mr. FOX. Thank you.

Senator LAUTENBERG. It is exciting to hear what can be done.

Next, Mr. Templeton, we welcome you and ask for you to give your testimony please.

STATEMENT OF PETER TEMPLETON, VICE PRESIDENT OF EDUCATION AND RESEARCH, U.S. GREEN BUILDING COUNCIL

Mr. TEMPLETON. Good morning. My name is Peter Templeton and I am vice president of Education and Research for the U.S. Green Building Council, a nonprofit coalition of more than 9,000 private, nonprofit and governmental organizations working to transform building design, construction and operations. Our vision is that all buildings will achieve sustainability within a generation.

Thank you for providing us the opportunity to talk with you about green buildings as an important part of the solution to the challenges of energy dependence and climate change, and the role of the Council and its LEED green building rating system in providing immediate and measurable results.

Every year, buildings are responsible for 39 percent of U.S. CO_2 emissions and 70 percent of U.S. electricity consumption. They use 15 trillion gallons of water and consume 40 percent of raw materials globally. Buildings are more than one third of the challenge and green buildings are the solution.

Green buildings use an average of 36 percent less energy than a conventional building, with a corresponding reduction in CO_2 emissions. If half of our all new construction in the United States were built to that standard, it would be the equivalent of taking more than one million cars off the road every year.

Green buildings make sense for both the environment and the bottom line. Studies show that on average, LEED buildings cost less than 1.5 percent more than conventional construction, and the investment is paid back in full within the first year, based on energy savings alone.

But energy savings aren't the only story. Water conservation, reductions in construction waste, and effective storm water management not only means savings for the building owner, but also reduced demands on municipal infrastructures. Health and productivity benefits are equally impressive. Anecdotal studies demonstrate that people in green buildings have 40 percent to 60 percent fewer incidents of colds, flu and asthma. Patients in green hospitals are discharged as much as 2.5 days earlier, and kids in green schools score up to 18 percent better on test scores.

LEED-certified buildings have higher asset value than their conventional counterparts. Leading institutions, including Bank of America, PNC Bank, Goldman Sachs, Citigroup and Wells Fargo have all embraced LEED. Insurance companies including AIG and Fireman's Fund now offer premium discounts for green buildings.

Since its introduction 7 years ago, LEED has become the nationally accepted benchmark for leadership in green building. True to its intent, it gives projects and project teams a concrete set of de-

sign and performance goals and third party certification that validates their achievement.

Today, 851 buildings have been LEED-certified, and 6,500 more are in the process, totaling 1.1 billion square feet. Every business day, $100 million worth of construction registers with LEED. There are LEED projects in every State and in 26 countries. Increasingly, building owners and developers are choosing to certify their entire portfolios.

The LEED rating system addresses all building types and the full life cycle of commercial buildings, from construction to operations and retrofits. In addition, LEED for Homes is currently in pilot with 6,000 individual homes and 200 builders. And LEED for Neighborhood Development opened for pilot this year and more than 300 projects have applied.

LEED takes a holistic approach to sustainability, recognizing performance in five key areas: site, water, energy, materials and resources, and indoor environmental quality, with an additional category to recognize innovation. Four progressive levels of LEED certification—certified, silver, gold, and platinum—are awarded based on the number of credits or points achieved in each category.

The transformation of the building marketplace can also be measured through the people who are part of it. More than 36,000 professionals have achieved LEED accreditation. More than 80,000 attend USGBC-offered educational programs each year, and 92,000 are actively engaged in USGBC programs nationally or through USGBC's 70 local chapters and affiliates.

As green buildings are integrated into the mainstream, costs come down, aggregate benefits go up, and the whole of the market is driven to innovation. It is a case study for how even a large and fractured industry, one that represents 14.2 percent of U.S. GDP, can change itself from the inside out and how environmental achievements can be won side by side with powerful economic results.

The public sector has demonstrated vision and leadership in the green building movement, both by adopting LEED for their own buildings and by creating smart incentives for the private sector. Currently, 12 Federal agencies, 22 States and 75 local governments have made commitments to use or encourage LEED. In 2006, GSA submitted a report to Congress concluding that LEED is the most credible of five different rating systems evaluated. The GSA currently requires its new buildings to achieve LEED certification.

USGBC is committed to our mission because green buildings save energy, reduce CO_2 emissions, conserve water, improve health, increase productivity, and cost less to operate and maintain. Green buildings are becoming highly prized assets and a critically important part of the solution to global climate change and energy dependence.

Thank you again for the opportunity to address you today. We commend you, Senator Lautenberg, for your leadership and look forward to working with this committee to accelerate transformation of the built environment to sustainability.

[The prepared statement of Mr. Templeton follows:]

STATEMENT OF PETER TEMPLETON, VICE PRESIDENT OF EDUCATION AND RESEARCH, U.S. GREEN BUILDING COUNCIL

Thank you for providing the U.S. Green Building Council (USGBC) with the opportunity to testify on the benefits of green buildings. We commend Chairwoman Boxer and Senator Lautenberg for their leadership in this critical area.

My name is Peter Templeton, and I am USGBC's Vice President of Education and Research. I joined USGBC as one of its first staff members, and previously served as the Council's Director for LEED® and International Programs. It is a privilege to talk with you about the role of the Council and the LEED® (Leadership in Energy and Environmental Design) Green Building Rating System™ in addressing the urgent challenge of energy efficiency and climate change, and the many far-reaching benefits of green building.

THE IMPACT OF THE BUILT ENVIRONMENT

Buildings are an essential element of the solution to the energy, resource, and climate issues our country is facing.

Buildings have a lifespan of 50–100 years, throughout which they continually consume energy, water, and natural resources, thereby generating significant CO_2 emissions. In fact, buildings are responsible for 39 percent of U.S. CO_2 emissions per year. If the U.S. built half of its new commercial buildings to use 50 percent less energy, it would save over 6 million metric tons of CO_2 annually, for the entire life of the buildings—the equivalent of taking more than 1 million cars off the road every year.

In addition, buildings annually account for 39 percent of U.S. primary energy use; 70 percent of U.S. resource consumption; use 12.2 percent of all potable water, or 15 trillion gallons per year; and consume 40 percent of raw materials globally (3 billion tons annually). The EPA estimates that 136 million tons of building-related construction and demolition debris are generated in the United States in a single year. (By way of comparison, the United States creates 209.7 million tons of municipal solid waste per year.)

Green buildings are a significant part of the solution to the problems of energy dependence and climate change. The average LEED certified building uses 32 percent less electricity, 26 percent less natural gas and 36 percent less total energy than a conventional building. LEED certified buildings in the United States are, in aggregate, reducing CO_2 emissions by 150,000 metric tons each year, which equates to taking 30,000 passenger cars off the road.

Of the various strategies that have been proposed, building green is one of the most effective for meeting the challenges of energy consumption and climate change. The technology to make substantial reductions in energy use and CO_2 emissions in buildings already exists; modest investments in energy-saving and other climate-friendly technologies can yield buildings and communities that are significantly more environmentally responsible, more profitable, and healthier places to live and work.

By addressing the whole building, from construction materials to cleaning supplies, LEED generates opportunities to reduce emissions and environmental impact throughout the supply chain and the complete building lifecycle. 65 percent of the credits in the LEED Rating System reduce the CO_2 footprint of the building. The avenues by which LEED mitigates climate change include:

Energy

LEED awards credits for reducing energy use in buildings through such means as installing energy efficient heating and cooling systems; using renewable power (e.g., daylight, solar heating, wind energy); requiring building commissioning; and purchasing green power.

Water

On average, a LEED certified building uses 30 percent less water than a conventional building, which translates to more than 1 million gallons of water saved per year. Reducing the amount of water that needs to be conveyed to and treated by municipal wastewater treatment facilities also reduces pumping and process energy required by these systems. LEED also promotes on-site treatment of storm water to minimize the burden on municipal treatment systems.

Materials

LEED buildings use fewer materials and generate less waste through measures such as reusing existing building structures whenever possible; developing a construction waste management plan; salvaging materials; using materials with recycled content; using local materials; and implementing an on-site recycling plan. Re-

duced materials consumption lowers the overall embodied energy of the building, which has a direct impact on the building's carbon footprint.

Transit- & Density-Oriented Development

LEED buildings earn credits for being located near public transportation. LEED also rewards car pooling; using hybrid or electric cars; and bicycling or walking instead of driving. In addition to the emissions produced by the cars themselves, the infrastructure required to support vehicle travel increases the consumption of land and non-renewable resources, alters storm water flow and absorbs heat energy, which exacerbates the heat island effect.

GREEN BUILDING TRENDS AND MARKET TRANSFORMATION

Just a few years ago, green building was the domain of a vanguard of innovative practitioners. Today, green building is being rapidly adopted into the mainstream of building practice in both the residential and commercial sectors. McGraw-Hill Construction forecasts that the combined annual commercial and residential green building markets will total $62 billion by 2010.

USGBC's LEED Green Building Rating System serves as an essential, proven tool for enabling this market transformation. Equally as important as recognizing leading practice through third-party certification, LEED has given the community of building design, construction, and management professionals a concise framework for best-practices in high-performance green building design and operations.

To date, there have been 851 LEED-certified buildings worldwide, with the majority in the United States. In addition, more than 6,500 building projects have enrolled with USGBC and are pursuing certification. In total, 1.1 billion square feet of construction space is being built to meet LEED, and that figure grows daily.

The growth is manifest in USGBC's green building professional accreditation program as well. Since the program's launch in 2002, more than 36,000 professionals from all disciplines have become LEED Accredited Professionals (LEED APs).

The LEED Rating System was originally developed for new commercial construction projects, and the rapid uptake of the program demonstrated that the market needed additional tools to address different building types and lifecycle phases. USGBC released rating systems for the operations and maintenance and commercial interiors markets in 2006, and is currently pilot-testing rating systems for homes and neighborhood developments. Already, more than 6,000 homes and 200 builders are participating in the LEED for Homes pilot test; nearly 200 homes have been certified to date. LEED for Neighborhood Development, which integrates principles of smart growth, urbanism, and green building at the neighborhood level, is also being pilot-tested. More than 350 projects have enrolled for consideration for the pilot. USGBC recently launched LEED for Schools, and is completing rating systems for health care facilities, retail, labs, and campuses.

In addition, USGBC is currently piloting a new LEED program for portfolio performance that meets the needs of large owners of commercial real estate who are seeking to green their entire real estate portfolios. This innovative approach provides cost-effective solutions to improve building performance across entire companies and organizations. The goal is to facilitate immediate and measurable achievements that will contribute to long-term sustainability. The portfolio program focuses on the permanent integration of green building and operational measures into standard business practice. USGBC is working with 26 market leaders as a part of the pilot, including American University, Bank of America, California State University—Los Angeles, Cushman & Wakefield, Emory University, HSBC, N.A., PNC Bank, State of CA—Dept. of General Services. Syracuse University, Thomas Properties Group, Transwestern, UC—Merced, UC—Santa Barbara, University of Florida, USAA Real Estate Company.

COSTS AND BENEFITS OF GREEN BUILDING USING LEED

Projects enroll in LEED by registering their intent with USGBC and paying a fee of $450. Project certification fees are approximately $0.03 per square foot, and average about $4,500.

According to third-party studies published and updated by Capital E and by Davis Langdon in the past 24 months, the average total additional cost for using LEED on a project (including professional fees, materials, and systems) is 1.5 percent or less. That cost is typically repaid in the first 10 months of building operation based on energy savings alone.

For example, according to U.S. Banker Magazine, the greening of the Bank of America Tower, being constructed in Manhattan, is adding less than 2 percent of

its projected cost. The project expects to recoup any investments through reduced electricity usage and water-saving techniques.

Harvard Business Review cites the DPR building in Sacramento, California as having invested 1.4 percent upfront additional costs to implement green measures. The project is expected to more than make up the investment by generating over $400,000 in operations savings.

ABOUT THE U.S. GREEN BUILDING COUNCIL

The U.S. Green Building Council (USGBC) is a nonprofit membership organization with a vision of sustainable buildings and communities within a generation. Our 9,000-member organizations and 92,000 active individual volunteers include leading corporations and real estate developers, architects, engineers, builders, schools and universities, nonprofits, trade associations and government agencies at the Federal, State and local levels. Green buildings save energy, reduce CO_2 emissions, conserve water, improve health, increase productivity, cost less to operate and maintain, and increasingly cost no more to build than conventional structures. Because of these benefits, they are becoming highly prized assets for companies, communities and individuals nationwide.

As the developer and administrator of the LEED® (Leadership in Energy and Environmental Design) Green Building Rating System™, USGBC is a leader in green building and green development. Founded in 1993, USGBC is a 501(c) (3) non-profit organization, an ANSI-accredited standards developer and a newly active participant in ISO technical working groups. The organization is governed by a diverse, 31-member Board of Directors that is elected by the USGBC membership. Volunteer committees representing users, service providers, manufacturers, and other stakeholders steward and develop all USGBC programs, including the LEED rating system, through well-documented consensus processes. Seventy local USGBC Chapters and Affiliates throughout the United States provide educational programming to local communities.

A staff of more than 85 professionals administers an extensive roster of educational and informational programs that support the LEED Rating System in addition to broad-based support of green building. USGBC's LEED Professional Accreditation program, workshops, green building publications, and the annual Greenbuild conference provide green building education for professionals and consumers worldwide.

ABOUT THE LEED® GREEN BUILDING RATING SYSTEM™

LEED is the nationally recognized benchmark for the design, construction, and operations of high-performance green buildings. Since 2001, LEED has provided building owners and operators with design and measurement tools with the reliability and integrity they need to have an immediate, quantifiable impact on their buildings' performance.

LEED is a voluntary standards and certification program, and was developed to promote leadership in the building industry by providing an objective, verifiable definition of "green." LEED is a flexible tool that can be applied to any building type and any building lifecycle phase, including new commercial construction; existing building operations and maintenance; interior renovations; speculative development; commercial interiors; homes; neighborhoods; schools; health care facilities; labs; and retail establishments.

LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas, with an additional category to recognize innovation: sustainable site development, water savings, energy efficiency, materials and resources and indoor environmental quality. Each category includes certain minimum standards ("prerequisites") that all projects must meet, followed by additional credits that are earned by incorporating green design and construction techniques. Four progressive levels of LEED certification—Certified, Silver, Gold and Platinum—are awarded based on the number of credits achieved. USGBC provides independent, third-party verification that a building meets these high performance standards.

USGBC member committees develop the LEED Rating System via a robust consensus process that enables USGBC to incorporate constantly evolving practices and technologies. The key elements of the process, which USGBC has refined over more than a decade of leadership experience, include a balanced and transparent committee structure; Technical Advisory Groups to ensure scientific consistency and rigor; opportunities for stakeholder comment and review; member ballot of new rating systems and substantive improvements to existing rating systems; and a fair and open appeals process. Details about the LEED development process are publicly available on the USGBC Web site, www.usgbc.org.

USGBC is continuing to advance the market with the development of LEED Version 3.0, which will harmonize and align LEED rating systems and versions, as well as incorporate recent advances in science and technology. Congruent with this effort, USGBC is introducing a continuous improvement process into LEED, which will create a more flexible and adaptive program and will allow USGBC to respond seamlessly to the market's evolving needs. Particular focus areas include technical and scientific innovations that will improve building performance; the applicability of LEED to the marketplace, in order to speed market transformation; and the customer experience, to ensure that LEED is an effective tool for the people and organizations using it.

The inclusion of Life Cycle Analysis (LCA) is an important step in the technical development of LEED. USGBC's Life Cycle Assessment working group has developed initial recommendations for incorporating Life Cycle Assessment (LCA) of building materials as part of the continuous improvement of LEED.

LCA holistically evaluates the environmental impact of a product throughout its life cycle: from the extraction or harvesting of raw materials through processing, manufacture, installation, use, and ultimate disposal or recycling. USGBC's long term objective is to make LCA a credible component of integrated design, thereby ensuring that the environmental performance of the whole building takes into account the complete building life cycle.

In 2006, citing the qualities outlined above, the U.S. General Services Administration submitted a report to Congress concluding that LEED is the "most credible" of five different rating systems evaluated. The GSA currently requires its new buildings to achieve LEED certification.

Building projects are enrolled in the LEED program by registering their intent with USGBC through LEED Online. After the building is constructed, the project teams submit proof-of-performance in the form of online documentation through LEED Online. LEED Online was developed through a partnership with Adobe Systems Inc.

Expert certification teams review and verify project documentation, and award LEED Certified, Silver, Gold, or Platinum certification based on the number of credits the project achieves based on a sliding scale.

LEED AND THE GOVERNMENT

Governments at all levels have been highly influential in the growth of green building, both by requiring LEED for their own buildings and by creating incentives for LEED for the private sector. From the Department of Energy's support for the initial development of LEED, to the Federal Energy Policy Act of 2005, to the many cities and states that have adopted LEED, the public sector has demonstrated considerable vision and leadership in the transformation of the built environment. Currently, 12 Federal agencies, 22 states and 75 local governments have made policy commitments to use or encourage LEED.

The Federal Government has been a particularly strong supporter of USGBC and LEED. The U.S. Department of Energy enabled the development of LEED with a $500,000 grant in 1997, and has also provided USGBC with $130,000 in grants to support the Greenbuild Conference and Expo. Staff from the national laboratories, FEMP and other program areas have actively shared their expertise to develop and refine LEED. USGBC has also collaborated with DOE's Office of Energy Efficiency and Renewable Energy with BuildingGreen on the High Performance Buildings Database.

The U.S. General Services Administration—which is the nation's largest landlord—requires its new buildings and major renovation projects to achieve LEED certification. As mentioned previously, GSA also submitted a report to Congress affirming that LEED "continues to be the most appropriate and credible sustainable building rating system available for evaluation of GSA projects."In particular, GSA noted that LEED applies to all GSA project types; that it tracks the quantifiable aspects of building performance; that LEED is verified by trained professionals and has a well-defined system for incorporating updates; and that it is the most widely used rating system in the U.S. market.

Government leadership will continue to be essential to the advancement of green building. USGBC supports targeted, viable government initiatives that facilitate market transformation, including:

• The creation of an Office of High-Performance Green Buildings within the

U.S. General Services Administration to coordinate green building research, information dissemination and other activities, as provided by S. 506, the High-Performance Green Buildings Act of 2007.

• The expansion of the Office Director's duties that would facilitate: metering, sub-metering and continuous commissioning of Federal buildings in order to measure energy use and to ensure that building systems are delivering the efficiencies for which they are designed; agency reports on their CO_2 reductions using the existing energy targets required by Federal law; establishment of green building education and training programs for Federal Agency staff in order to ensure that the capability exists to achieve agency sustainable building goals.

RESEARCH

In a March 2007 report, USGBC found that research related to high-performance green building practices and technologies amounts to only 0.2 percent of all federally funded research. At an average of $193 million per year from 2002 to 2005, research spending is equal to just 0.02 percent of the estimated value of annual U.S. building construction. These funding levels are not commensurate with the level of impact that the built environment has on our nation's economy, environment and quality of life. USGBC recommends that total annual federal funding equate to 0.1 percent of annual construction value, $1 billion.

Furthermore, USGBC has identified the following eight research program areas toward which such funding should be applied: Life Cycle Assessment of Construction Materials; Building Envelope and HVAC Strategies; Lighting Quality; Transportation-Related Impacts of Buildings; Performance Metrics and Evaluation; Information Technology and Design Process Innovation; Indoor Environmental Quality; and Potable Water Use Reduction in Buildings.

HIGH PERFORMANCE SCHOOLS

In the United States, more than 55 million students and more than 5 million faculty, staff, and administrators spend their days in school buildings. These buildings represent the largest construction sector in the U.S.—$80 billion in 20060–2008—which means that greening school buildings is a significant opportunity to make a major impact on human, environmental, and economic health.

Most important, children in green schools are healthier and more productive. Design features including attention to acoustical and visual quality, daylighting, and color have a profound impact on children's ability to learn. Green schools also have superior indoor air quality and thermal comfort, and expose children to fewer chemicals and environmental toxins—which has been linked to lower asthma rates, fewer allergies, and reduced sick days.

Green schools cost less to operate and greatly reduce water and energy use, which generates significant financial savings. According to a recent study by Capital E, if all new school construction and school renovations went green starting today, energy savings alone would total $20 billion over the next 10 years. On average, a green school saves $100,000 per year—enough to hire two new teachers, buy 500 new computers, or purchase 5000 new textbooks. The minimal increase in upfront costs—on average less than $3 per square foot—is paid back in the first year of operations based on energy savings alone.

To further this effort, USGBC supports federal authorization and funding of K-12 green school demonstration projects in targeted school districts throughout the country. Such a directive must also include a requirement that the buildings are constructed so that they can serve the students as teaching tools on green building design, construction and operation.

CONCLUSION

The U.S. Green Building Council is a coalition of leaders from every sector of the building industry working to transform the way buildings and communities are designed, built, and operated through market-based tools. USGBC's LEED® (Leadership in Energy and Environmental Design) Green Building Rating System™ has become a nationally accepted benchmark for high-performance green buildings.

In just seven years, LEED has had a significant, positive impact on the building marketplace. LEED was created to establish a common standard of measurement for what constitutes a "green" building, and provides independent third-party validation of a building's green features. LEED provides building owners and operators with the tools they need to make an immediate and measurable impact on their buildings' health and performance, which is why more than 1.1 billion square feet of construction space is being built to LEED standards. The impact is growing: Every business day $100 million worth of construction registers with LEED; 50 people attend a USGBC training course; 20 people become LEED Accredited Professionals and four organizations join USGBC as members.

Green building is essential to environmental, economic, and human health. Annually, buildings account for 39 percent of U.S. primary energy use; 70 percent of U.S. energy consumption; use 12.2 percent of all potable water, or 15 trillion gallons per year; and consume 40 percent of raw materials globally (3 billion tons annually). The EPA estimates that 136 million tons of building-related construction and demolition debris is generated in the U.S. in a single year.

Buildings are an essential part of the solution to mitigating climate change and establishing energy independence. The average LEED certified building uses 32 percent less electricity, 26 percent less natural gas, and 36 percent less total energy than a conventional building. LEED certified buildings in the United Staates are in aggregate reducing CO_2 emissions by 150,000 metric tons each year, which equates to 30,000 passenger cars not driven. Building green is a highly effective strategy for meeting the challenges ahead of us. The technology to make substantial reductions in energy use and CO_2 emissions in buildings already exists, which means that modest investments in energy-saving and other climate-friendly technologies can yield buildings and communities that are significantly more environmentally responsible, more profitable, and healthier places to live and work.

Federal, State, and local governments have been instrumental in the growth of green building, both by adopting green building themselves and by encouraging it in the private sector. The government's continued leadership will be essential to ongoing advancements in this area. Significant opportunities exist in increasing Federal funding for green building research and in Federal support for the design and construction of green schools.

Thank you again for the opportunity to present the views of the U.S. Green Building Council. We look forward to working with you to facilitate the transformation of the built environment to sustainability.

Senator LAUTENBERG. Thank you for some of those startling results that we can expect from green building architecture and development. Thank you.

Ms. Barnett.

STATEMENT OF CLAIRE BARNETT, EXECUTIVE DIRECTOR, HEALTHY SCHOOLS NETWORK

Ms. BARNETT. Thank you. Good morning. I want to thank the committee for the opportunity this morning to speak to you about children's environmental health and how our Nation's non-green and very unhealthy schools actually undermine children's health and learning, and what we can do together to promote healthy school environments for all children.

My name is Claire Barnett. I am executive director of the Health Schools Network. I also coordinate the National Coalition for Healthier Schools.

Today, 54 million children, because today is a school day, are required to be in our Nation's 120,000 public and private schools. Yet every single day brings another report of lead in school drinking water, schools sinking into landfills, closures due to mold infestations, evacuations and emergency room trips prompted by chemical spills, schools on toxic sites, chemicals in closets literally from the 1840's, and hard-working parents told in fact by their family doctors to keep children out of unhealthy buildings.

It is not the right legacy. We know that children are uniquely vulnerable to environmental contaminants. They breathe more air, drink more fluids, and eat more food per pound of body weight than adults do. Their developing systems are more vulnerable to environmental toxins and their behaviors, like sitting and rolling around on the floor, would put them in touch with a different set of pollutants.

Focusing in on just one set of pollutants commonly found in schools, EPA estimates that about half of all our Nation's schools

have problems with indoor air, which can be 5 to 100 times more polluted than outdoor air. Air pollution is in fact a major contributor to asthma, the leading cause of school absenteeism and the leading occupational disease of teachers. That means they get it on the job.

Other health effects from indoor air include respiratory problems, difficulty with concentration, rashes, headaches, nausea and so forth. Anyone can be affected. But then think of the escalating numbers of children with preexisting health and learning impairments who are being enrolled in schools every day. They may be even more affected.

One answer is to get back to basics and find an approach that deliberately designs out common problems and designs in solutions that restore fresh air and sunshine to our schools. Benefits include improved achievement, health, attendance, and productivity, as well as savings in energy and resource conservation. One study found an 87 percent reduction in flu in schools that had healthy indoor environments. Another found 67 percent reduction in sick building syndrome, and a 46 percent reduction in upper respiratory problems. One health study found a 40 percent reduction in asthma episodes taking place during school.

High performance schools save an average of one third in energy costs. These are really astounding numbers. How can every child benefit from this? Communities are beginning to make very smart choices to build healthy green schools. Governors in California and New Jersey have issued executive orders. New York City schools just adopted new green high performance design standards following the lead of Los Angeles Unified School District, as well as statewide initiatives in New York, Washington, Massachusetts, and New Hampshire.

A 2006 National Research Council report called Green Schools found that there is in fact a robust scientific literature on indoor environments and children's health. I would hope the Senators would take note that the Federal Education Department has yet to report to all of you on its similar 2004 National Priorities Study done pursuant to No Child Left Behind.

The hard sciences show that children in fact do better in buildings with specific qualities. The buildings should be dry. They should have good indoor air quality. They should be quiet. They should have well maintained systems, and they should be clean. In fact, basic best practices in prevention such as green cleaning and the use of less toxic pest controls are highly cost-effective and minimize indoor air pollutant risks to all school occupants.

So if all these things are wonderful, how does any one school reach that? How does a volunteer school board member or a parent or a classroom teacher or a school head figure out how to get a high performance school? What do they do?

Fortunately, EPA has created a suite of proven school environment best practices and has encouraged them locally over the last few years with mini-grants, largely to school constituency organizations. Today, in our view, the best way to rapidly accelerate the numbers of children and communities benefiting from healthy and high performing schools is to encourage State activity.

Thus, we support the High Performance Green Buildings Act that would establish a Federal Office on Green Buildings, and authorize EPA to give grants to qualified State agencies to build information and technical assistance systems. Within the States, they can promote high performance school design, help resolve environmental problems, and EPA alone is uniquely qualified with the Federal Centers for Disease Control and ATSDR to develop school siting guidelines.

In summary, there is absolutely no downside. Every child and every community should have a healthy, high performance school. It is achievable. It is doable.

Thank you very much.

[The prepared statement of Ms. Barnett follows:]

STATEMENT OF CLAIRE BARNETT, EXECUTIVE DIRECTOR, HEALTHY SCHOOLS NETWORK

INTRODUCTION

Good morning. Thank you Senators Boxer and Inhofe and the other members of the U.S. Senate Environment and Public Works Committee for the opportunity to present information on how the poor conditions of our school buildings undermine children's health and interfere with learning and what we can do to reverse that by building and operating healthy and high performance schools.

Our children and grandchildren—yours and mine—are compelled to be in school today. Yet, every day brings new reports of e-coli in school water; schools sinking into landfills; closures due to mold infestations; evacuations and ER trips prompted by chemical fumes; schools on toxic sites; chemicals in closets from the 1840's; parents told to keep their children away from unhealthy schools. No parent wants that for their child and no one here would visit those threats on anyone's else's child. But our society does. And the real shocker is that all of those problems are easily avoided through the siting, design, construction, and operations of our children's workplaces—their school buildings.

School buildings can be designed and maintained in such a way that the school facility itself promotes the health and well being of children, and promotes and facilitates learning. A Healthy and High Performance School dramatically improves the health and learning of students while saving money for schools. Too often schools are unhealthy places that impede learning, sicken children, teachers and staff and waste public resources. The Healthy and High Performance School combines design features that promote children's environmental health, environmental sustainability, energy efficiency, reduced carbon emissions and save money for education and their communities. Science-based policy and action steps should be taken now to "design out" common problems and ensure that all our children have environmentally healthy schools that are clean and in good repair.

My name is Claire Barnett. I am the founding Executive Director of Healthy Schools Network, Inc., and the Coordinator of the national Coalition for Healthier Schools. Healthy Schools Network is a not for profit research, information and education, and advocacy organization that seeks to ensure that every child will have an environmentally healthy school that is clean and in good repair. We have successfully shaped and secured new polices, programs, and funds for schools, at home in New York, and nationally, while our Clearinghouse has assisted parents and schools in every state. The national Coalition provides "the platform and the forum" for healthy school environments, endorsed by over 520 organizations and individuals nationwide. My testimony is on behalf of Healthy Schools Network and on behalf of participants in the Coalition.

Lessons Learned: A National Report

32,000,000 children: victims of a public health crisis

(national collaborative report, with 28 contributing groups, April 2006)

Missouri Parent. My daughter had been missing one day of school per week for 3 months because of her extreme bouts with chronic illness. She was sent home several times complaining of severe headaches…, the doctor recommended that she stay home from school for 2 weeks to rebuild her strength. We have to be extremely cautious in managing her asthma because she is allergic to a lot of the medications that help, so we followed doctor's orders without hesitation. Shortly after her school absence, I discovered that the school had reported me to Social Services for educational neglect! This was a shock because the school is well aware of her health problems as well as the doctor's order to stay out of school….

New Jersey Parent. When my daughter entered fifth grade, the nightmare began. Construction was taking place and she became very asthmatic, but over the summer, she was fine. As soon as school re-convened, she got extremely ill-headaches, body rashes and sores. She got worse; her skin began peeling, she was losing hair and developed dark spots all over. After staying home, within two hours of re-entering the school, I was called to pick her up because she had completely relapsed! Once I moved her to another school, she never had a problem.

Ohio Teacher. "Why should we continue to teach in a building that's making everyone ill?!" Our district decided to erect a brand new school building. It went up fast, but we were all happy to relocate. After we moved in, I began feeling ill and having problems with my eyes. …I informed administration about many teacher's complaints and suggested that it may have something to do with the new building. ….I began tracking the kids. They were ill; symptoms flared during the week and subsided over the weekend. Soon after, …a few other teachers were diagnosed with new occupational asthma…. Finally we staged a "teach out"; all but 90 students left the building. This is when things started to change: the school was closed for 16 months and cleaned up.

Georgia Environmental Advocate. The Board of Education learned in April 2005 that our Elementary school soils were contaminated-enough to be included on Georgia's list of Hazardous Sites. Starting from scratch in May 2005, school staff began… testing the schoolyard…. Initial estimates were a few hundred cubic yards of soil. … When clean up levels were not met, more was removed until goals were achieved. The few hundred cubic yards ballooned to 3500 as toxic soils were discovered much deeper than expected. May, June, and July rushed by as the August 10th school- reopening date approached. School opened, cleaned-up, and on time, thanks to the commitment and hard work of the school's Facility Director.

National Summary of Data*

No. Publ. School Bldgs	**96,143**
No. Students	**48,590,635**
No. Minority Students	**19,778,912**
No. Students in Special Ed. Programs	**6,597,187**
No. Employees in School System	**5,447,541**
% Children w/Asthma (under 18)	**8.7 %**
% Schools with at least one Inadequate Bldg. Feature	**57 %**
% Schools with at least one Unsatisfactory Bldg. Condition	**68 %**
Est. No. Students at High Risk	**31,067,803**

*** *Lessons Learned* provides state by state data tables, news clips and reports for parents and teachers on school conditions.**

OVERVIEW

Children are uniquely vulnerable to environmental contaminants, many of which are found in schools. Children proportionately breathe more air, drink more fluids, and eat more food than adults. Developing systems are more vulnerable to environmental toxins than are fully developed adults. Yet health standards for children's exposure to indoor environmental contaminants do not exist. An often-cited U.S. General Accounting Office report noted that children are compelled by law to attend school, yet these school facilities may be unsafe or harmful to student health.

Children's exposure to environmental hazards at school contributes to multiple health problems. Poor school indoor air is a major contributor to causing and exacerbating asthma, which is well known to be at epidemic proportions among school age children. Hazards in the school environment are linked to a host of other health problems including respiratory problems, poor concentration, rashes, headaches, gastrointestinal problems, nervous system disorders, and cancers. Nationally, there has been a dramatic rise in the number of children afflicted with learning disabilities, attention deficit hyperactivity disorder, and autism. These conditions are also linked with environmental toxins that may be found in the school environment.

The poor conditions of America's schools are well documented (and endured by millions of children every day), and these deteriorating school facilities contribute greatly to harmful environmental exposures. As noted above, there is no system of environmental health protection for children at school. The school environment is therefore unique, and tragically, often fails in providing its most basic function, that is providing a healthy and safe learning environment for students, teachers and school staff.

THE "GREEN" OR HEALTHY AND HIGH PERFORMANCE SCHOOL

One answer to this complex problem is to have schools well designed from the start. Communities across the Nation are designing and building healthy and high performance (or "green") schools that create environments that improve learning, promote good health, are easier to maintain, and cost less to operate than traditional school facilities. Clean air, non-toxic building materials, daylighting and full-spectrum lighting, state of the art thermal and acoustical engineering and energy efficiency are incorporated into a holistic design and comprehensive construction of a school. Demonstrated benefits include improved student performance, improved child health, improved student attendance and substantial operational savings. High performance schools mitigate poor indoor air quality by using materials that do not off-gas hazardous chemicals, by utilizing properly designed ventilation and air conditioning systems, and focusing on preventative maintenance. In addition to superior indoor air quality, healthy and high performance schools provide improved student performance due to better lighting, acoustics and thermal comfort. A healthy and high performance school also saves up to 40 percent of the building's energy costs over the lifetime of the facility. In addition, healthy and high performance schools can be built at the same cost as conventional school facilities. These schools then have an added benefit, saving districts substantial funds in decreased energy and maintenance costs over the life of the building.

Across the country, communities are building Healthy and High Performance ("green", sustainable) schools. Governors of both California and New Jersey have issued Executive Orders requiring schools to be built in accordance with High Performance/Green design standards. The New York City Schools, our nation's largest district, just adopted a Green Schools Guide blending USGBC's LEED–NC rating system with elements of NY-CHPS, the NY Collaborative for High Performance Schools design guidelines. Indeed the CHPS design model that began in CAL and is adopted by Los Angeles and other large districts, has now been adapted for use statewide into Washington, New York, Massachusetts, and New Hampshire. These environmentally healthy design protocols will impact billions of dollars of school construction and major renovations. More states can and should do the same.

Indeed, school construction and school purchasing is a $730 billion a year decentralized market taking place in thousands of local communities. Imagine if all 54 million children in our Nation's 120,000 + public and private schools had environmentally healthy buildings. What a transformation! And a ready market for green-rated product producers.

The health and learning benefits are known to Federal agencies, as well as to high-end real estate developers. But what are the real benefits to our children?

A new National Research Council report "Green Schools: Attributes for Health and Learning" is an excellent review of the hard sciences. Among the findings, that 'green' has not been well defined; but that there is a "robust literature" in the impacts of healthy school environments on children, on attendance, on achievement

and behavior, and on productivity. Bear in mind the virtual epidemic of children with asthma, autism, auto-immune disorders, visual, auditory, and other learning challenges in school every day, then consider:

- Robust body of evidence linking health to IAQ
- Some evidence linking IAQ to productivity and learning
- There is an association between excessive moisture, dampness, molds in buildings and adverse health outcomes
- Key factors in IAQ: ventilation rate and effectiveness, filter efficiency, temperature and humidity control, control of excess moisture, O&M, maintenance
- Indoor pollutants and allergens also linked to linked to respiratory and asthma symptoms (HSN note—asthma is the leading occupational disease of teachers and of custodians)
- Reduced pollutant load (through increased ventilation and filtration) has been shown to reduce occurrence of building-associated symptoms
- Work performance decreases with higher room temperatures
- Green school lighting focuses on energy, not work performance
- Control glare when encouraging daylighting
- Speaking and listening are key to learning
- Sufficient evidence for inverse association between excessive noise and student learning
- Infection control in densely occupied spaces requires cleaning and ventilation
- More research will be helpful

Greening school design provides an extraordinarily cost-effective way to enhance student learning, reduce health and operational costs and, ultimately, increase school quality and competitiveness.—Gregory Katz, Greening America's Schools: Costs and Benefits, October 2006, Capital–E.

BACK TO BASICS. No one should be surprised that children do better with a little fresh air and sunshine and a quiet place in which to learn.

The federal agencies like EPA and Education and CDC are aware of the impacts of unhealthy schools on children's health, and the National Academy of Sciences has produced a tremendous report summarizing the peer reviewed literature on the health and learning attributes of schools, finding that healthy indoor environments produce benefits.

What should a parent, teacher, school principal or a local school board member or school head do?

One way to get usable information into their hands quickly and to accelerate the number of schools taking action is to encourage states to become active. Thus my own organization and the participants in the national Coalition are supporting The High Performance Green Buildings Act that would establish a federal office and advisory committee on green buildings.

Focusing on Title II, the Healthy and High Performance Schools section, we find that it will address many of the issues raised today. For example,

Grants to the states.—An important effort that will protect taxpayers and protect children is to make sure that High Performance Green buildings, once opened, stay green, and that localities don't "lose" any more school facilities due to poor siting, design, construction, operations, or ill-informed maintenance practices. This puts a premium on rapidly disseminating U.S. EPA's best practices for healthy indoor environments, such as IAQ Tools for Schools and Healthy SEAT into states and cities, thence into local schools, allowing State agencies to mix and match energy, education, health, and construction aid formulas for efficient and effective results.

Title II authorizes EPA to make grants to qualified State agencies to develop comprehensive school environmental quality plans that address critical issues in design, construction, siting, maintenance. It also would allow states to identify problems and develop and disseminate solutions.

Title II also directs EPA to develop model school siting guidelines. Not one parent in the country wants their child to go to school on a toxic waste site or in a swamp. Yet report after report has found too many schools on such sites. Model guidelines for the siting of schools would do much to alleviate the pressure to place schools on compromised sites and would help communities reject proposals to place hazards adjacent to or near existing schools.

Title II also directs EPA to issue guidelines for the states to develop and implement environmental health programs for schools in research and in children's health protection. One feature that is critical to protecting children caught in unhealthy conditions is encouraging the states to collaborate with the federally designated and funded Pediatric Environmental Health Specialty Units in on-site environmental investigations of schools. Adults and children often have the same exposures in schools; children may outnumber adults in schools by ten to one and are more vulnerable to these hazards. Yet adults can call upon contracts, unions, OSHA, NIOSH,

Labor Departments, occupational health clinics and more, while children and families have no such system of environmental health services anywhere. In the aftermath of September 11th, with local schools contaminated by fumes and debris, not one agency stepped in when schools were re-opened without appropriate, full remediation. This gap in services has a perverse effect, depriving everyone—schools, agencies, parents and children—of independent, full and complete assessments of hazards. (Schools of Ground Zero: Early Lessons Learned in Children's Environmental Health,© APHA, Healthy Schools Network, Bartlett and Petrarca, 2002).

As advocates for children's environmental health, we have worked diligently to promote Healthy and High Performance school design in the federal government, in the State houses, in local districts and with parents, teachers and school personnel across the country. There is now burgeoning interest across the country in "green" building and design as an essential part of our commitment to protect our environmental heritage.

Yet the additional benefits for our children, their health, and their educational experience from designing in features that are health-protective, in contrast to resource efficient, is at least as great.

The Bottom Line.—There is no downside to healthy and high performance school design and operations. It improves children's health, workers health, improves our environment, saves energy, and saves money for education. As schools across the country are built, rebuilt and renovated, we owe it to our children, their parents, their sponsoring communities and the taxpayers to assure that they are designed and built to specifications representing now proven state-of-the-art healthy and high performance architectural standards.

A vote for healthy schools is a vote for children, for environment, for education, for health, and for communities.

Thank you.

COALITION FOR HEALTHIER SCHOOLS: ISSUE STATEMENT

ISSUE BACKGROUND.—IMPROVING CHILDREN'S HEALTH, LEARNING, THE ENVIRONMENT, AND COMMUNITIES

Each day over 53 million school children and 6 million adults—20 percent of the entire U.S. population—enter our Nation's 120,000 school buildings to teach and learn. Unfortunately, in too many cases, they enter "unhealthy" school buildings," that undermine learning and health. Many school facilities have been poorly maintained and thousands of our Nation's schools remain severely overcrowded. Schools are often sited next to industrial plants or on abandoned landfills; new schools are built beyond safe walking or biking distance for students. In a recent five-state survey, more than 1,100 public schools were built with in a half-mile of a toxic waste site. Polluted indoor air, toxic chemical and pesticide use, growing molds, lead in paint and drinking water, and asbestos are also factors that impact the health of our nation's students and school staff. These problems contribute to absenteeism, student medication use, learning difficulties, sick building syndrome, staff turnover, and greater liability for school districts. The U.S. Energy Dept. found schools could save billions of dollars by installing energy efficient heating systems.

32 million children at elevated risk of health problems caused by decayed schools (Lessons Learned, 2006). According to U.S. EPA, "Studies show that one-half of our nation's schools have problems linked to indoor air quality. Students, teachers and staff are at greater risk because of the hours spent in school facilities and because children are especially susceptible to pollutants." Schools are also more densely occupied and more intensively used than offices, which contribute to the overall problem. Asthma is the leading cause of school absenteeism and the leading occupational disease among teachers and custodians. The increase in asthma problems is particularly acute in urban areas with large numbers of African-American, Hispanic American and other minority students. Children with preexisting health, learning, or other special needs may be at greater risk.

Federal agencies, states, communities, and education officials must improve school environmental quality. Federal agencies are well aware that "high performance school" design and construction and environmental management of facilities can produce healthier learning environments. Key policy and program reforms include siting, design and construction, and environmental management on issues such as "green cleaning" and least-toxic pest control, as well as preventive repairs that preserve neighborhood infrastructure and center communities on children's needs.

At a time when this Nation is committed to raising the academic performance of all children, it is essential that the federal agencies provide the knowledge, leader-

ship and technical assistance that states, cities, and schools need to ensure that every child, every school employee, and every community has environmentally safe and healthy schools that are clean and in good repair.

Statement Sponsors: American Association on Intellectual and Developmental Disabilities, American Federation of State, County, and Municipal Employees, Alliance for Healthy Homes, American Lung Association, American Public Health Association, Beyond Pesticides, Children's Environmental Health Network, Connecticut Foundation for Environmentally Safe Schools, Environmental Defense, Funders Forum on Environment and Education, Healthy Child Healthy World (CHEC), Healthy Kids: The Key to Basics (MA), Healthy Schools Network, Improving Kids Environment (IN), Institute for Children's Environmental Health, Learning Disabilities Association of America, Marin Golden Gate Learning Disabilities Association (CA), Massachusetts Healthy Schools Network, National Center for Environmental Health Strategies, National Education Association, National Education Association/ Health Information Network, National PTA, Natural Resources Defense Council, New Jersey Work Environment Council, New Jersey Environmental Federation, Oregon Environmental Council, Physicians for Social Responsibility, Public Education Network, 21st Century Schools Fund, West Harlem Environmental Action, League of Conservation Voters, National Clearinghouse for Educational Facilities, National Association of Pediatric Nurse Practitioners, Apollo Alliance, and 500 more groups and individuals, as of April 2007.

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Senator LAUTENBERG. Thank you very much, Ms. Barnett.

Shocking results on the plus side can result from these changes, from these improvements. If we want to look at this in an appropriate way, we look at our children and see what we want for them. Pretty simple.

Mr. Tonjes.

STATEMENT OF RAY TONJES, CHAIRMAN, GREEN BUILDING SUBCOMMITTEE, NATIONAL ASSOCIATION OF HOME BUILDERS

Mr. TONJES. Thank you, Mr. Chairman. I am Ray Tonjes, and I am a custom builder from Austin, TX, and I am chairman of the Green Building Subcommittee of the National Association of Home Builders.

NAHB represents over 235,000 members who employ millions of individuals in the homebuilding, remodeling, multi-family, and light commercial construction industry. I am here to talk about the success that I and my fellow builders have had in cultivating the progressive green building program that produces sustainable energy and resource-efficient homes throughout the Country.

NAHB members build more than 80 percent of all new homes, and by the end of 2007, more than half of NAHB members will be incorporating green building practices into the development, design and construction of these new homes.

Because housing represents 16 percent of our Nation's gross domestic product, homebuilders have the potential to profoundly affect sustainability, conserve precious natural resources, and preserve our environment.

NAHB members are true leaders in the green building movement. Acting with the help of over 850 State and local homebuilders' associations, NAHB members have been implementing green building practices since the term "green building" was coined in 1991. According to McGraw Hill, about 10 percent of the homes built in 2010 will be green homes, which is a major jump from just 2 percent in 2006.

Being green means more than a tankless water heater or a little extra insulation in the attic. Green building is how a home exists on the land, conserves resources, and provides a healthy indoor en-

vironment for its residents. Green building means making an intentional decision to positively impact energy efficiency, preserve resources, and to reduce and recycle waste throughout the entire design and construction process and for the life of the home.

How do we get there? In 2005, NAHB, along with more than 60 stakeholders, including environmentalists, builders, product manufacturers, and designers, agreed upon a number of criteria that can guide builders on how to construct a green home. These model green homebuilding guidelines were developed for use by any builder. The guidelines are free and NAHB does not profit in any way from their use.

To date, 18 State and local homebuilder associations have adopted programs based on the guidelines, and dozens more are in development. Some of these have already been endorsed by State and local governments. The net effect is thousands of homes are being built to these green criteria.

The six guiding principles of the guidelines, which are outlined in my written testimony, include lot development, energy and resource efficiency, water conservation, indoor environmental quality, and homeowner education, which includes operation and maintenance.

NAHB has proactively adopted a policy of promoting green building as a means of reducing greenhouse gas emissions. NAHB has partnered with the International Code Council, the Nation's preeminent authority for building codes, to produce and develop the first and only national green building standard for residential construction. The standard will be accredited by the American National Standards Institute. It will be an industry-wide, consensus-based, and certifiable benchmark for all residential construction types. This includes single family, multi-family, remodeling, and land development.

The committee that is developing the standard includes members from the U.S. EPA, the Department of Energy, the U.S. Navy, many State and local housing agencies, product manufacturers, and nongovernmental green building organizations, including those represented here today.

Finally, the committee includes small custom builders like myself and remodelers, and one of the Nation's largest production builders. Both members and the general public have the opportunity to influence the development of the standard. Once published, the standard will be periodically reviewed and revised to ensure its rigor and integrity.

Many viable green building programs already exist and more are likely to come as we address the challenge of climate change. Healthy competition in the burgeoning market will only continue to drive its growth and innovation, as well as keep costs down for home buyers so that green homes are affordable and people can easily make the green choice.

NAHB urges Congress to preserve competition in the emerging green building arena. NAHB's next step is the development of a national green building program that will not only support the standards I mentioned earlier, but will also help State and local governments to implement green building practices. The housing industry's commitment to increasing energy and resource efficiency in

home construction is demonstrated by the development of the national green building standard and a national program based on that standard.

On behalf of the Nation's home builders, I thank you for the opportunity to speak here today about our industry's advances in green building and our ongoing efforts to protect and preserve our environment.

I would be happy to answer any questions that you might have.

[The prepared statement of Mr. Tonjes follows:]

STATEMENT OF RAY TONJES, CHAIRMAN, GREEN BUILDING SUBCOMMITTEE, NATIONAL ASSOCIATION OF HOME BUILDERS

Madame Chair, Ranking Member Inhofe, and distinguished members of the committee, thank you for the opportunity to testify on behalf of the National Association of Home Builders (NAHB). My name is Ray Tonjes and I am the Chairman of the Green Building Subcommittee at NAHB, representing 235,000 thousand corporate members that, in turn, employ millions of individuals in the home building, remodeling, multifamily construction, property management, subcontracting, design, housing finance, building product manufacturing, and light commercial construction industries. As a custom home builder, I appreciate the opportunity to talk about the successes that I, and my fellow builders, have made in cultivating a progressive green building program that is producing sustainable energy- and resource-efficient homes throughout the United States.

INTRODUCTION

NAHB members currently build about 80 percent of all new units in the United States and, by the end of 2007, more than half of NAHB's members will be incorporating green practices into the development, design, and construction of these new units. This is a significant and important fact because housing comprises 16 percent of the U.S. GDP. The impact of housing on the economy of the United States is substantial, and by encouraging growth in green building, our nation's home builders have the potential to profoundly affect sustainability and conserve precious natural resources and our environment.

NAHB members are leaders in the green building movement and were active on this effort long before the recent media interest in climate change and global warming. NAHB has been working on green building alongside its 800+ State and local Home Builder Associations (HBAs) for nearly a decade, which is longer than many other green building advocates have even existed. In fact, NAHB will be hosting its 10th Annual National Green Building Conference in New Orleans next year and has consistently been ahead of the curve in promoting and developing energy-efficient and environmentally-friendly construction techniques for the mainstream home builder.

Based on a survey of NAHB home builders conducted last year by McGrawHill Construction, about 10 percent of the homes built in 2010 are expected to be green, containing at least three of five green building elements. Being green means much more than a tankless water heater and a little extra insulation in the attic, it is a holistic approach to how the home exists on the land with the least impact, how conservatively it uses resources; and how it provides healthy, safe, and decent shelter to the resident. Simply put, building greener is building better. It means making intentional decisions that positively impact energy efficiency, resource conservation and indoor environmental quality throughout the entire design and construction process. Green means doing the right thing for the builder, the homeowner, and, most importantly, the environment.

The recent strength and growth of green building is due in large part to its voluntary nature, which provides builders and developers the flexibility that is essential for incorporating the principles of sustainable design in innovative ways to construct a home that is both environmentally sound and affordable to homebuyers. Green home building will continue to be an important component and because of the current flexibility in green building options, builders will be able to successfully adjust to the shifting market demand for greener homes.

NATIONAL GREEN BUILDING STANDARD

Working with more than 60 industry stakeholders, in January 2005 NAHB completed the Model Green Home Building Guidelines (the Guidelines). The Guidelines

are a product of a year-long, consensus-based process involving input from architects and designers, environmentalists, builders, research consortia, and building product manufacturers. The shining hallmark of the Guidelines is that every aspect of the construction industry was involved in forming these criteria so that every builder, large and small, could easily adopt the practices. The Guidelines truly are designed for every builder, and they address 100 percent of America's housing stock. Most importantly, NAHB makes absolutely no profit from the promulgation of the Guidelines; they are entirely free of charge. I am proud to report that all of the benefits reaped from building a green home with the Guidelines go directly to the homeowner and, ultimately, to our environment.

The voluntary Guidelines contain six guiding principles that offer a variety of distinct line items from which builders (and operating HBAs) can choose, allowing them to be customized to reflect local geographic and climate conditions. These principles include the following:

• *Lot Design, Preparation, and Development.*—Resource-efficient site design and development practices help reduce the environmental impacts and improve the energy performance of new homes. Siting that saves trees, incorporates onsite storm water retention/infiltration features, and orients the home to maximize passive solar heating and cooling are essential elements used in planning a green home.

• *Resource Efficiency.*—Most successful green homes start at the design phase, which includes the selection of materials to be used in its construction. For example, engineered-wood products can help optimize material resources because more than 50 percent of the log is converted into structural lumber rather than conventional dimensional lumber.

Resource efficiency also means reducing job-site waste by developing construction waste management plans. These waste management plans, which includes recycling, can reduce normal average construction waste by at least two-thirds, thus reducing the burden on landfill space. Lastly, performing life-cycle analysis (LCA) on building materials will help to determine a more accurate impact on the environment, since materials can be renewable, yet can be very energy-intensive when considering their transport to job-sites, for example. The LCA process involves a "cradle to grade" philosophy and covers how the material is recovered, the product manufacturing process, the home building process, the maintenance and operation, the home demolition, and product reuse, recycling, and disposal. All of these facets combine to help builders choose the most resource-efficient products that have the least impact on the environment throughout the life of the home.

• Energy Efficiency.—Energy consumption has profound impacts on our environment, from the mining of fossil fuels to the emissions of burning non-renewable energy sources. The impact of a home's energy use over time is a significant factor in how that home will impact the environment. Therefore, energy efficiency is heavily weighted in any green building program. The greatest results in energy efficiency come from a "whole systems" approach. Energy performance does not end with just increasing insulation, using renewable energy, or upgrading the HVAC equipment. Green homes must have a balance between these features and careful window placement, building envelope air sealing, duct sealing, and proper placement of air and vapor barriers from the foundation up to the attic. Once these features are incorporated into the green home, then it will truly be high-performing, energy efficient, less-expensive to operate, and more comfortable to live in than a conventionally-constructed home.

• Water Conservation.—Implementing water conservation measures can reduce mean per capita water usage from 64 gallons per day to 45 gallons per day. Thus, green homes are especially welcome in areas affected by long- and short-term water supply issues. Green homes conserve water both inside and outside the home with more efficient water delivery systems, native and drought-resistant landscaping, and careful treatment of storm water and wastewater in the construction process. In fact, some communities gain additional benefits from builders using native species in landscaping and filtering and removing contaminants from storm water and wastewater in a green home.

• Indoor Environmental Quality.—Healthy indoor environments are another hallmark of green building. Following energy efficiency, the quality of a home's indoor air is often recognized as the most important feature of a green home. Increases in reported allergies and respiratory issues, and the use of chemicals that can emit gas from building materials have contributed to an increased awareness of the air that is breathed inside the home. Although no official authoritative definition exists of what healthy indoor air means, there are measures that green home builders can take to mitigate the effects of potential contaminants by controlling the source, diluting the source, or capturing some of the source through filtration.

• Operation, Maintenance, and Homeowner Education.—Inadequate or improper maintenance of a green home can defeat the designer and builder's best efforts to create a resource-efficient home. Failing to change air filters regularly, or neglecting to use kitchen and bath exhaust fans in moist air, are very common mistakes most homeowners make. Also, many homeowners are unaware of the impact of using common substances in and around the home, such as pesticides, fertilizers, and even common cleaning agents. By giving homeowners a manual that explains proper operation and maintenance procedures, includes information on alternatives to toxic cleaning substances and lawn and garden chemicals, and directs them to water-saving practices, a green home builder can help assure that the home functions as carefully as it was constructed, in an environmentally-responsible manner.

Since its publication, the Guidelines have been successfully implemented by 18 State and local HBAs around the country, with the demand growing each day for new programs. Working off of this overwhelming success, NAHB agreed to collaborate with the International Code Council (ICC) in February 2007 to establish the first and only national residential green building standard that will be certified and accredited by the American National Standards Institute (ANSI). Based on the NAHB Guidelines, this standard will serve as the only consensus-based industry standard for residential green construction in the United States.

As a national standard, ANSI requires consensus-based decision-making, opportunity for public comment, and other processes to help guarantee that the standard is acceptable to all members of the home building industry, as well as to those who regulate them. This process involves full participation from interested stakeholders who volunteer to sit on a Consensus Committee, and who provide advice and counsel on how to build a green home, how to verify and certify its integrity, and how to continuously update the standard to ensure improvement and rigor. A membership roster of the official Consensus Committee of the National Green Building Standard is attached to my statement.

You will note on this roster the membership of the U.S. Green Building Council, the U.S. Envrionmental Protection Agency, the U.S. Department of Energy, numerous city and State housing officials, product manufacturers, insulation manufacturers, architects, and some of the Nation's largest production home builders. All members provide their insight and input into this very open and transparent process. In fact, prior to the inaugural meeting of the Consensus Committee, on April 19–20, 2007, the NAHB Research Center, an ANSI-accredited research organization that is serving as the Secretariat for the standard, had received over 250 individual comments to the first draft.

A few of the benchmarks that could go into the Nation green building standard upon committee agreement include:

• Demonstration that the home's heating and cooling units are correctly sized, according to the Air Conditioning Contractor's of America's Manual J, or another reference guide, to achieve minimum energy efficiencies

• Achievement of minimum requirements set by the International Code Council's International Energy Conservation Code (IECC)®

• Requirement for third-party review to verify design and compliance with an established energy efficiency program, such as Energy Star®

• Existence of many options for builders to achieve targets, by scoring points, in order to reach various compliance levels, i.e., embedded flexibility

The consensus process is advanced by the activity of "Task Groups" that serve the purpose of providing expertise on the specific topical areas for the standard. There are currently seven task groups: Administration and Points, Site Development and Global Impact, Resource Efficiency and Owner Education, Water Efficiency and Indoor Air Quality, Energy Efficiency, Multifamily, and Remodeling. These groups each review drafts of the standard and provide proposed changes in their specific areas that are then presented to the full Consensus Committee for consideration. The Consensus Committee has already held its first meeting in April 2007 and is scheduled to meet again in July in Washington, D.C.

Normally, standards development processes can take one to two years to complete, given the extensive public input that requires full consideration. However, the need to develop appropriate strategies to address growing environmental challenges like climate change has motivated our industry to commit to a fast-tracked standards process because we believe that it simply cannot be put off any longer. Because the Guidelines were developed in concert with such a large and diverse group of stakeholders, we can accelerate this process while still allowing time for required public comment.

Encompassing single- and multi-family construction, remodeling, and land development, the National Green Building Standard is expected to be completed in early 2008, an indication of the level of urgency with which the industry is approaching

and addressing the issue. I am proud of the continued effort of the home building community to create the first comprehensive residential green construction standard that not only informs builders on how to build green, but also educates homeowners on how to operate their home in an energy- and resource-efficient manner. Ultimately, the goal is to develop a standard that is flexible enough to adjust to the various resource and energy concerns in the varying climate zones around the country, while at the same time encouraging continued innovation in green technology that is already dramatically shifting the market. Green building should continue to exist in its most flexible form.

NATIONAL GREEN BUILDING PROGRAM

In order to address the most pressing environmental challenge of our time, climate change, the Board of Directors of the NAHB established policy to proactively seek to contribute to efforts to reduce greenhouse gas emissions by establishing a national green building program. With this charge, NAHB members have stepped up their national campaign to inform the public about the innumerable benefits of green building and sustainability in housing design. In this program, there is a substantial effort to market the green building standard as an effective alternative, and to monitor State and local legislative and regulatory activity to ensure builders retain the right to choose from the myriad of green building options and are not restricted to the sole use of one branded product over another. Viable green alternatives exist in the market today in both residential and commercial construction.

NAHB is poised to make a substantial dollar investment in a National Green Building Program. The NAHB National Green Building Program will help push the green building envelope and encourage innovation in green construction for the millions of homes that are waiting to be built. As one architect recently stated at the NAHB National Green Building Conference in St. Louis, Missouri, by mandating one green building program to the exclusion of others, you create a "race to the bottom." At a time when the challenge of climate change is moving people to live, work, and function in a more environmentally responsible way, we need to have options to force green building technology to its limit. NAHB's National Green Building Program will provide those options for all builders and, most importantly, will seek to inform current homeowners about how they can improve existing homes with green remodeling, making home occupation and maintenance just as efficient as new home construction.

RECOMMENDATIONS/OUTLOOK

As the committee reviews options for passing green building legislation that will help guide the federal government towards sustainability in design and construction principles, it is important to consider the incredible momentum and green building success stories that are already moving the market forward. The daunting task of reducing greenhouse gas emissions from buildings and homes is already beginning and the stewardship of the Congress in this matter will be increasingly important. Congress has the great opportunity to create avenues for extensive innovation in green construction by keeping the market fluid, free of mandates, and striving towards the greatest energy- and resource-efficient buildings available.

The green building movement is shaping our industry in a tremendous way. To date, there have been more than 2,000 homes certified to Guidelines-based programs with thousands more in the pipeline. The healthy competition in the market is driving demand. Within three years, almost 10 percent of this nation's new homes will be green. As consumer awareness and education increases, and as green supplies and materials become easier to obtain, more and more builders will take advantage of educational opportunities offered by NAHB and other organizations.

Above all, NAHB cautions the Committee and Congress against mandating only one green rating system to the exclusion of others. Green practices and sustainability are incredibly important in the battle against climate change, and we feel that builders need to have access to as many options as possible. Many green building alternatives already exist, and with awareness increasing every day about the benefits of green homes, additional programs are likely to be added in the marketplace.

CONCLUSION

NAHB members have shown that green building is both proactive and profitable, primarily because current programs have been allowed to thrive and shift and mold to meet specific conservation needs in a geographic area. Our industry's commitment to developing a rigorous standard, with valuable input from diverse disciplines, will produce certifiable benchmarks for measuring a home's energy and re-

source efficiency for years to come. The standard will also include a green remodeling component to address the serious needs of upgrading existing homes, many of which were not built with energy or resource efficiency in mind. NAHB believes that there must be a viable path to elevate the 120 million existing homes into greater environmental and energy efficient operation. The National Green Building Standard can provide that pathway.

NAHB supports and encourages energy efficiency and green building. We support a national green building program that is flexible and market-driven, encourages continued growth in green construction that protects options for builders in all markets, as well as preserves, protects, and promotes the health of our environment. Home builders are having great success with the green building movement, in which they have been engaged for years. The commitment of the home building industry to energy and resource efficiency in construction is evidenced by our Guidelines, the development of the first and only residential green building standard, and our national campaign. Thank you for the opportunity to present the views of the National Association of Home Builders. I look forward to any questions you may have for me.

Consensus Committee on the

Committee List as of March 30, 2007

G - General Interest; P - Producer Interest; U - User Interest

American Forest & Paper Association, Washington, DC (Kenneth Bland, P.E.) (P)

American Gas Association, Washington, DC (Jim Ranfone) (P)

American Institute of Architects, Washington, DC (David Collins) (U)

Brick Industry Association, Reston, VA (J. Gregg Borchelt, PE) (P)

Build Green New Mexico, Albuquerque, NM (Steve Hale) (U)

Building Owners and Managers Association (BOMA) International, Washington, DC (Ron Burton) (U)

Building Quality, Richland, WA (Craig Charles Conner) (U)

City of Dearborn, MI, Department of Building & Safety (David J. Norwood) (G)

City of Denton, TX, County Building Inspections (Kurt Spence Hansen) (G)

City of Keene, NH (Medard Kopczynski) (G) (Vice Chair)

City of Moscow, ID (James E Johnson) (G)

City Of Rio Rancho, NM (Lee Alan Brammeier) (G)

City of Saint Paul, MN (Greg Johnson) (G)

City of Scottsdale, AZ (Anthony C. Floyd) (G)

CNIC Housing - Commander, Navy Installation Command, U.S. Navy, Washington, DC (Craig S. Collins) (G)

ConSol, Stockton, CA (Michael Hodgson) (U)

Edison Electric Institute, Washington, DC (Steve Rosenstock) (P)

Fairfax County, VA, Department of Public Works (Stephen J. Turchen) (G)

Gas Appliance Manufacturers Association, Arlington, VA (Frank A. Stanonik) (P)

Green Builder®, LLC, Eastsound, WA (Ronald W. (Ron) Jones) (U) (Chair)

Green Building Initiative, Portland, OR (Wayne B. Trusty) (P)

Green Built Michigan, Lansing, MI (Arnold McIntyre) (U)

Gypsum Association, Washington, DC (Michael Gardner) (P)

K. Hovnanian Homes/Landover Group, Chantilly, VA (Chip Merlin) (U)

Manufactured Housing Institute, Washington, DC (Robert Kelly) (U)

NAHB Land Development Committee, Washington, DC (Bruce Boncke, President, BME Associates, Fairport, NY) (U)

National Multi Housing Council, Washington, DC (Ronald G. Nickson) (U)

North American Insulation Manufactures Association, Alexandria, VA (Charles C. Cottrell) (P)

Plastic Pipe and Fittings Association (PPFA), Glen Ellyn, IL (Michael William Cudahy) (P)

Plumbing Manufacturers Institute, Schaumburg, IL (David Viola) (P)

Portland Cement Association, Skokie, IL (David Shepherd, AIA) (P)

State of California, Department of Housing and Community Development (Doug Hensel) (G)

Steel Framing Alliance, Washington, DC (Maribeth S. Rizzuto) (P)

Sustainable Buildings Industry Council, Washington, DC (Helen English) (P)

Town of Parker, CO (Gil Rossmiller) (G)

U.S. Environmental Protection Agency, Washington, DC (David J. Price) (G)

U.S. Green Building Council, Washington, DC (Michael "Mick" Dalrymple) (P)

US Department of Energy, Washington, DC (Edward Pollock) (G)

Veridian Homes, Madison, WI (Gary Alphonse Zajicek) (U)

Village of Arlington Heights, IL (Nicholas L. Gadzekpo) (G)

Whirlpool Corporation, Benton Harbor, MI (Omer "Butch" Gaudette) (P)

Winchester Homes, Inc., New Market, MD (Randall K. Melvin) (U)

RESPONSE BY RAY TONJES TO AN ADDITIONAL QUESTION FROM SENATOR SANDERS

Question. In your testimonies you talk about the "green building" work being done by the National Association of Home Builders through the Green Building Initiative. You fail, however, to give details about what this means, such as, how much energy has been saved, how much water has been saved, what are the reductions in CO_2 emissions, how much have you improved indoor air quality, etc. What concrete changes can you point to from your "green building" practices?

Response. NAHB members construct more than 80 percent of all new homes in the United States and have been incorporating green and sustainable design practices into residential construction for more than 10 years. Assisted by more than 800 State and local associations, NAHB has been working to grow local green building programs throughout the United States. To date, more than 100,000 green homes have been built and more than 50 State and local voluntary green building programs have been initiated, twenty of which are based on NAHB's Model Green Home Building Guidelines.

NAHB does not operate its green building programs "through" the Green Building Initiative (GBI), as indicated above. 0131 is a separate entity that has promoted the Model Green Home Budding Guidelines on behalf of NABS. NAHB's programs and leadership in green building promotion and education are independent of GBI.

Energy Savings.—Green homes are consistently above code, performing at energy savings criteria based on the following tiered-achievement levels:

- Bronze Level = 15 percent energy savings above the 2003 International Energy Conservation Code (IECC)
- Silver Level = 30 percent energy savings above the 2003 IECC
- Gold Level = 40 percent energy savings above the 2003 IECC

At the very least, green homes are achieving 15 percent above the most aggressive energy code available at the time of development of the Model Green Home Building Guidelines. Homes at the bronze level use substantially less energy for heating, cooling, and water heating, delivering $200 to $400 in annual savings. Most likely, the energy and dollar savings are much more significant because many are being built at the higher Silver and Gold level.

Water Savings.—As identified in the criteria of the Model Green home Building Guidelines, implementing water conservation measures can save as much as 19 gallons of water per day for each green home, as compared to an average home. These savings come from using more efficient delivery systems, incorporating native and drought-resistant landscaping, and careful treatment of stormwater and wastewater in the construction process.

Indoor Air Quality.—Since there is no "official" authoritative definition by which "healthy" indoor air can be measured, it in difficult to quantify air quality improvements in green homes. However, builders do use specific measures in green home construction that can purposefully mitigate the effects of potential indoor air contaminants by controlling, diluting, or capturing source pollution inside the home.

Carbon Dioxide Emissions.—While a mechanism to measure carbon reductions does not currently exist in the framework of the Model Green Home Building Guidelines, NAHB is working with the other stakeholders to develop a carbon calculator that will be part of the National Green Building Standard, and will also be incorporated into NAHB's National Green Building Program. This will give builders and consumers clear and quantifiable data regarding CO_2 emissions reductions and will be able to verify actual reductions in CO_2 emissions as compared to an average home.

RESPONSES BY RAY TONJES TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. What are the potential benefits to both contractors and consumers of using the Model Green Home Building Guidelines in the construction of new homes, and how do these guidelines compare to the LEED system?

The first and most significant benefit to contractors using the Model Green Home Building Guidelines is the flexibility embodied in the criteria. Because there are no rigid limits to efficiency targets, builders and contractors can push the envelope and modify various part of the home's construction and performance to achieve sustainability. There are many ways, using a number of different products and practices, to achieve the green targets in the Guidelines. The LEED for Home (LEED–H) program is a one-size-fits-all approach with numerous mandatory measures, limiting flexibility and increasing costs to homebuyers. The Guidelines are designed to assist the mainstream home builder, whereas LEED–H is developed for "the top 25 percent of homes with best practice environmental features," according to the U.S. Green Building Council (USGBC). Lastly, the Guidelines are flee and open to public use, providing no profit to NAHB NAHB encourages investment directly into sus-

tainability. The LEED–H program, on the other hand, includes documentation and verification fees that can be as high as $3,000. That investment goes directly to the USGBC and its providers and does nothing to improve the resource efficiency of the home. Attached to this response is a side-by-side comparison, so that you can more accurately compare the Guidelines with the LEED–H.

Question 2. Why is a consensus-based approach important in formulating green building standards?

Response. A consensus-based approach is critical to formulating green building standards because it provides for input from a broad range of industry stakeholders—such as government agencies, academia, builders, building owners, and manufacturers—thus ensuring success. Also, the allowance of public review and scrutiny ensures that all interested parties are given an opportunity to shape the outcome, so that the integrity of the benchmarks is never in question. By allowing the public, the government, and industry to have transparency into the process. it is ensured that certain interests are not unfairly favored over others. Furthermore, this transparent and consensus- based process exists for many construction standards, both in the residential and commercial sector. These standards, and numerous others, are accredited by the American National Standards Institute (ANSI), the oversight authority on standards development.

Question 3. What effect on Green Building innovation would mandating a single standard at the Federal level have?

Response. A competitive market process enables green building to continually improve by both responding to the needs of consumers and builders and adjusting to new technology. By mandating a single standard at the federal level, the government would effectively limit innovation in green building and sustainable design as builders would struggle to use mandatory products and practices that may or may not be cost-effective, or easy to access. Mandates reduce the incentive for green building rating systems to adapt and change to meet the demands of the market. Choosing or emphasizing a singular rating system to the exclusion of others virtually ensures that builders will be given only one option for constructing sustainable homes. As one architect stated, "mandating one green building system is a race to the bottom," leaving builders with no impetus to strive towards newer technologies, greater efficiencies, or better products.

Voluntary, market-driven green building	USGBC-encouraged green mandates
20 HBAs have already used the NAHB Model Green Home Building Guidelines as a baseline for developing regionally appropriate, flexible green building programs. They join Built Green Colorado & Washington, Earthcraft and other HBA-affiliated green building programs that predate the 2005 Guidelines and that have certified more than 90,000 homes since their launch.	LEED for Homes (LEED-H) is the United States Green Building Council's one-size-fits-all approach to residential construction. With numerous mandatory measures, the LEED-H rating system limits builders' flexibility to make choices that are appropriate to each home and each homebuyer's circumstance. LEED-H is still a pilot program. The final rating system was scheduled for a June 2007 launch; however that date has been pushed back to Fall 2007.
The Guidelines were developed to help the mainstream homebuilder incorporate green-building principles without significantly driving up the cost of construction. Builders document environmental gains through practical and attainable goals, without expensive third-party fees. The planned National Green Building Program will likely include third-party certification, but at a minimal cost.	LEED-H mandates will raise the cost of housing for consumers. The purchase and installation of the mandatory above-code measures in the LEED-H rating system will increase the cost of construction, which will ultimately fall on homebuyers. In addition, LEED-H documentation and verification fees can be as much as $3,000. Costs include a registration fee; a plan review; as needed "technical assistance" from the "Provider"; reviews and inspections during and after construction; performance tests; and a certification fee.
NAHB is interested in promoting affordable green building. The Guidelines address 100% of America's housing stock.	Green building mandates will disproportionately affect buyers of affordable housing. Particularly, LEED-H which targets "the top 25% of homes with best practice environmental features."
Voluntary, market-driven green building challenges users to assess each rating system or line item's effectiveness and choose when, how and whether to employ it.	Choosing or emphasizing one particular rating system through mandates virtually ensures that builders will be put in a position to fit a square peg into a round hole when designing and building homes.
A competitive market process enables standards to continually improve by responding to the needs of consumers and builders and adjusting to new technology.	Mandates reduce the incentive or pressure for rating systems to adapt and change to meet the demands of the market.
The Guidelines allow for the use of a wide range of materials and offer builders the flexibility to weigh environmental benefits, cost-effectiveness, life-cycle costs and ease of implementation when making material choices.	A builder's choice of materials is limited with LEED-H because the rating system discriminates against the use of products, like renewable wood. LEED-H also penalizes larger homes.

NAHB does not have a financial interest in the promulgation of the Guidelines.	USGBC's interest in mandating green is self-serving. USGBC owns and licenses LEED products and thus derives income from mandated programs. USGBC not only develops its rating systems, it certifies performance (either directly or through a "Provider") and in the case of LEED-NC, the commercial product, accredits design professionals who pay to submit their project applications back to USGBC for review. Each time LEED-H or LEED-NC is mandated, USGBC makes money.
The NAHB Model Green Homebuilding Guidelines are the result of an open, extensive, year-long review of existing programs and industry best practices by 64 stakeholders. They were developed in conjunction with the NAHB Research Center, an ANSI -accredited standards developing organization, which is now serving as secretariat for the development of the Guidelines-based National Green Building Standard. NAHB and the International Code Council have partnered to produce and develop the Standard, which will be an industry-wide, consensus-based and certifiable benchmark for all residential construction types – SF, MF (low and high rise), remodeling and land development. The consensus committee that is developing the Standard includes members from the U.S. EPA, U.S. DOE, the U.S. Navy, many state and local housing agencies, product manufacturers, and non-government green building organizations including the USGBC; along with code officials, and builders from small custom to the nation's largest production builder. The Standard, which will be available in early 2008, will provide a reference point for rigorous, yet affordable green building. Thus, jurisdictions considering green home building programs can be assured that the criteria they are adopting is authentically green.	USGBC calls its LEED-H rating system a "nationally recognized standard for green building," but builders and code officials understand a standard to be a document arrived to by a consensus process. USGBC does not allow industry participation, despite claims of a "collaborative initiative that actively works with all sectors of the home building industry." Further, USGBC did not create nor does it operate LEED using generally accepted criteria for the development of a consensus standard, failing to meet most of the measures as set out by ANSI. Legislators need to understand the specific provisions of the green building programs they are voting to mandate, closely examining the upfront costs, environmental benefits, ease of implementation and impact on housing affordability.

Senator LAUTENBERG. Thank you very much.
Mr. Hubbell, I will call on you now, please.

STATEMENT OF WARD HUBBELL, PRESIDENT, GREEN BUILDING INITIATIVE

Mr. HUBBELL. Mr. Chairman, members of the committee, thank you for the opportunity to discuss the benefits of green buildings. I am Ward Hubbell, president of the Green Building Initiative.

Founded in 2003, the Green Building Initiative, or the GBI, is a not-for-profit organization dedicated to accelerating the practice of designing and maintaining more energy efficient, healthier, and more environmentally sensitive buildings throughout the Nation. We work in both the residential and commercial sectors.

Our work in the residential sector revolves around our relationship with the National Association of Home Builders to educate builders and promote the NAHB's model green home guidelines for residential construction. These guidelines, developed through an inclusive and rigorous process, are fast becoming the accepted approach for residential green building throughout the Nation. We are proud to work with the NAHB and commend them for their leadership in this area.

For commercial buildings, we offer state-of-the-art interactive web-based tools to facilitate the design and maintenance of sustainable commercial buildings. This portfolio of tools, widely used in Canada and known as Green Globes, has been enthusiastically received in the United States since we introduced it in 2004. Green Globes has been officially recognized by six State legislatures, piloted by several Federal agencies, and is being used on more than 300 public and private sector buildings throughout the Nation.

With Green Globes for new construction, not only can a building achieve an environmental rating that is verified by an independent third party, but too can also assist designers and architects in selecting the right environmental strategy for their particular project. By using its companion system, Green Globes for the continual improvement of existing buildings, building operators can monitor the performance of their buildings to ensure that the enhanced environmental design actually equates to better performance.

A full description of these tools, their origins, and our third party assessment processes are included in my written testimony.

The entrance of the GBI and the groundbreaking work of the National Association of Home Builders not only complements the good work of other private organizations such as the U.S. Green Building Council, but it also creates a very healthy competitive dynamic that has served to stimulate some exciting advancements in the green building arena, for example, a movement toward the development of true consensus standards for green building.

The GBI became the first organization of its kind to subject its ratings system to the rigors of a recognized consensus organization and we expect to establish Green Globes as an American national standard early next year. Other organizations have since pursued a similar path.

Another example is the creation of practical, user-friendly tools to allow for the consideration of the cradle to grave environmental impacts of materials used in construction. With a life cycle assess-

ment tool recently developed by the GBI, designers can now know the total energy, air, water, solid waste, and climate change impacts of the products they use. We are not only incorporating this data into our own rating system, but we have also offered it free of charge to any other rating organization or government entity that would like to incorporate it.

We also believe our user friendly interactive platform has made it possible for a greater number of projects to be built to green standards and has encouraged the increasing use of technology in other rating systems.

As this committee begins the important work of developing policy to help green the Nation's built environment, I would offer several observations for your consideration. First, green design is vitally important, but it is only part of the equation. Effective building operation and maintenance is necessary to ensure a sustainable built environment. Just as one can purchase a superbly designed vehicle, performance will greatly depend on how often one changes the spark plugs, rotates the tires, and drives it in for a tuneup. The same principle applies to buildings.

Second, while environmental attributes such as durability, recycle content and short-term renewability are all important considerations, we must ultimately make decisions about the products we use based on a sound understanding of their total environmental impact. Good data on life cycle assessments can help us achieve our goal of carbon-neutral buildings.

Finally, buildings are a big part of our climate problem. Public policy should harness the powers of competition to help solve it. Organizations such as the GBI, the National Association of Home Builders, the American Institute of Architects, and the U.S. Green Building Council and others are all working in various ways to develop approaches to measure, incentivize and promote green building. This competitive dynamic has already stimulated improvement in the field and is essential for the further advancement of the green building movement.

Thank you.

[The prepared statement of Mr. Hubbell follows:]

STATEMENT OF WARD HUBBELL, PRESIDENT, GREEN BUILDING INITIATIVE

Chairman Boxer, Ranking Member Inhofe and members of the committee, thank you for the opportunity to showcase the benefits of green buildings, as well as highlight the work of the Green Building Initiative (GBI).

The Green Building Initiative is a not-for-profit, 501(c)(3) public charity dedicated to accelerating the practice of designing and maintaining more energy efficient, healthier and less environmentally-impactful buildings.

Our organization was founded in 2003, initially to facilitate the adoption of the National Association of Home Builders Model Green Home guidelines for residential construction. These guidelines, developed through an inclusive and rigorous process, are fast becoming the accepted approach for residential green building nationwide. The NAHB developed their guidelines by following procedures approved by the American National Standards Institute—or ANSI—and now are on a path to develop the first true consensus standard for residential green building. We are proud to work with the NAHB and commend them for their leadership in this area.

In addition to our work with the NAHB, we also offer systems to facilitate the sustainable design, development and maintenance of commercial buildings. Green Globes—widely used in Canada—was brought to the U.S. market by GBI. It is a portfolio of interactive, Web-based design and building performance tools that enable designers to evaluate environmental strategies for their buildings and achieve

ratings that are verified by an independent third-party. A full description of these tools, their origins and our third party assessment processes are included below.

The creation of the GBI and the groundbreaking work of the NAHB not only complements the good work of other private organizations such as the U.S. Green Building Council, but also creates a very healthy and competitive dynamic that has served to stimulate some exciting advancements in the green building arena. These include:

• Movement toward the development of true consensus standards for green building. The GBI became the first organization of its kind to subject a rating system to the rigors of an independent, third-party, codified and consensus process under the rules of the ANSI. Other organizations have since pursued a similar path.

• The creation of practical, user-friendly tools to allow owners and designers to consider the "cradle-to-grave" environmental impact of materials used in construction. With life cycle assessment tools recently developed by the GBI, designers can now make decisions based on the energy, air, water, solid waste and climate change impacts of more than 400 commonly used building assemblies. We're incorporating this data into our own rating system, and we've also offered it free of charge to any other rating organization or government entity that would like to utilize it.

• Stimulating the increased use of technology in green assessment. The Green Globes interactive platform has helped make green design and assessment both cost-effective and user-friendly. This has made it possible for a greater number of projects to be built to green standards and has encouraged the increasing use of technology in other rating systems.

As this committee begins the important work of developing policy to help green the nation's built environment, I would offer several observations for your consideration.

1. Green design is vitally important, but it is only part of the equation. Effective building operation and maintenance is necessary to ensure a sustainable built environment. Just as one can purchase a superbly designed vehicle, performance will greatly depend on how often one changes the spark plugs, rotates the tires and drives in for a tune up. The same principle applies to buildings. That's why the GBI offers Green Globes tools to facilitate and certify building design as well as building operation and maintenance.

2. While environmental attributes—such as durability, recycled content and short term renewability—are all important considerations, we must ultimately make decisions about the products we use based on a sound understanding of their lifetime environmental impact. Good life cycle assessment data can help to achieve our goals of carbon neutral buildings.

3. Finally, buildings are a big contributor to the problem of climate change. Public policy should harness the powers of competition to help the building sector contribute to a solution. Organizations such as the GBI, the NAHB, the American Society of Heating, Refrigerating and Air-conditioning Engineers, the National Institute of Standards and Technology, ASTM International and the U.S. Green Building Council are all working in various ways to develop approaches to measure, incentivize and promote green building. This competitive dynamic has already stimulated improvement in the field and is essential for the further advancement of the green building movement.

GREEN BUILDING INITIATIVE BACKGROUND

The Green Building Initiative (GBI) is a 501(c)(3) non-profit education organization based in Portland, Oregon. It was established to accelerate the adoption of sustainable design and construction practices by promoting credible and practical approaches to green building for both residential and commercial construction.

I serve as President at the discretion of an independent, multi-stakeholder board of directors comprised of construction professionals, product manufacturers, nonprofit organizations, university officials, and other interested third parties. Each board member is allocated one vote to guide the GBI, ensuring an equal balance of influence. For a list of board members, please visit our Web site at *www.thegbi.org.*

In terms of funding, the GBI has benefited from the early support of a core group of industries that are committed to advancing the green building movement by creating a variety of credible options for their builder customers. Since our inception, we have also worked tirelessly to diversify our financial base through membership, training and other initiatives. You can view the GBI's complete list of funders at *www.thegbi.org.*

We have also long recognized the power of collaboration and have tried to foster relationships with a variety of organizations related to the built environment to help

accelerate the acceptance of sustainable design and construction in the marketplace. Some of the organizations that we have worked with include:

- American Institute of Architects
- National Association of Home Builders
- Associated General Contractors of America
- Sustainable Buildings Industry Council
- U.S. Conference of Mayors
- Building Owners and Managers Association

THE MISSION OF THE GBI

The GBI is committed to helping promote green building by offering credible and practical solutions to make green design, management and assessment more accessible to a wider population of builders and designers.

For residential construction, the GBI has a unique strategic partnership with the NAHB. Our role is to promote the NAHB Model Green Home Building Guidelines to residential construction professionals, and to work with NAHB chapters, called home builder associations, to develop and populate local green building programs based on the national guidelines. We provide technical assistance, promotional and marketing support, host educational seminars for builder members, and conduct market research in an effort to spur sustainable development, as well as consumer demand for green homes. To date, in partnership with the NAHB and their local affiliates, the GBI has helped to develop and launch local and State green building programs in 15 major markets across the country. For a list of these programs, please visit *www.thegbi.org*.

For commercial construction, the GBI owns the rights to promote and distribute the Green Globes environmental assessment and rating system, which was originally developed for the Canadian marketplace. Green Globes is a revolutionary green management tool that features an assessment protocol, rating system and guide for integrating environmentally friendly design into commercial buildings. It features modules for New Construction and the Continual Improvement of Existing Buildings and facilitates recognition of completed projects through third-party verification. The system is successful because it is rigorous, yet easy to use and affordable. Due to its unique, Web-based platform, the detailed information and references users need to design sustainable, energy-efficient buildings are embedded within the system providing the most relevant information at exactly the time it is needed.

Innovation and Competition

The rating systems we promote—NAHB Model Green Home Building Guidelines for residential construction and Green Globes for commercial construction—have helped accelerate the adoption of green building practices by driving advancements in green building rating systems.

In addition to supporting the diversity of buildings and building professionals, we believe that competition will continue to do for green building what it has done in countless other areas—drive improvements, lower costs and benefit the ultimate consumer, which in this case, is our shared environment.

The following initiatives are explained in more detail below, but, in the last two years alone, GBI:

- Became the first green building organization to be accredited as a Standards Developing Organization (SDO) by ANSI and is well into the process to establish our Green Globes system, as the first commercial green rating system to become an ANSI standard.
- Began pilot testing Green Globes for the Continual Improvement of Existing Buildings to strengthen the link between sustainable design objectives and actual building performance,
- Developed the first tool for integrating life cycle assessment (LCA)—considered to be the most effective way to compare the environmental impacts of building materials and assemblies—into a green rating system, and
- Chose to advance the green movement as a whole by supporting the development of a generic version of our LCA tool—the ATHENÂ® Eco-Calculator for Assemblies—which will soon be available from the ATHENA Institute, free of charge, to the entire sustainable design community.

GBI's status as an innovator was also reinforced by the AIA's and Architecture 2030's recent call for climate change legislation based on energy data generated through the Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS). Widely considered to be the most accurate and reliable source of energy benchmarking information, GBI and the EPA's Energy Star program are the only rating systems that rely on this important database. Green Globes is unique

in its emphasis on using CBECS for both its design and existing buildings modules—where it serves as the system's benchmark for measured reductions in energy consumption.

GREEN GLOBES-HISTORY AND CREDENTIALS

The Green Globes environmental assessment and rating system represents more than nine years of research and refinement by a wide range of prominent international organizations and experts.

The genesis of the system was the Building Research Establishment's Environmental Assessment Method (BREEAM), which was brought to Canada in 1996 in cooperation with ECD Energy and Environment. Pioneers of this project included Jiri Skopek, John Doggart and Roger Baldwin, who were the principal authors of the BREEAM Canada document.

In 1996, the Canadian Standards Association (CSA) published BREEAM Canada for Existing Buildings. More than 35 individuals participated in its development, including representatives from the following organizations:

- Bell Canada
- Carrier
- Canadian Construction Research Board
- Canadian Standards Association
- ECE Group
- Environment Canada
- Environmental Planning Institute of Canada
- Halozone, Inc.
- International Council for Local Environmental Initiatives
- Natural Resources Canada
- National Research Council
- Ontario Hydro
- Ontario Realty Corporation
- Tescor Energy Services, Inc.
- University of Toronto

In 1999, ECD Energy and Environment worked with TerraChoice, the agency that administers the Government of Canada's Environmental Choice program, to develop a more streamlined, question-based tool, which was introduced as the BREEAM Green Leaf eco-rating program. This program led to the development of Green Leaf for Municipal Buildings with the Federation of Canadian Municipalities later that year.

In 2000, BREEAM Green Leaf took another leap forward in its evolution, becoming an online assessment and rating tool under the name Green Globes for Existing Buildings. Also that year, BREEAM Green Leaf for the Design of New Buildings was developed for the Department of National Defense and Public Works and Government Services Canada.

In 2002, Green Globes for Existing Buildings was introduced online in the United Kingdom as the Global Environmental Method (GEM). Work also began to adapt BREEAM Green Leaf for the Design of New Buildings into the online Green Globes for New Buildings. Participants in this process included representatives from:

- Arizona State University
- Besto Group
- Building Owners and Manufacturers Association of Canada
- Canadian Construction Association
- Canadian Standards Association
- Department of National Defense
- DST Group
- Elia Sterling Associates
- Energy Profiles
- GWL Realty
- MCMP Architects
- Natural Resources Canada
- Public Works and Government Services Canada
- Stewart Energy
- TerraChoice
- The ATHENA Institute

In 2004, Green Globes for Existing Buildings was adopted by the Building Owners and Manufacturers Association of Canada (BOMA) under the name Go Green Comprehensive (now Go Green Plus). Since then, the Canadian federal government has adopted Go Green Plus as a green management tool for its portfolio of more than

500 existing buildings. It is also integral to the Ontario Power Authority's program for energy retrofits, and is used by most major property management firms.

GREEN GLOBES AND THE GREEN BUILDING INITIATIVE

In 2004, the GBI acquired the rights to distribute Green Globes for the Design of New Buildings in the United States. In adapting the system for the U.S. market, the only changes made were those necessary to make the system appropriate for the U.S. market (e.g. converting units of measurement and integration with the U.S. Energy Star program).

However, we have since committed ourselves to ensuring that Green Globes continues to reflect best practices and ongoing advances in research and technology.

To that end, the GBI sought and received accreditation as an ANSI standards developer and began the consensus-based process of establishing Green Globes as the first ANSI standard for commercial green building. As part of the process, the GBI established a technical committee and sub-committees featuring nearly 100 building science experts, including representatives from four federal agencies, states, municipalities, universities and leading construction firms, as well as building owners. A complete list is available at *www.thegbi.org*.

As part of the ANSI process, the GBI has relinquished control of the Green Globes tool to the technical committee, which will determine the final standard without influence from the GBI board of directors, funders or staff.

ABOUT GREEN GLOBES

Although many green building tools claim to be Web-enabled, this is typically limited to providing online information and templates. Green Globes' use of Web tools is far more complex, and offers a fully interactive experience.

Once an online questionnaire is completed, the system generates a point score and project design highlights. is the report generated includes an educational component, which highlights sustainability attributes of the building and provides detailed suggestions for improvements that should result in a reducing the building's overall environmental impact. This is supported by hot-links to further information regarding best design practices and standards or specific information on building systems and materials. Links are selected to provide educational information, government references, NGOs, and industry research relevant to each stage of project delivery and helps users achieve a better high performance design and higher Green Globes score.

Projects are awarded up to 1,000 points based on their performance in seven areas of assessment:

1. Project Management-50 Points.—The Green Globes system places an emphasis on integrated design, an approach that encourages multi-disciplinary collaboration from the earliest stages of a project while also considering the interaction between elements related to sustainability. Most decisions that influence a building's performance (such as siting, orientation, form, construction and building services) are made at the start of the project and yet it's common, even for experienced designers, to focus on environmental performance late in the process, adding expensive technologies after key decisions have been made. This is costly as well as ineffective.

To ensure that all of the relevant players are involved, the system tailors questionnaires so that input from team members is captured in an interactive manner, even on those issues which may at first appear to fall outside their mandate. For example, while site design and landscaping may come under the purview of the landscape designers, the questionnaire prompts the electrical engineer to get involved with design issues such as outdoor lighting or security. Thus the Green Globes format promotes design teamwork and prevents a situation where, despite strong individual resources, the combined effort falls short.

Also included under project management are environmental purchasing, commissioning, and emergency response.

2. Site-115 Points.—Building sites are evaluated based on the development area (including site selection, development density and site remediation), ecological impacts (on ecological integrity, biodiversity, air and water quality, microclimate, habitat, and nocturnal fauna and flora), watershed features (such as site grading, storm water management, previous cover and rainwater capture), and site ecology enhancement.

3. Energy-360 Points.—To simplify the process of energy performance targeting, Green Globes directs users to the Web interface used for the Energy Star Target Finder software, which helps to generate a realistic energy consumption target. As a result, an aggressive energy performance goal can be set—with points awarded

for design and operations strategies that result in a significant reduction in energy consumption—as compared to actual performance data from real buildings.

As previously stated, Green Globes is the only green rating system to use energy data generated through the DOE's Commercial Buildings Energy Consumption Survey (CBECS), which is widely considered to be the most accurate and reliable source of energy benchmarking information.

In addition to overall consumption, projects are evaluated based on the objectives of reduced energy demand (through space optimization, microclimatic response to site, day lighting, envelope design and metering), integration of "right sized" energy-efficient systems, on-site renewable energy sources, and access to energy-efficient transportation.

4. Water—100 Points.—Projects receive points for overall water efficiency as well as specific water conservation features (such as sub-metering, efficiency of cooling towers and irrigation strategies), and on-site treatment (of grey water and waste water).

5. Resources—100 Points.—The resources section covers building materials and solid waste. It includes points for materials with low environmental impact (based on life cycle assessment), minimal consumption and depletion of resources (with an emphasis on materials that are re-used, recycled, bio-based and, in the case of wood products, certified as having come from sustainable sources), the re-use of existing structures, building durability, adaptability and disassembly, and the reduction, re-use and recycling of waste.

6. Emissions, Effluents and Other Impacts—75 Points.—Points in this section are awarded in six categories, including air emissions, ozone depletion and global warming, protection of waterways and impact on municipal waste water treatment facilities, minimization of land and water pollution (and the associated risk to occupants' health and the local environment), integrated pest management, and the storage of hazardous materials.

7. Indoor Environment—200 Points.—According to the U.S. Environmental Protection Agency (EPA), indoor air can be up to 10 times more polluted than outdoor air, even in cities where the quality of outdoor air is poor. This has obvious health implications, but the consequences are also economic. A study by Lawrence Berkeley National Laboratory found that improving indoor air at work could save U.S. businesses up to $58 billion in lost sick time each year, with another $200 billion earned in increased worker performance.

This section evaluates the quality of the indoor environment based on the effectiveness of the ventilation system, the source control of indoor pollutants, lighting design and the integration of lighting systems, thermal comfort and acoustic comfort.

Projects that achieve a score of 35 percent or more become eligible for a Green Globes rating of one, two, three or four globes, as follows:

- One Globe: 35–54 percent
- Two Globes: 55–69 percent
- Three Globes: 70–84 percent
- Four Globes: 85–100 percent

However, buildings cannot be promoted as having achieved a Green Globes rating until the information submitted has been third-party verified by a qualified and authorized individual assessor.

The GBI currently oversees Green Globes-trained verifiers comprised primarily of licensed architects and engineers with significant experience in building sciences and sustainability issues. The Green Globes third-party verification process features a rigorous two-stage approach.

Stage I can be initiated by the design team as soon as the Construction Documents questionnaire is finalized. The completed questionnaire is verified against the documentation generated throughout the design process and, providing the building is on target to achieve a minimum of 35 percent of the 1,000 possible points, the design team receives a Certificate of Achievement. However, a final rating cannot be achieved until after a Stage II verification, which occurs post-construction. Stage II includes a site visit and walk-through by the third-party verifier and can be initiated as soon as construction is complete.

To further strengthen our third-party verification program, the GBI recently announced an agreement with CSA America, Inc., a leading developer of standards and codes, to develop an independently accredited Green Globes Personnel Certification Program. CSA America is developing the program on behalf of GBI for assessors using the Green Globes system to verify achievements in the design and operation of green buildings. It is the industry's first independently administered certification program for third-party verifiers of green buildings.

GREEN GLOBES AND LIFE CYCLE ASSESSMENT (LCA)

The green building movement is experiencing a fundamental shift in the way it approaches sustainable design, away from a prescriptive methodology—whereby materials are assumed to have environmental benefits based on rapid renewability, recycled content or other attributes—toward one that emphasizes measurable performance. Life cycle assessment (LCA) is a means to this end because it allows the impartial comparison of materials, assemblies and even whole buildings, from cradle-to-grave, in terms of quantifiable impact indicators such as global warming potential.

LCA is widely accepted in the environmental research community as one of the best ways to assess building sustainability, but its use has been limited by the perception that it's too complex or time consuming for mainstream practitioners. Now, thanks to a new tool commissioned by the GBI, LCA is more accessible than ever before to architects, engineers, policy makers, manufacturers and developers, regardless of environmental design experience.

Developed for use with the Green Globes system, the new tool provides instant LCA results for more than 400 common building assemblies in low- and high-rise categories—including exterior walls, roofs, intermediate floors, interior walls, windows, and columns and beams. It was created by the ATHENA Institute in association with the University of Minnesota's Center for Sustainable Building Research and Morrison Hershfield Consulting Engineers. ATHENA's widely acclaimed Impact Estimator for Buildings was used to generate the results embedded in the tool.

The tool is currently being reviewed by the ANSI technical committee prior to its integration into Green Globes. However, recognizing its importance as an indicator of climate change impacts, GBI supported the team's creation of a generic version for use by the entire sustainable design community. This version will soon be available, free of charge, from the ATHENA Web site (*www.athenasmi.ca*), and we are encouraging its use among other green building organizations and universities, and at all levels of government.

GREEN GLOBES AND OTHER RATING SYSTEMS

There is a great deal of agreement as to what constitutes best energy and environmental practices, so the major green building standards and rating systems have more similarities than differences.

For example, a team of independent researchers at the University of Minnesota recently published the results of a three month intensive analysis of Green Globes and LEED.

The report, "Green Building Systems: A Comparison of the LEED and Green Globes Systems in the US," is available on the GBI Web site (www.thegbi.org/gbi/Green—Building—Rating—UofM.pdf). It provides a detailed comparison of how the systems operate as well as their respective strengths and weaknesses.

Among its conclusions, the report states that "in total the systems are quite similar," and that "both include a common set of potentially impactful design elements that contribute to the improvement of a building's green performance."

The study also found that nearly 80 percent of the categories available for points in Green Globes are also addressed in LEED 2.2 and that over 85 percent of the categories specified in LEED 2.2 are addressed in Green Globes.

It concluded that, while comparing the two systems is extremely difficult, there are a number of trends "worth noting." Included in this summary were the following three points:

- Green Globes "appears to be doing a fairly good job in improving upon the delivery mechanisms employed by LEED which are so often criticized," by providing an online approach to assessment that improves efficiency and reduces costs,
- Green Globes better integrates life-cycle thinking into its rating system, and
- The GBI, as an accredited standards developer under the American National Standards Institute (ANSI) "will undoubtedly enhance Green Globes presence in the marketplace" by undergoing the consensus-based process associated with creating an official ANSI standard for green building practices.

In addition, the study revealed some "moderate dissimilarity" in point allocations in the two systems, pointing out that "Green Globes emphasizes energy use above all other categories. In contrast, LEED allocates comparatively more points to the Materials section." It reported that areas such as indoor environmental quality, resources, and site ecology are similarly emphasized by both systems, and that Green Globes employs a rating criterion that reflects life-cycle thinking and covers the entire life-cycle of building materials.

It also stated that, "from a process perspective, Green Globes' simpler methodology, employing a user-friendly interactive guide for assessing and integrating

green design principles for buildings, continues to be a point of differentiation to LEED's more complex, and largely paper-based system. While LEED has recently introduced an online-based system, it remains more extensive and requires expert knowledge in various areas. Green Globes' Web-based self-assessment tool can be completed by any team member with general knowledge of the building's parameters." The researchers added that, "in contrast, LEED tends to be more rigid, time-intensive, and [more] expensive to administer."

Aside from the fundamental similarities, the Green Globes system has a number of unique characteristics that make it an attractive option for those seeking a tool that's both rigorous and practical, at an affordable price. For example, Green Globes is:

Flexible

Designed for use on building projects of any size, Green Globes is suitable for everything from large and small offices and multi-family structures, to institutional buildings such as schools, universities and libraries.

Encourages Building Comparisons

Owners and developers with multiple properties can use Green Globes to assess and compare the buildings in their portfolio. As more and more buildings are Green Globes verified, point scores will also be aggregated in an anonymous database, enabling users to analyze how both their designs and existing buildings perform in relation to the median and to buildings that are similar in size, type and region.

Promotes Integrated Design

Green Globes facilitates the integrated design process, encouraging multi-disciplinary collaboration from the earliest stages of a project. The system guides design team members by reminding them of next steps and introducing the elements of sustainability in a logical sequence.

Facilitates Planning

Self-assessment occurs in two phases: during the schematic design stage (which corresponds with site plan approval) and during the construction documents stage (which typically corresponds with building permit approval). This allows design teams, clients and municipal authorities to review a detailed report that provides the percentage of points likely to be achieved (out of 1,000), highlights the project's environmental attributes, and suggests opportunities for improvement.

U.S. MARKET ACCEPTANCE

To date, eight buildings have successfully completed Green Globes third-party verifications across the United States, with an additional 70 buildings in the pipeline.

Of those that have completed the verification process, four of the eight have also been certified under the USGBC's LEED program, and two are awaiting their final LEED certification. Because both systems have similar four tiered rating structures, these dual-certified buildings provide benchmark data demonstrating that while not identical, the systems are comparable—in terms of the final ratings and areas of assessment. They just take a different approach to reach the same goal.

Examples of dual-certified projects include:

- William J. Clinton Presidential Center (Little Rock, AR)
  - Two Green Globes; LEED Silver
- Alberici Corporate Headquarters (St. Louis, MO)
  - Four Green Globes; LEED Platinum
- Blakely Hall (Issaquah, WA)
  - Two Green Globes, LEED Silver
- Pfizer Inc. Clinical Research Unit (New Haven, CT)*
  - Three Green Globes, LEED Silver

*This project received points for excellence in project management for their integrated design process, which were not available in LEED.

Green Globes has also been formally recognized by the public and private sectors including:

- Formal recognition of Green Globes by six states in green building legislation and executive orders, including Arkansas, Connecticut, Hawaiii, Maryland, Pennsylvania and Wisconsin.
- Inclusion in the Fireman's Fund Insurance Company's Certified Green Building Replacement and Green Upgrade coverage package, which provides discounted rates

for certified green buildings. (The Fireman's Fund is the only insurance company currently offering incentives for green commercial buildings.)

• Indications from several federal agencies, including the Department of Health and Human Services (piloting Green Globes on the NIH building in Maryland and an Indian Health Services building in Arizona) and the Department of the Interior (piloting Green Globes on a building in New Mexico) that Green Globes provides unique benefits that made it worthy of adding into their formal sustainability policies.

FUTURE OF THE GBI

The GBI has made tremendous strides in a short time—and we intend to continue leading science-based and technologically-advanced initiatives that allow us to bring to fruition important contributions on priority issues within the green building movement.

One contribution is to ensure that the those working with the existing built environment have a reliable, affordable and holistic tool for improving the energy efficiency of existing buildings, while considering other environmental impacts. It is critical that our Nation make strides in improving our existing building stock and at the same time address the gap between design intent and actual building performance.

The unfortunate reality is that many buildings designed to be sustainable fail to perform as expected. There are logical reasons, such as the fact that design team predictions may have been based on ideal assumptions, while actual performance was diminished by unforeseen variables, such as moving budget targets, value engineering, or insufficient commissioning. But to a building owner that receives higher than expected utility bills or fails to achieve his or her energy reduction targets, the reasons matter less than the results.

What's been missing, until now, is a way to measure and monitor performance on an ongoing basis. That is why GBI is introducing Green Globes for Continual Improvement of Existing Buildings (Green Globes-CIEB).

There is an increasing demand for accountability—through mechanisms such as climate change legislation, which mandate energy and CO_2 reductions—and building owners are being called upon to improve building performance with verifiable results. They need to know quickly and reliably whether specific improvements are having the intended effects.

Green Globes-CIEB allows users to create a baseline of their building's performance, evaluate interventions, plan for improvements, and monitor success—all within a holistic framework that also addresses the building's physical and human elements such as material use and indoor environment.

In the context of climate change, energy is the most significant area of assessment within Green Globes-CIEB. A combined focus on energy use, building features and management helps to pinpoint where performance is lacking and what corrective action is required. The system uses the EPA's Portfolio Manager to determine a consumption target in k/Btus for each building type, and, where appropriate, buildings must meet a minimum performance target of 75 percent based on the comparable EPA Target Finder building.

Green Globes-CIEB is being pilot tested with the goal of demonstrating that it provides the combination of a credible baseline and guidance that allows users to plan with accuracy the interventions required to achieve measured reductions in energy consumption for existing buildings.

In the first six weeks after the launch of the pilot, the GBI registered 111 users and 34 buildings began the assessment process. At this time, more than 160 buildings are using this web-enabled assessment. This supports our belief, not only in the urgent need for practical and cost-effective tools such as Green Globes-CIEB, but in their ability to transform the market from one in which green building leads to valuable but imprecise benefits to one in which it defines the path for achieving specific and measured environmental goals.

Other GBI priorities include:

• Further integration of LCA into our suite of tools, including specific regional versions for the different climate zones across the country.

• Interactive tools that make it easier for home builders to learn about and adopt sustainable practices.

Thank you again for inviting the Green Building Initiative to participate in today's hearing. We look forward to the opportunity to work with all of the members of the committee to help make green building the norm, rather than the exception in residential and commercial construction.

Supporting Documentation Follows

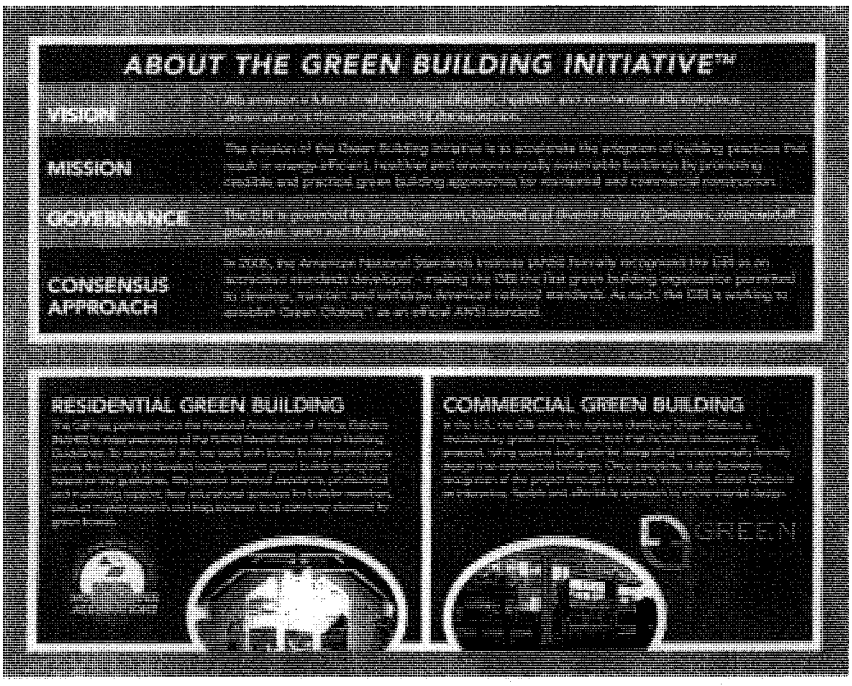
Senate Committee on Environment and Public Works
"Green Buildings: Benefits to Health, the Environment and the Bottom Line"
United States Senate
May 15, 2007

Table of Contents: Supporting Materials

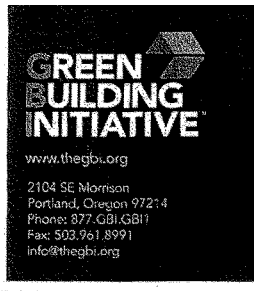
GBI Brochure


BRINGING GREEN
TO THE MAINSTREAM
GREEN
BUILDING
INITIATIVE™
WWW.THEGBI.ORG

2


ABOUT THE GREEN BUILDING INITIATIVE™
VISION
MISSION
GOVERNANCE
CONSENSUS APPROACH
RESIDENTIAL GREEN BUILDING
COMMERCIAL GREEN BUILDING
GREEN

Life Cycle Analysis Information



For Immediate Release

Contact: Mike Gehrig
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mgehrig@thegbi.org

GREEN BUILDING INITIATIVE™ COMPLETES GROUNDBREAKING SOFTWARE FOR LIFE CYCLE ASSESSMENT

New Tool Measures Global Warming and Other Environmental Impacts of Building Assemblies

Portland, Ore. (January 24, 2007) – Designing a sustainable structure that minimizes greenhouse gas emissions and other environmental impacts will soon be easier, thanks to a new Life Cycle Assessment (LCA) tool developed by the Green Building Initiative (GBI) to compare alternate design scenarios.

LCA considers materials over the course of their entire lives and takes into account a full range of environmental impact indicators—including embodied energy, solid waste, air and water pollution, and global warming potential.

Developed primarily for use with the GBI's Green Globes™ environmental assessment and rating system, the new software tool provides LCA results for more than 400 common building assemblies in low- and high-rise categories—including exterior walls, roofs, intermediate floors, interior walls, windows, and columns and beams. It was created through a contract with Morrison Hershfield Consulting Engineers, in association with the University of Minnesota's Center for Sustainable Building Research and the Athena Sustainable Materials Institute. Athena's *Environmental Impact Estimator* software was used to generate the results embedded in the tool.

"This project is tied to the GBI objective of making green building more accessible to the mainstream design community," said Ward Hubbell, executive director of the GBI. "LCA is essential to green building because it allows the impartial comparison of materials, assemblies and even whole buildings, but it poses a challenge for many designers—in terms of complexity as well as time. Our intent is to simplify the process in order to facilitate informed choices."

- more -

Because the GBI has also initiated the process to establish Green Globes as an official standard under the American National Standards Institute (ANSI), the LCA tool must be reviewed by the ANSI technical sub-committee before being integrated into the web-based Green Globes system.

"Life Cycle Assessment represents a shift in the way rating systems have traditionally approached green building," said Wayne Trusty, president of Athena and chair of the GBI's ANSI technical committee. "Instead of rewarding materials or products for specific attributes, rating systems such as Green Globes are increasingly looking at performance measures, such as global warming potential, and giving designers the flexibility to choose how to achieve their environmental goals. LCA is a means to this end."

Once it is reviewed by the ANSI technical sub-committee, the LCA tool will be integrated into the Green Globes system. The GBI also intends to release the tool for general use by the broader design community, in order to encourage more people to design and build green.

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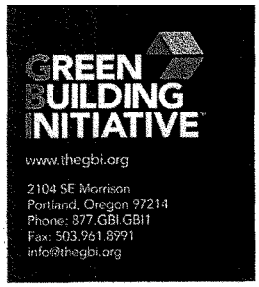
ABOUT THE GREEN BUILDING INITIATIVE: The mission of the Green Building Initiative is to accelerate the adoption of building practices that result in energy-efficient, healthier and environmentally sustainable buildings by promoting credible and practical green building approaches. A not-for-profit education initiative, the GBI is supported by a broad cross section of organizations and individuals with an interest in residential and commercial construction. For more information on the Green Building Initiative, please visit www.thegbi.org.



For Immediate Release

Contact: Mike Gehrig
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GREEN BUILDING INITIATIVE™ SHARES GROUND-BREAKING CLIMATE CHANGE CALCULATOR WITH ENTIRE GREEN BUILDING COMMUNITY

Portland, Ore. (February 26, 2007) — Last month, the Green Building Initiative (GBI) became the first organization in North America to develop a Life Cycle Assessment (LCA) tool for integrating the evaluation of building assemblies in green building rating systems. Today, GBI is announcing its intention to grant permission to its consulting team to offer a generic version, free of charge, to the entire sustainable construction community.

Developed for use with the GBI's Green Globes™ environmental assessment and rating system for commercial buildings, the new software tool measures the global warming potential and other environmental impacts of more than 400 common building assemblies in low- and high-rise categories. It was created by Morrison Hershfield Consulting Engineers in association with the University of Minnesota's Center for Sustainable Building Research and the Athena Sustainable Materials Institute, and features LCA results generated by the ATHENA® *Environmental Impact Estimator* software.

The tool is being reviewed by the GBI ANSI technical committee prior to its integration into Green Globes. However, recognizing the value of this one-of-a-kind climate change calculator to the entire North American building community, the GBI will be authorizing the Athena Sustainable Materials Institute to release a free generic version for use by other green building organizations, government entities, trade associations and universities.

- more -

GBI Shares Ground-Breaking LCA Tool / Page 2

"This tool is too important to keep to ourselves," said Ward Hubbell, executive director of the GBI. "Our mission is to make green building accessible to the mainstream design and construction community—and we see it as our duty to share important advancements for the betterment of the green building movement."

By making the tool available, other existing green rating systems (such as LEED® and the National Association of Home Builders' Model Green Home Building Guidelines), federal and municipal governments, and others will be able to use the tool as they strive to achieve goals related to the reduction of carbon dioxide emissions from buildings—which are widely accepted to be major contributors to global climate change.

"While the green building community has long recognized the value of LCA and encouraged its use, this is the first time that mainstream professionals will have streamlined access to crucial data on building assemblies," said Hubbell. "This tool gives the public and private sectors the information they need to make informed choices about assemblies based on climate change and other environmental impacts."

GBI's consultants plan to release the generic version of the tool as early as April, following technical input from GBI's ANSI committee. Organizations interested in acquiring a free copy of the LCA tool once released will find it on the Athena Sustainable Materials Institute website at www.athenasmi.ca.

LIFE CYCLE ASSESSMENT

LCA considers materials over the course of their entire lives and takes into account a range of environmental impact indicators—including embodied energy, solid waste, air and water pollution, and global warming potential.

- more -

GBI Shares Ground-Breaking LCA Tool / Page 3

"The use of life cycle assessment will represent a shift in the way rating systems have traditionally approached green building," said Wayne Trusty, president of Athena and chair of the GBI's ANSI technical committee." Instead of rewarding materials or products for specific attributes, LCA analyzes environmental performance measures, such as global warming potential, thus giving designers the flexibility to choose how to achieve their environmental goals."

For more information about Life Cycle Assessment or the new LCA tool, visit www.thegbi.org.

# # #

ABOUT THE GREEN BUILDING INITIATIVE: The mission of the Green Building Initiative is to accelerate the adoption of building practices that result in energy-efficient, healthier and environmentally sustainable buildings by promoting credible and practical green building approaches. A not-for-profit education initiative, the GBI is supported by a broad cross section of organizations and individuals with an interest in residential and commercial construction. For more information on the Green Building Initiative, please visit www.thegbi.org.

ABOUT THE ATHENA SUSTAINABLE MATERIALS INSTITUTE: The Athena Institute is dedicated to sustainability of the built environment, a goal that can only be achieved by meeting the building community's need for better information and tools. From its Canadian offices, and through its U.S. affiliate, Athena Institute International, the not-for-profit Athena organization undertakes and directs various research and development activities that make it possible to factor environmental considerations into the design process from the conceptual stage onward. For more information, please visit www.athenasmi.ca.

ABOUT MORRISON HERSHFIELD: Morrison Hershfield is a multidisciplinary engineering and management firm. Engineering and design build services are provided to clients in the transportation, building, life sciences, municipal, utilities and telecommunications sectors. For more information, please visit www.morrisonhershfield.com.

ABOUT THE UNIVERSITY OF MINNESOTA'S CENTER FOR SUSTAINABLE BUILDING RESEARCH: The Center for Sustainable Building Research (CSBR) was established as an official unit within the College of Design (formerly known as the College of Architecture and Landscape Architecture) in 2001 although the staff has been conducting building research since 1997. Sponsors of CSBR projects include the U.S. Department of Energy, and state agencies such as the Minnesota Departments of Natural Resources and Transportation, and the Office of Environmental Assistance. Other sponsors include building industry sources such as Aspen Research Corporation. For more information, please visit www.csbr.umn.edu.

University of Minnesota Study

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UNIVERSITY OF MINNESOTA STUDY COMPARES GREEN BUILDING RATING SYSTEMS

A team of independent researchers at the University of Minnesota led by Associate Professor Timothy M. Smith recently published the results of a three month intensive analysis of the two most prominent commercial building environmental assessment and rating systems in the United States, the Green Building Initiative's (GBI) Green Globes™ system and the U.S. Green Building Council's (USGBC) LEED® system.

The report, "Green Building Systems: A Comparison of the LEED and Green Globes Systems in the US," can be can be found by on the GBI website (http://www.thegbi.org/gbi/Green_Building_Rating_UofM.pdf). The study provides a detailed comparison of how the systems operate as well as their respective strengths and weaknesses.

The study stated that "in total the systems are quite similar," and that "both include a common set of potentially impactful design elements that contribute to the improvement of a building's green performance."

It also found that nearly 80 percent of the categories available for points in Green Globes are also addressed in LEED 2.2 and that over 85 percent of the categories specified in LEED 2.2 are addressed in Green Globes.

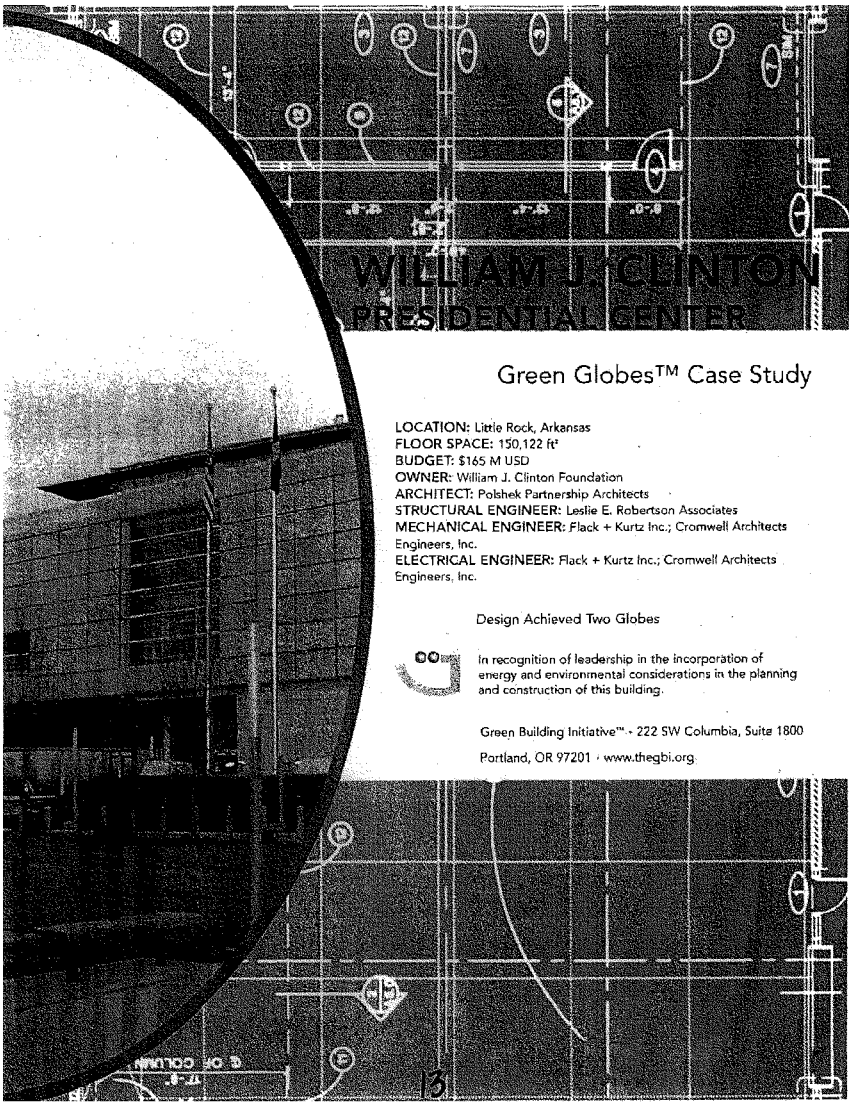
The study concluded that, while comparing the two systems is extremely difficult, there are a number of trends "worth noting." Included in this summary were the following three points:

- That Green Globes "appears to be doing a fairly good job in improving upon the delivery mechanisms employed by LEED which are so often criticized," by providing an online approach to assessment that improves efficiency and reduces costs;
- That Green Globes better integrates life-cycle thinking into its rating system;
- And that the GBI, as an accredited standards developer under the American National Standards Institute (ANSI) "will undoubtedly enhance Green Globes presence in the marketplace" by undergoing the consensus-based process associated with creating an official ANSI standard for green building practices.

It also stated that, "From a process perspective, Green Globes' simpler methodology, employing a user-friendly interactive guide for assessing and integrating green design principles for buildings, continues to be a point of differentiation to LEED's more complex, and largely paper-based system. While LEED has recently introduced an online-based system, it remains more extensive and requires expert knowledge in various areas. Green Globes' web-based self-assessment tool can be completed by any team member with general knowledge of the building's parameters." The researchers added that, "In contrast, LEED tends to be more rigid, time-intensive, and expensive to administer." To view an analysis of the process comparison, please visit http://www.thegbi.org/gbi/pdf/ProcessComparison.pdf.

For more information on the Green Globes system and the opportunity to try the system for free for 30 days, please visit http://www.thegbi.org/greenglobes/promocodes.asp.

Green Globes Case Studies


WILLIAM J. CLINTON
PRESIDENTIAL CENTER
Green Globes™ Case Study
LOCATION: Little Rock, Arkansas
FLOOR SPACE: 150,122 ft²
BUDGET: $165 M USD
OWNER: William J. Clinton Foundation
ARCHITECT: Polshek Partnership Architects
STRUCTURAL ENGINEER: Leslie E. Robertson Associates
MECHANICAL ENGINEER: Flack + Kurtz Inc.; Cromwell Architects Engineers, Inc.
ELECTRICAL ENGINEER: Flack + Kurtz Inc.; Cromwell Architects Engineers, Inc.
Design Achieved Two Globes
In recognition of leadership in the incorporation of energy and environmental considerations in the planning and construction of this building.
Green Building Initiative™ · 222 SW Columbia, Suite 1800
Portland, OR 97201 · www.thegbi.org

PROJECT NOTES

The William J. Clinton Presidential Center is a 150,000-square-foot building located in Little Rock, Arkansas. The building achieved Two Green Globes for its use of environmentally sensitive systems and low impact materials as well as the reuse of a previously underutilized industrial area.

PROJECT MANAGEMENT

Integrated Design Process (IDP)

- Integrated design was partially implemented
- Team approach used throughout the design process
- Green design facilitation supported integration of energy and environmental considerations throughout the design stages

Environmental Purchasing

- Products meeting green specifications include bamboo and rubber roll flooring
- Energy-saving, high-efficiency equipment

Commissioning Plan

- Best-practice project commissioning plan includes:
  - Engagement of Commissioning Authority
  - Review of *Design Intent* and *Basis of Design* documentation
  - Inclusion of commissioning requirements in construction documentation
  - Development of Commissioning Plan

Emergency Response Plan

- Plan to mitigate likelihood of on-site safety and environmental emergencies during preparation and construction
- Emergency Manual for building operation

SITE

Development Area

- Constructed on remediated, previously contaminated land
- Located on land that is neither a wetland nor a wildlife corridor
- Building functions are accommodated while minimizing disturbance to site topography, soils and vegetation

Minimization of Ecological Impact

- Best management practices control site erosion

Enhancement of Site Ecology

- Remediation of brownfield site
- Naturalized landscape using hardy and native trees, shrubs and ground cover, with minimal lawn

ENERGY

Building Energy Performance

- Building is projected to be 20% more energy-efficient than the energy code reference building

Space Optimization

- Floor area optimized to fulfill functional and special requirements while minimizing space to be heated and cooled

Microclimate and Topography

- Site topography and design measures optimized to provide shelter from wind

Integration of Daylighting

- Daylighting optimized through building orientation and window-to-wall size ratios

Building Envelope

- Window glazing with low U value and treatments that enhance interior thermal comfort
- Measures to prevent groundwater and/or rain penetration
- Best air/vapor barrier practices optimize building integrity

Energy Metering

- Building Management System (BMS) tracks energy use by specific area
- Sub-metering of major energy uses

Energy-efficient Systems

- High-efficiency lighting fixtures, lamps, ballasts, lighting controls, HVAC equipment, boilers, chillers, hot water service systems, building automation systems, variable speed drives, motors and elevators
- Other advanced building technologies include radiant floor system, heat exchangers and photovoltaic solar panels for improved energy-efficiency

Renewable Energy Sources

- Photovoltaic solar panels supply portion of the total energy load

Energy-efficient Transportation

- Easily accessible public transportation
- Preferred carpool parking
- Secure bicycle parking and changing facilities

WATER

Water Performance

- Consumption metered and sub-meters provided for high usage operations/occupancies

Water Conserving Features

- Water-saving showerheads (2.5 gallons/minute) and low-flush toilets (1.6 gallons/minute)
- Cooling towers include features to minimize consumption of make-up water
- Water-efficient irrigation system

RESOURCES, BUILDING MATERIALS AND SOLID WASTE

Materials that Minimize Consumption of Resources

- Materials containing recycled content include cast in-place concrete, pre-cast concrete systems, structural steel, self-adhering sheet waterproofing, hot fluid-applied roofing, gypsum board assemblies, acoustic panel ceiling, resilient floor tile and carpet
- Reused ceiling tiles, light fixtures
- Recycled steel for structure, recycled blast furnace slag in concrete foundation and sidewalks, recycled aluminum in curtain wall system
- Solid lumber and timber panel from sources certified as sustainable
- Materials from renewable sources and/or locally manufactured were specified

Reuse of Existing Buildings

- Design integrated all existing façades from original railway station building
- 50% of the existing major structures (other than the shell) are reused

Building Durability, Adaptability and Disassembly

- Building assemblies and materials specified for durability and low maintenance (e.g. brick, glass, aluminum and steel)
- Design promotes building adaptability (i.e. for community functions)
- Design and selection of materials and fastenings allow easy disassembly

Facilities for Recycling and Composting

- 300 ft² of space designated for the storage of recyclable waste

EMISSIONS AND OTHER IMPACTS

Minimization of Air Emissions

- Low-NOx boilers and furnaces (i.e. heat input of 5,220,000 BTU/hour)

Minimization of Ozone-depletion

- Refrigeration system avoids ozone-depleting substances (ODS) and potent industrial greenhouse gases (PIGG)
- Ozone-depleting potential of refrigerant HFC-134a equal to 0
- Air-conditioning system complies with Safety Code for Mechanical Refrigeration, ASHRAE 15 -1994

Control of Surface Run-off and Prevention of Sewer Contamination

- Measures to intercept and/or treat contaminated water to prevent pollutants (including toxic materials, oils and suspended materials) from entering sewers or waterways

Integrated Pest Management

- Measures taken to avoid infestation by pests

Storage and Control of Hazardous Materials

- Secure, ventilated storage areas for hazardous and flammable materials

INDOOR ENVIRONMENT

Effective Ventilation System

- Air intakes and outlets positioned at least 30 ft. apart; inlets upwind of outlets
- Air intakes located more than 60 ft. from major sources of pollution and at least minimum recommended distances from lesser sources of pollution
- Vent openings suitably protected
- Systems and components avoid release of pollution and fibers into ventilation air path
- Sufficient ventilation to obtain acceptable IAQ, in accordance with ANSI/ASHRAE 62.1-2004
- Mechanical systems provide effective air exchange (computer modeled)
- Electronic airflow indoor air quality monitoring
- Capacity for mechanical ventilation system to flush the building with 100% outside air at ambient temperatures above 32°F
- Personal control over ventilation including controls for archives
- Filters have minimum efficiency of 65% arrestance, or 40% atmospheric dust-spot efficiency for air distributed to occupied spaces

Source Control of Indoor Pollutants

- Measures to minimize moisture and prevent the growth of fungus, mold, and bacteria
- Easy access to air-handling units (AHUs) facilitates maintenance and drainage and avoids accumulation of debris
- Humidifiers avoid growth of microorganisms
- Measures to avoid pollution at-source (i.e. no VOC finishes and no smoking within the building)
- Wet cooling towers designed and located to prevent Legionella; tower uses triple-bypass drift eliminators, which limit drift losses to no more than 0.005% of the design GPM flow rate
- Domestic hot water system designed to prevent Legionella
- Interior materials are low-VOC, non-toxic and chemically inert (e.g. rough carpentry, exterior finish carpentry, interior architectural woodwork, wood paneling, flush wood doors, wood flooring, resilient floor tile, carpet and paint)

Daylighting

- Direct ambient daylight to 80% of primary spaces
- Ambient natural lighting provides daylight factor of 0.2 for work places and or living/dining areas requiring moderate daylighting, and 0.5 for well day-lit work areas
- Views to the building exterior or atria from all primary interior spaces
- Solar shading devices enable occupants to control brightness and glare from direct daylighting

Lighting Design

- Lighting levels meet those recommended in *IESNA Lighting Handbook, 2000*
- Measures to ensure that spaces are free of excessive direct or reflected glare
- Local lighting controls related to room occupancy, circulation space, daylighting and number of workstations

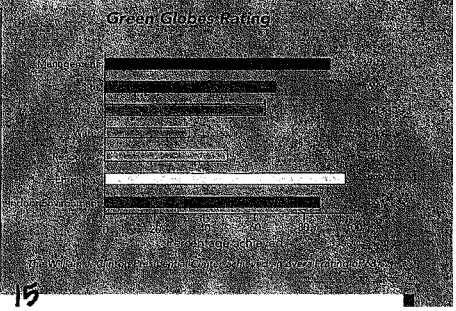
Thermal Comfort

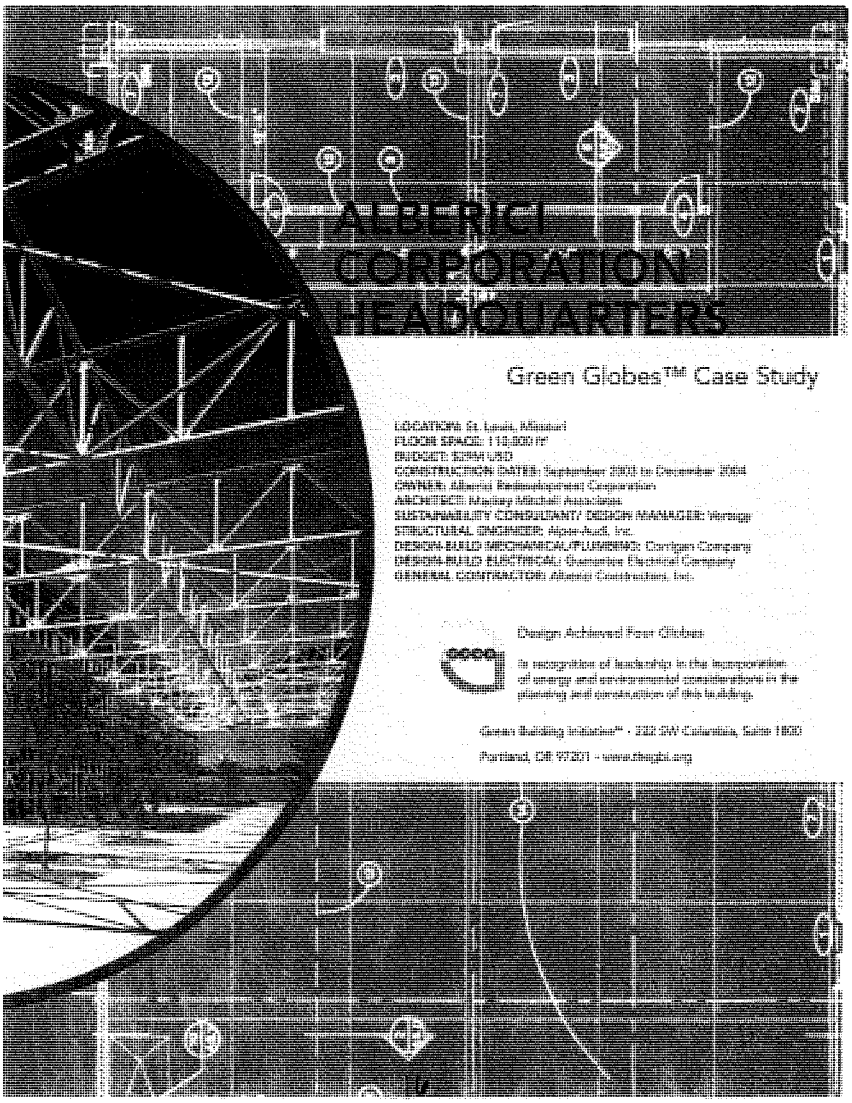
- Design conforms to ASHRAE 55-2004 for thermal comfort

Acoustic Comfort

- Building is sited and spaced within the building zone to provide optimum protection from undesirable outside noise, and fall within acceptable noise criteria (NC) ranges
- Noise attenuation of structural systems and measures to insulate primary spaces from impact noise
- Measures to meet speech intelligibility requirements
- Measures to mitigate acoustic problems associated with mechanical equipment noise and vibration, and plumbing

85–100%		Reserved for select building designs which serve as national or world leaders in energy and environmental performance. The project introduces design practices that can be adopted and implemented by others.
70–84%		Demonstrates leadership in energy and environmental design practices and a commitment to continuous improvement and industry leadership.
55–69%		Demonstrates excellent progress in achieving eco-efficiency results through current best practices in energy and environmental design.
35–54%		Demonstrates movement beyond awareness and commitment to sound energy and environmental design practices by demonstrating good progress in reducing environmental impacts.




ALBERICI
CORPORATION
HEADQUARTERS
Green Globes™ Case Study
LOCATION: St. Louis, Missouri
FLOOR SPACE: 110,000 ft²
BUDGET: $25M USD
CONSTRUCTION DATES: September 2003 to December 2004
OWNER: Alberici Redevelopment Corporation
ARCHITECT: Hastey Mitchell Associates
SUSTAINABILITY CONSULTANT/ DESIGN MANAGER: Heritage
STRUCTURAL ENGINEER: Alper Audi, Inc.
DESIGN-BUILD MECHANICAL/PLUMBING: Corrigan Company
DESIGN-BUILD ELECTRICAL: Demeritte Electrical Company
GENERAL CONTRACTOR: Alberici Contractors, Inc.
Design Achieved Four Globes
In recognition of leadership in the incorporation of energy and environmental considerations in the planning and construction of this building.
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Portland, OR 97201 • www.thegbi.org

PROJECT NOTES

The Alberici Corporation Headquarters is a two-story, 110,000-square-foot Class-A office building in St. Louis, Missouri.

PROJECT MANAGEMENT

Integrated Design Process (IDP)

- Emphasis on IDP during design development and during integrated project delivery
- Green design facilitation supported aggressive goal setting and integration of energy and environmental considerations throughout the design stages

Environmental Purchasing

- Green specifications incorporated (e.g. 100% synthetic Gyp-board, ELMS50 roof membrane, Plyboo, Wheatstalk)
- Environmental purchasing has been integrated, including the procurement of energy-saving, high-efficiency equipment

Commissioning Plan

- Best-practice project commissioning plan includes:
  - Engagement of Commissioning Authority
  - Review of *Design Intent* and Basis of Design documentation
  - Development of Commissioning Plan

SITE

Development Area

- Constructed on existing serviced site (former steel works)
- Constructed on remediated, previously contaminated land

Minimization of Ecological Impact

- Best management practices control site erosion
- At least 50% of impervious surfaces shaded to avoid creating a heat island
- Roof is Energy Star compliant; high albedo materials on 100% of the roof surface reflect heat and avoid creating a heat island
- Exterior lighting unobtrusive to preserve nocturnal sky

Enhancement of Watershed Features

- Storm water run-off controlled to prevent damage to the building and vegetation, and to minimize run-off into waterways
- Storm water control plan designed to achieve a 90% decrease in storm water run-off
- Run-off from the roof will be controlled and directed to a pervious area and two high clay content lined ponds, which retain 100% of rain water

Enhancement of Site Ecology

- Site-planning documents specify a native prairie planted with trees, grasses and wildflowers indigenous to the region

ENERGY

Building Energy Performance

- Building projected to be 45% more energy-efficient than reference EPA Energy Star Target Finder building; energy targets are reportedly being met

Space Optimization

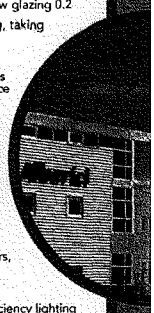
- Floor area optimized to efficiently fulfill functional and spatial requirements while minimizing the amount of space to be heated and cooled (e.g. non-leasable footage under stairs is used for storage; core elements are located in the building center and all elements of like function stacked on top of each other)

Microclimate and Topography

- Building oriented on site to optimize the effect of microclimatic conditions for heating or cooling
- Design maximizes opportunities for natural ventilation

Integration of Daylighting

- Daylighting is optimized through building orientation and window-to-wall size ratios
- Indicated visible transmittance (VT) of window glazing 0.2
- Electrical lighting integrated with daylighting, taking into account daily and seasonal variations



Building Envelope

- Thermal resistance of exterior enclosure meets Building Energy Code levels; thermal resistance of R19 for exterior wall and R30 for the roof
- Window glazing with a low U value and window treatments enhance interior thermal comfort; indicated U value of window glazing 0.31
- Measures to prevent groundwater and/or rain penetration into the building (best air/vapor barrier practices optimize building integrity; air barrier materials meet local and national building code requirements)

Energy Metering

- Sub-metering for major energy uses (e.g. chillers, boilers, VFDs, hot water heaters, lighting)

Energy-efficient Systems

- Energy-efficient equipment includes high-efficiency lighting fixtures, lamps with step ballast, lighting controls/occupancy sensors, HVAC equipment with under-floor system and heat recovery, humidity control and both airside and waterside economizer, boilers (modulating or condensing), chillers, hot water service systems, building automation systems and elevators

Renewable Energy Sources

- Renewable energy sources to supply more than 20% of total load; design includes a solar preheat system for 95% of hot water and a 65kW wind turbine for 18% of the facility's energy needs

Energy-efficient Transportation

- Easily accessible public transportation; carpooling and/or public transport accommodated on-site; preferred parking for car/van pooling and shelter
- Secure bicycle parking and changing facilities

WATER

Water Performance

- Water consumption target of 70% reduction, or less than 0.9 gallons/ft²/year

Water Conserving Features

- Minimal consumption of potable water; total water consumption is metered and sub-meters will be provided for high water-usage operations or occupancies
- Minimal use of water for cooling towers
- Specified landscaping uses plants that are able to withstand extreme local weather conditions and require no irrigation

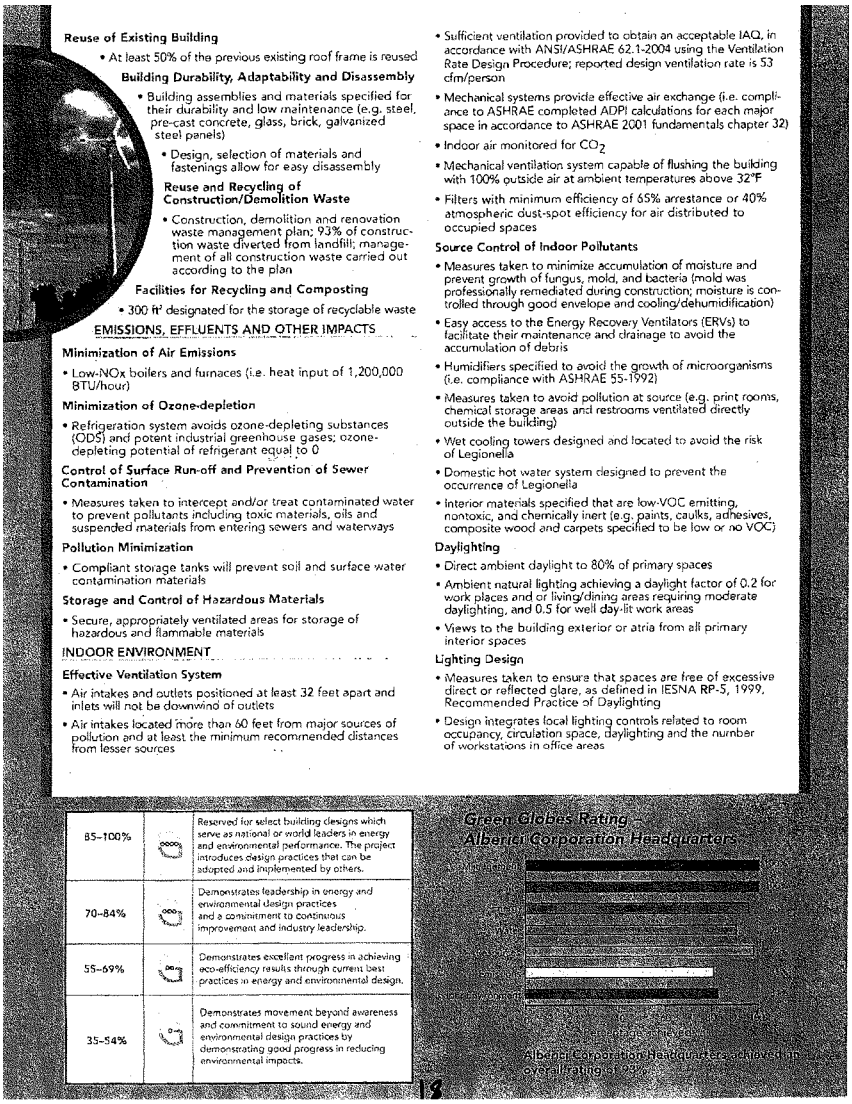
RESOURCES, BUILDING MATERIALS AND SOLID WASTE

Systems and Materials with Low Environmental Impact

- Specifications process included life cycle assessment of environmental burden and embodied energy of foundations and floor assembly, column and beam or post and beam combinations, walls and roof assembly

Materials that Minimize Consumption of Resources

- Reused building materials and components (e.g. 65KW wind turbine, structural steel beams, sheet pile, concrete pre-cast panels, granite countertops)
- 28% of the building materials used have recycled content
- Materials from renewable sources and/or locally manufactured are specified and have undergone life cycle assessment; 5% of materials are rapidly renewable including Woodstalk, Plyboo, ELMS50 and cork; 57% are locally manufactured, 52% of which are extracted locally
- Solid lumber and timber panel products will originate from certified and sustainable sources; no tropical hardwoods used



Reuse of Existing Building

- At least 50% of the previous existing roof frame is reused

Building Durability, Adaptability and Disassembly

- Building assemblies and materials specified for their durability and low maintenance (e.g. steel, pre-cast concrete, glass, brick, galvanized steel panels)
- Design, selection of materials and fastenings allow for easy disassembly

Reuse and Recycling of Construction/Demolition Waste

- Construction, demolition and renovation waste management plan; 93% of construction waste diverted from landfill; management of all construction waste carried out according to the plan

Facilities for Recycling and Composting

- 300 ft² designated for the storage of recyclable waste

EMISSIONS, EFFLUENTS AND OTHER IMPACTS

Minimization of Air Emissions

- Low-NOx boilers and furnaces (i.e. heat input of 1,200,000 BTU/hour)

Minimization of Ozone-depletion

- Refrigeration system avoids ozone-depleting substances (ODS) and potent industrial greenhouse gases; ozone-depleting potential of refrigerant equal to 0

Control of Surface Run-off and Prevention of Sewer Contamination

- Measures taken to intercept and/or treat contaminated water to prevent pollutants including toxic materials, oils and suspended materials from entering sewers and waterways

Pollution Minimization

- Compliant storage tanks will prevent soil and surface water contamination materials

Storage and Control of Hazardous Materials

- Secure, appropriately ventilated areas for storage of hazardous and flammable materials

INDOOR ENVIRONMENT

Effective Ventilation System

- Air intakes and outlets positioned at least 32 feet apart and inlets will not be downwind of outlets
- Air intakes located more than 60 feet from major sources of pollution and at least the minimum recommended distances from lesser sources
- Sufficient ventilation provided to obtain an acceptable IAQ, in accordance with ANSI/ASHRAE 62.1-2004 using the Ventilation Rate Design Procedure; reported design ventilation rate is 53 cfm/person
- Mechanical systems provide effective air exchange (i.e. compliance to ASHRAE completed ADPI calculations for each major space in accordance to ASHRAE 2001 fundamentals chapter 32)
- Indoor air monitored for CO_2
- Mechanical ventilation system capable of flushing the building with 100% outside air at ambient temperatures above 32°F
- Filters with minimum efficiency of 65% arrestance or 40% atmospheric dust-spot efficiency for air distributed to occupied spaces

Source Control of Indoor Pollutants

- Measures taken to minimize accumulation of moisture and prevent growth of fungus, mold, and bacteria (mold was professionally remediated during construction; moisture is controlled through good envelope and cooling/dehumidification)
- Easy access to the Energy Recovery Ventilators (ERVs) to facilitate their maintenance and drainage to avoid the accumulation of debris
- Humidifiers specified to avoid the growth of microorganisms (i.e. compliance with ASHRAE 55-1992)
- Measures taken to avoid pollution at source (e.g. print rooms, chemical storage areas and restrooms ventilated directly outside the building)
- Wet cooling towers designed and located to avoid the risk of Legionella
- Domestic hot water system designed to prevent the occurrence of Legionella
- Interior materials specified that are low-VOC emitting, nontoxic, and chemically inert (e.g. paints, caulks, adhesives, composite wood and carpets specified to be low or no VOC)

Daylighting

- Direct ambient daylight to 80% of primary spaces
- Ambient natural lighting achieving a daylight factor of 0.2 for work places and or living/dining areas requiring moderate daylighting, and 0.5 for well day-lit work areas
- Views to the building exterior or atria from all primary interior spaces

Lighting Design

- Measures taken to ensure that spaces are free of excessive direct or reflected glare, as defined in IESNA RP-5, 1999, Recommended Practice of Daylighting
- Design integrates local lighting controls related to room occupancy, circulation space, daylighting and the number of workstations in office areas

85–100%		Reserved for select building designs which serve as national or world leaders in energy and environmental performance. The project introduces design practices that can be adopted and implemented by others.
70–84%		Demonstrates leadership in energy and environmental design practices and a commitment to continuous improvement and industry leadership.
55–69%		Demonstrates excellent progress in achieving eco-efficiency results through current best practices in energy and environmental design.
35–54%		Demonstrates movement beyond awareness and commitment to sound energy and environmental design practices by demonstrating good progress in reducing environmental impacts.

Green Globes Rating – Alberici Corporation Headquarters

Alberici Corporation Headquarters achieved an overall rating of 90%.

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Green Globes History

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GREEN BUILDING INITIATIVE™

History of Green Building Initiative™ and Green Globes™

The Green Building Initiative™ (GBI) is a non-profit organization governed by a multi-stakeholder board. Its 15 directors represent a balance of industry, users (i.e. architects, engineers, builders) and interested parties (i.e. NGOs), each of whom has a single vote. Ultimately, the GBI aims to expand its board to 30 participants.

The GBI was originally conceived as a means to promote credible and practical green building tools to the mainstream commercial and residential construction industries.

In 2004, while developing a strategic partnership with the National Association of Home Builders (NAHB) to promote its Model Green Home Building Guidelines, an opportunity emerged to bring a revolutionary tool for commercial construction—the Green Globes™ environmental assessment and rating system—from Canada to the United States.

The following year the GBI was formally recognized by as an accredited national standards developer by the American National Standards Institute (ANSI). This recognition made the GBI the first green building organization permitted to develop, maintain and withdraw American national standards. Shortly thereafter the recognition from ANSI, the GBI submitted an application to establish Green Globes as an American National Standard (ANS).

Both the GBI and Green Globes have benefited from the early support of a core group of industries, users and like-minded organizations that are committed to advancing the cause of green building by promoting a variety of credible tools for mainstream use. Industry organizations like the Wood Promotion Network and companies such as Dow Chemical, as well as representatives from the financial services sector, retailers, wholesalers, appliance manufacturers and building material providers such as US GreenFiber have all stepped forward to offer their support. To build on this momentum, the GBI is actively working to diversify its leadership and financial base with similarly committed companies and organizations.

In terms of residential construction, the GBI is working with Home Builder Associations in more than 15 major markets to create and populate local programs based on the NAHB Model Green Home Building Guidelines. The GBI provides various types of support, including educational seminars, verification development and training, and program marketing assistance.

For commercial construction, the GBI promotes the Green Globes environmental assessment and rating system—a practical and affordable tool that helps to guide the

integration of green principles into a building's design. The Green Globes system represents more than nine years of research and refinement by a range of prominent international organizations and experts. Based on the British Research Establishment's Environmental Assessment Method (BREEAM), it was brought to Canada in 1996 in cooperation with ECD Energy and Environment. Pioneers of this project included Jiri Skopek, John Doggart and Roger Baldwin, who were the principal authors of the BREEAM Canada document.

In 1996, the Canadian Standards Association published BREEAM Canada for Existing Buildings. More than 35 individuals participated in its development, including representatives from organizations such as Bell Canada, Carrier, Canadian Construction Research Board, Canadian Standards Association, ECE Group, Environment Canada, Environmental Planning Institute of Canada, Halozone, Inc., International Council for Local Environmental Initiatives, Natural Resources Canada, National Research Council, Ontario Hydro, Ontario Realty Corporation, Tescor Energy Services, Inc. and the University of Toronto.

In 1999, ECD Energy and Environment worked with TerraChoice, the agency that administers the Government of Canada's Environmental Choice program, to develop a more streamlined, question-based tool, which was introduced as the BREEAM Green Leaf eco-rating program. This program led to the development of Green Leaf for Municipal Buildings with the Federation of Canadian Municipalities later that year.

In 2000, BREEAM Green Leaf took another leap forward in its evolution, becoming an online assessment and rating tool under the name Green Globes for Existing Buildings. Also that year, BREEAM Green Leaf for the Design of New Buildings was developed for the Department of National Defense and Public Works and Government Services Canada.

In 2002, Green Globes for Existing Buildings was introduced online in the United Kingdom as the Global Environmental Method (GEM). Work also began to adapt BREEAM Green Leaf for the Design of New Buildings into the online Green Globes for New Buildings. Participants in this process included representatives from Arizona State University, Besto Group, Building Owners and Manufacturers Association of Canada, Canadian Construction Association, Canadian Standards Association, Department of National Defense, DST Group, Elia Sterling Associates, Energy Profiles, GWL Realty, MCMP Architects, Natural Resources Canada, Public Works and, Government Services Canada, Stewart Energy, TerraChoice and The Athena Institute.

In 2004, the Green Building Initiative acquired the rights to distribute Green Globes USA in the United States. Also that year, Green Globes for Existing Buildings was adopted by the Building Owners and Manufacturers Association of Canada as a national program under the name BOMA Go Green Comprehensive.

The GBI plans to continue refining the Green Globes system to ensure that it reflects ongoing advances in building science and technology.

CSA Verifier Release

CSA AMERICA INC

GREEN BUILDING INITIATIVE

NEWS RELEASE

FOR IMMEDIATE RELEASE

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CSA AMERICA TO DEVELOP PERSONNEL CERTIFICATION PROGRAM ON BEHALF OF GREEN BUILDING INITIATIVE

Cleveland, OH –March 6, 2007 – CSA America, Inc., a leading developer of standards and codes, today announced a new agreement with the Green Building Initiative™ (GBI) for the development of the Green Globes™ independently accredited Personnel Certification program. CSA America will develop the Personnel Certification program on behalf of GBI for assessors using the Green Globes environmental assessment and rating system to verify achievements in design and operation of green buildings. It is the industry's first independently administered certification program for third-party verifiers of green buildings.

"CSA America is committed to addressing climate change issues and welcomes the opportunity to work with the Green Building Initiative on this project," says Spencer Grieco, Vice President, Standards, CSA America. "Through this agreement, CSA America will play a critical role in advancing building efficiency by creating an industry-wide, independently validated certification program that provides assurances of the competence of anyone evaluating building designs using the Green Globes system."

Green Globes is North America's first web-based and interactive building rating system and design tool; the tool includes an assessment protocol, rating system and guide for integrating environmentally friendly design into commercial buildings. Once a project is complete, the building can be recognized as a Green Globes building only following third-party verification, which includes an on-site inspection and auditing of points attributed through the rating process.

According to Vicki Worden, GBI's head of commercial programs, "This program is important for GBI as we prepare for the release of Green Globes as an American National Standard. CSA America will help us fulfill our commitment to the public to follow the most credible and codified procedures for our program development activities."

-more-

The Green Globes Assessor Certification Program will be based on ISO 17024 *General Requirements for Bodies Operating Certification Systems of Persons*. Personnel certification is the assessment and formal recognition, through certification, of an individual's competence against objectively identified criteria within a specific subject area.

The goal of CSA America's certification program is to improve public confidence through the development and application of specific worker competency criteria that address the needs of workers, industry, regulators, and the general public. Unlike qualification based programs that consider an individual's education and general qualifications, CSA America's program examines an individual's measurable competency. The examination is expected to be available in mid-2007.

For more information on Personnel Certification Services, contact CSA at (216) 524-4990 or personnel-certification@csa-america.org.

About CSA America:

CSA America develops standards for gas equipment, fuel cells and related energy sectors in the U.S. market, provides personnel certification services, and participates in other National and International standards activities. CSA America, Inc. is accredited by American National Standards Institute (ANSI) and is a part of CSA Group, which also consists of the Canadian Standards Association, a developer of standards and codes, CSA International for product testing and certification, OnSpeX for consumer product evaluation services, and QMI for management systems registration. For more information, visit www.csa-america.org

About The Green Building Initiative:
The mission of the Green Building Initiative is to accelerate the adoption of building practices that result in energy-efficient, healthier and environmentally sustainable buildings by promoting credible and practical green building approaches. A not-for-profit education initiative, the GBI is supported by a broad cross section of organizations and individuals with an interest in residential and commercial construction. For more information on the Green Building Initiative, please visit www.thegbi.org.

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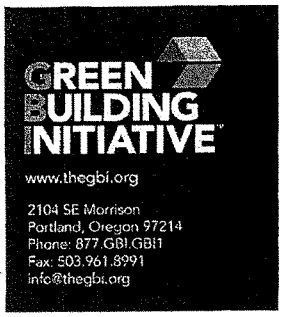
Green Globes Continual Improvement of Existing Buildings Fact Sheet



Fact Sheet
Green Globes™ for Continual Improvement of Existing Buildings
PILOT PROGRAM TO BE LAUNCHED JANUARY 2007

To complement the Green Globes module for New Construction, the Green Building Initiative™ will soon launch Green Globes for Continual Improvement of Existing Buildings—an online system designed to give building owners and facility managers a practical and cost-effective way to assess and improve the performance of commercial and institutional buildings.

Known as Green Globes for Continual Improvement, this unique green asset management tool allows users to:

- Assess and benchmark building performance.
- Develop comprehensive action plans for improvement.
- Evaluate and compare multiple buildings within a portfolio
- Foster increased environmental consciousness while training operational staff to reduce costs, and
- Improve tenant relations by demonstrating a commitment both to the environment and occupant health and comfort.

The Assessment Process
Flexible and user-friendly, the system features an online questionnaire that can be completed in two to three hours, providing users have information such as energy and other utility bills at hand. There are approximately 150 questions, most of which require a *yes* or *no* answer.

Questions are divided into six areas of assessment, each focusing on one aspect of the building's operation or management and each weighted based on its environmental impact:

- Energy
- Water
- Resources
- Emissions, Effluents and Other Impacts
- Indoor Environment
- Environmental Management

Once the questionnaire is complete, the system generates a comprehensive report. It identifies strengths and weaknesses, suggests opportunities for improvement, and serves as a platform for communication between owners, facility managers and operational staff.

Green Globes Rating
Green Globes uses criteria established following several years of extensive consultation with industry experts. This criteria is also based on the experience of BOMA Canada's Go Green Plus program, which is the trade name used by that organization for the Green Globes existing buildings module, and is the basis for BOMA Canada's national environmental program.

Buildings that achieve a score of 70% or more out of 1,000 possible points are eligible to receive a Green Globes pass/fail rating. Once the rating is verified, buildings receive publicity and a plaque from the Green Building Initiative, and are permitted to publicize their achievement. The percentage scores - overall and for each section - are also useful as a tool for internal benchmarking.

An Established Green Management Tool
Like Green Globes for New Construction, the Continual Improvement module is already widely used in Canada—both under the Green Globes name and as the basis for BOMA Canada's Go Green Plus program. Go Green Plus was recently chosen by the Department of Public Works and Government Services for use with an estimated 300 buildings within its existing portfolio.

With the exception of adding the EPA's Energy Star program for benchmarking, the adaptation for the U.S. market included non-substantive changes only, such as units of measure and the exchange of U.S. for Canadian references. However, as part of the process to establish Green Globes as an official standard recognized by the American National Standards Institute (ANSI), both modules are undergoing a thorough technical review.

Linking Sustainable Design and Operational Performance
For new commercial projects, the GBI recommends that Green Globes for New Construction be used in concert with Green Globes for Continual Improvement to ensure that the building team stays focused on improving operational performance—and to avoid the all-too-common gaps between predicted design and actual performance outcomes.

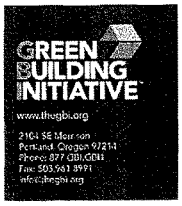
Using energy as an example, there are a tremendous number of variables that have an impact on performance, including building systems, operations and occupant habits. As a result, it isn't unusual for consumption to be substantially higher than predicted values.

With Green Globes for Continual Improvement, users can assess ongoing building performance in a seamless continuum, making it possible to establish a baseline, identify problems when and where they occur, and take corrective action.

Pilot Program
To view a beta version of the Continual Improvement module, please visit http://www.greenglobes.com/existing/homeus.asp. Complete the registration form and enter the complimentary code: **performance1**.

The GBI is looking for buildings to participate in our U.S. Pilot Program starting in January 2007. If you are interested in taking your building through the module, please e-mail cipilot@thegbi.org or visit www.thegbi.org for more information.

Dual Certified Buildings by Green Globes and LEED



Dual Certified Buildings by Green Globes and LEED

Building	Green Globes Score	LEED Score	Building Contact
Alberici Corporate Headquarters	4 Globes	Platinum 60 points	Thomas A. Taylor (314) 733-2666 TomT@ALBERICI.com
William J. Clinton Presidential Center	2 Globes	Silver 34 points	Jonathan Semans (501) 920-1279 jsemans@semanspartnership.com
Blakeley Hall	2 Globes	Silver Points n/a	Kristen Scott (206) 344-5700 kscott@weberthompson.com
Pfizer Inc. Clinical Research Unit	3 Globes	Silver Points n/a	Gregory J. Bergmiller (860) 659-1010 ext. 3363 bergmiller@slamcoll.com
Wisconsin Electrical Employees Benefit Fund Office	2 Globes	LEED Registered	Eric Truelove (608) 833-2321 erict@renschler.com
RenewAire, LLC	2 Globes	LEED Registered	Eric Truelove (608) 833-2321 erict@renschler.com

RESPONSE BY WARD HUBBELL TO AN ADDITIONAL QUESTION FROM SENATOR SANDERS

Question. In your testimony you talk about the "green building" work being done by the National Association of Home Builders through the Green Building Initiative. You fall, however, to give details about what this means, such as, how much energy has been saved, how much water has been saved, what are the reductions in CO_2 emissions, how much have you improved indoor air finality, etc. . . , What concrete changes can you point to from your "green building" practices?

Response. Two related shortcomings of the green building movement as a whole have been our tendency to focus on a building's design instead of its performance and our promotion to date of prescriptive tools and guidelines instead of those that are performance-based. While a sustainable design is the first step to achieving energy and other savings, it is just one part of the equation. A buildings performance is also greatly influenced by the specifics of its occupancy and management.

As a result, although more than 100 homes have been certified to the National Association of Home Builders (NAHB) Model. Green Home Building Guidelines through work with the Green Building Initiative (GBI), and thousands more have started the process. I am unable to point to any concrete evidence of energy savings, carbon emission reductions or improved indoor-air quality from their participation in the program. Most of the data that our sector uses to encourage sustainability is anecdotal, but we intend to change that.

For the commercial sector, the GBI is preparing to release a new module of the Green Globes system—Green Globes for Continual improvement of Existing Buildings—which is currently being piloted. With its emphasis on performance data, the new module will provide a practical and cost-effective mechanism, (a) for ensuring that high performance designs result in high performance buildings, and (b) for evaluating, comparing and improving buildings over the long term. It will also provide some mud, needed data on the type of savings one can expect from sustainable construction practices.

For the residential sector, we intend to commission studies on homes based or the NAHB guidelines in order to understand the true performance impacts of the recommended practices and more accurately forecast the benefits.

As soon as this data is available, the GBI will develop a formal report to share with the Senate Committee on Environment and Public Works.

RESPONSE BY WARD HUBBELL TO AN ADDITIONAL QUESTION FROM SENATOR WARNER

Question. As you know, some federal agencies, like the Department of Health and Human Services, have issued policies Incorporating the Green Globes rating system into their guidance for sustainable and high performance buildings. Have the Green Globes system provided certification to any federal buildings to date? What kind of long-term savings should the agencies expect?

Response. Taking into consideration that the Green Globes environmental assessment and rating system has been available in the United States for less than two years, we are pleased to report progress with a number of federal buildings.

The William J. Clinton Presidential Library and Museum in Little Rock, Ark. was the first federally funded project to undergo both the initial assessment and third-party verification process required before any building can be promoted as having achieved a Green Globes rating.

We are currently working with the Department of Health and Human Services (DHHS), which is piloting Green Globes on the National Institute of Health building in Maryland and an Indian Health Services building in Arizona, as well as the Department of the Interior (DOI), which is piloting Green Globes on a building in New Mexico.

The GBI provides interactive solutions that make even the most sophisticated processes practical and accessible, and agencies such as these should expect many benefits from using the Green Globes system—not only as an assessment and rating tool, but as a guide for integrating environmentally-friendly design into new and existing buildings.

The Green Globes system's revolutionary interactive platform gives all building professionals, regardless of experience, the opportunity to incorporate sustainable principles into their projects. The system is designed for use with buildings of any size and, in response to the U.S. Government's creation of Guiding Principles for Federal Leadership in High Performance Sustainable Buildings with its Memorandum of Understanding; it has been identified by agencies such as the DHHS and DOI for use with all new construction/renovation projects.

Use of the Green Globes system is also in keeping with the government's desire to increase efficiencies through "electronic government." As you know, many agen-

cies are being asked to enhance service delivery by increasing their Information Technology resources. As an online system that's also easy to use and cost-effective, Green Globes helps to address this growing need.

RESPONSES BY WARD HUBBELL TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. There is already one rating system (LEED) used widely in the United States, Why Is it Important that other rating systems also be available?

Response. Obviously, there is some similarity between the GBI and organizations such as the U.S. Green Building Council (USGBC). Were both private sector, non-profit organizations that offer tools for assessing and rating green structures. However, while we are technically competitors, I believe share the common goal of a much greener built environment—and that our tools have their own unique characteristics that, together, meet the needs of a much broader segment of the design and building community.

What's important to keep in mind is that as in other segments of society, healthy competition among rating systems will drive improvements. lower costs and benefit the ultimate consumer which In this case is our shared environment. I also believe its necessary to motivate the kind of innovation—both separately and collectively—that our Nation needs to address crisis-level problems such as climate change.

Let me be clear, organizations such as the USGBC have contributed mightily to the cause of green building and LEED is a helpful tool. Yet, as with all such tools Our own included), it comes with its own unique set of limitations.

In addition to providing a greater range of options for design and building professionals, an increased level of competition in the green rating field has already stimulated some exciting advancements in the green building arena. These include:

• Movement toward the development of true consensus standards for green building. The GBI became the first organization of its kind to subject a rating system to the rigors of an independent, third party, codified and consensus-based process under the rules of the American National Standards Institute (ANSI). Other organizations have since pursued a similar path.

• The creation of practical, user-friendly tools to allow owners and designers to consider the "cradle-to-graver" environmental impact of materials used in construction. With life cycle assessment tools recently developed by the GBI, designers can now make decisions based on the energy, a water, solid waste and climate change impacts of more than 400 commonly used building assemblies. We're incorporating this data into our own Green Globes rating system, and we've also offered it free of charge to any other rating organization or government entity that wants to use it.

• Stimulating the increased use of technology in green assessment. The Green Globes interactive platform has helped make green design and assessment both cost-effective and user-friendly. This has made it possible for a greater number of projects to be built to green standards and has encouraged the increasing use of technology in other rating systems.

In addition, Green Globes and other similar tools play an important role by attracting mainstream design and construction professionals whose needs (and budgets) aren't met by other systems. For example, in Summit County, Colo., the local government and High Country Conservation Center celebrated a sustainable construction milestone last year when the Summit County Materials Recovery Facility (MRF) became the first recycling facility in the country to be built green.

As a mission-driven, non-profit, the Summit County MRF required a system such as Green Globes, which offers affordability, flexibility and user friendliness. Without this option, it would have been impractical to assess and rate the building's environmental achievements—and its accomplishments would have gone unrecognized.

The bottom line: green building does not only apply to big budget projects and cathedrals of architecture. The market can bear—and frankly needs—a variety of options that accommodate a full range of budgets and building types, as well as the individual preferences of architects, builders and others in a position to influence the adoption of sustainable building practices.

Question 2. What effect on Green Building innovation would mandating a single standard at the Federal level have?

Response. As indicated above, increased competition since the inception of the GBI has already spurred improvements. However, while we have come a long way in the work to better our built environment, there is still more to be done. Mandating a single standard at the Federal level would promote a monopoly situation and stifle the innovations inspired through a competitive environment.

Simply put, if the government finds it necessary to mandate green building, it is vital that the legislation or executive order be rating system neutral. If we want the green building movement to mature and grow, we need the power of competition to drive the improvements that will take us to the next level.

Question 3. Why is a consensus-based approach important in formulating green building standards?

Response. True consensus standards are established when a recognized standards developer follows a prescribed process that subjects every aspect of its rating system to review, analysis and voting by a balanced group of independent stakeholders.

In the case of the GBI, we were the first green building organization to become a standards developer under ANSI. The USGBC and the NAHB followed suit, but the USGBC has not initiated a standards development process. The GBI and NAHB are working to establish the Green Globes rating system and the NAHB Model Green Home Building Guidelines (respectively) as the first ANSI standards for commercial and residential green building.

Speaking to the GBI's ANSI process, the Green Globes system is undergoing a thorough review by an independent technical committee and seven expert subcommittees, which will make modifications through a formal voting process. Before it can be ratified, the standard must be released for public comment and all negative comments must be addressed by the committee in writing.

While other green building standards are commonly referred to as consensus standards, they are neither developed nor maintained through an independent, third-Party process for consensus development. This is an important distinction, not only because the federal government has stated that it prefers voluntary consensus standards for use in federal buildings, but because standards not developed by consensus are under the control of their governing bodies.

Utilizing established, consensus-based procedures, such as those required by ANSI, to develop a green building standard encourages a fair, equitable and open process that helps ensure the best standard will be brought forward to the public.

Question 4a. Explain why you decided to pursue ANSI certification for Green Globes.

Response. With an estimated 100 million buildings in operation by 2010, it is vital that organizations like the GBI and others encourage green building by developing third-party codified consensus standards buildings based on sound building science.

The GBI is committed to offering consensus-based standards that are also practical and affordable, and give design and construction professionals the confidence that they are working with the best tools available. Through the ANSI process, we are leveraging the considerable knowledge of nearly 100 building science experts who sit on our technical committee and subcommittees and will also seek public comment We feel confident that the result will be a highly credible and useful standard.

We also applaud the decision of our partners at the NAHB to take their Model Green Home Building Guidelines through the same ANSI process, as well as organizations such as the National Institute of Building Sciences, American Society of Heating, Refrigerating and Air-Conditioning Engineers and ASTM International, which are working to develop minimum standards for green building. Together, these Initiatives will provide a variety of options that accommodate a full range of budgets, building types and preferences.

Question 4b. Will you continue to pursue ANSI certification for other rating systems you might promote in the future?

Response. We will most assuredly evaluate opportunities to seek ANSI accreditation for future tools and rating systems.

Question 5. In your testimony, you mentioned the prescriptive nature of rating systems and the need to move towards performance-based systems. Please elaborate.

Response. The green building movement is experiencing a fundamental shift in the way it approaches sustainable design, away from a prescriptive methodology—whereby certain practices or materials are assumed to have environmental benefits—toward one that emphasizes measurable performance.

For example, many people believe it's better for the environment to use materials produced within 500 miles of the structure being built. On the surface this makes sense—since less energy will be required to transport the materials. But there are a tremendous number of factors that influence whether or not a locally produced material is preferable, including the source of its components, type of manufacturing process and mode of transportation.

Life cycle assessment (LCA), which allows the impartial comparison of building designs based on measures such as global warming potential, is widely considered to be the best way to determine a building's true sustainability.

As such the GBI recently commissioned a software tool that provides LCA results for more than 400 common building assemblies in low- and high-rise categories. Prior to its integration into Green Globes, the new tool is being reviewed by our ANSI technical committee. It is also being created in generic form for use (free of charge) by other rating organizations as well as the broader sustainable design community.

As mentioned previously, the GBI is also preparing to introduce a new addition to the Green Globes suite of tools: Green Globes for Continual Improvement of Existing Buildings. Designed to complement Green Globes for New Construction, the new module will allow building owners and managers to evaluate, track and improve the environmental performance of their buildings, and to compare multiple buildings within a portfolio.

Question 6. Please provide additional detail on your third-party on-site verification process.

Response. A building cannot be promoted as having achieved a Green Globes rating until it undergoes a rigorous third-party verification process and the information submitted has been verified by qualified and authorized assessor.

The process features two stages. Stage I can be initiated by the design team as soon as the Construction Documents questionnaire is finalized. The completed questionnaire is verified against the documentation generated during the design process and, providing the building is on target to achieve a minimum 35 percent of the 1,000 possible points, the design team receives a Certificate of Achievement. However, a final rating cannot be achieved until after a Stage II verification, which occurs post-construction. Stage II includes a site visit and walk-through by the third-party verifier and can be initiated as soon as construction is complete.

The GBI currently oversees a team of Green Globes-trained verifiers, who are primarily licensed architects and engineers with significant experience in building science. However, to further strengthen our third-party verification program, we recently announced an agreement with CSA America Inc., a leading developer of standards and codes, to develop an independently accredited Green Globes Personnel Certification Program. CSA America is developing the program on behalf of the GBI for assessors using the Green Globes system to verify achievements in the design and operation of green buildings. It will be the industry's first independently administered certification program or third-party verifiers of green buildings.

The Green Globes Assessor Certification Program will be based on ISO 17024 General Requirements for Bodies Operating Certification Systems of Persons. Personnel certification is the assessment and formal recognition of an individual's competence against objectively identified criteria within a specific subject area.

Senator LAUTENBERG. Thank you very much, Mr. Hubbell.

I think that you at this table have won a prize which I will call the Noble Prize, which is that each one of you finished on time. It is quite a remarkable and a noble achievement, and all of you, despite occasional differences in view, I think presented excellent testimony. I thank you.

You know, one of the things that is being discussed at some length is there are some differences. Senator Warner of Virginia has a bill that has similar characteristics to the one that I have proposed, but ours is more demanding in terms of the verification of what constitutes a green building.

One of the things that I would ask, Mr. Fox, does the calculation presented by Mr. Templeton about the recovery of the extra costs in building a green building, estimated to be 30 percent more, if I remember, to do it, but recover in roughly a 3-year period of time, obviously. Is that consistent with your experience in the buildings that you have worked on?

Mr. FOX. Yes, it is. We are seeing, depending on the type of building, anywhere from a 1 percent to maybe a 3 percent increase in costs, and the recovery period that we look for in all of the innovations that we propose is 5 years or less.

Senator LAUTENBERG. What has been the response? You obviously have had clients who support the effort and are willing to spend the extra money at the time of development, knowing very well that they are going to have a much better product out there, believing that they will have a healthier environment more consistent with our mission to reduce greenhouse gases, global warming, et cetera. So it sounds like a good investment, but when you see what some of the costs of building is, especially when you talk about New York, and I am a little familiar with that. It is a suburb of my State of New Jersey, you know.

[Laughter.]

Senator LAUTENBERG. We are very interested in what takes place there.

You said that the green design of the B of A Building will result in a 50 percent energy saving. Which technologies that are part of this design will yield that kind of energy saving and how difficult is it to install?

Mr. FOX. The place where we start is with the building envelope, to make that the most efficient, the most energy conserving envelope that we can—the windows, the spandrel panels, the roof, and try and make that the most high performance envelope that we can.

We then look at the mechanical systems that are delivering both heating and cooling to the interior of the space, and make those systems the most efficient we can. One of our innovations was the ice storage system, which is 44 large tanks 10 feet in diameter, 10 feet high, made in New Jersey by a terrific company named CALMAC, and get all of those systems in balance so that we are using the least amount of energy we can to both heat and cool the building.

All of those technologies are off the shelf. They are current state-of-the-art. The ice storage system has been in use for decades.

Senator LAUTENBERG. How about the aesthetics?

Mr. FOX. The aesthetics?

Senator LAUTENBERG. Yes, of the exterior. I had an opportunity to visit with a manufacturer in California of solar panels, typically used on roofs, but also could be siding. It is incredible, the volume of these things that they are turning out now, the solar panels. They have their own character in terms of how they appear. I think they are OK, but it is a fairly uniform type of thing, I think even in the color.

So when people are building buildings, they like the uniqueness about it, whether it is a gigantic skyscraper or a home. So are you able to envelop these programs in the same quality of view and aesthetics that you would otherwise be able to get?

Mr. FOX. Well, the answer is yes. This building is a very transparent, all glass, prismatic-informed building. We looked at photovoltaic panels, which when they are the most efficient are a dark purple color. We tried to integrate that into the design, and it made the building very stripey, with horizontal stripes. So we elected not to proceed with that.

On the Four Times Square Building, which is also on the same block, which has a different facade treatment, we did incorporate solar panels in the facade of that building.

So depending on one's design aesthetic and design approach, some of these technologies fit better than others at different times.

Senator LAUTENBERG. You mentioned the cost of water. Water availability is a favorite subject of mine. I traveled to the South Pole a couple of years ago to see what the National Science Foundation is doing in terms of ice melt and so forth. Some time ago, 70 percent of the world's fresh water was stored in the ice in Antarctica. As the temperatures increase, we see the dissolving virtually of that ice protection, that ice cap. As it slides off into the sea, obviously it is less available. One of the problems that I think our Country and our world has to face pretty darn quickly is the availability of potable water and how we are going to adjust to that.

This mission that all of you are on really deserves commendation. The fact is, there are some different approaches, obviously, since I am proposing legislation. I tilt toward the LEED standard, but respect Mr. Hubbell and the fact that you see it differently. I am concerned about the verification. I think you said that there were independent ratings created. Who is the independent that creates that?

Mr. HUBBELL. We have an ISO-certified organization called CSA America that is also an ANSI standards developer. They have developed a training course for our third party verifiers. These third party verifiers will look at not only the answers to the questionnaire and the other things in our system, but also look at construction documents and commissioning plans and all that. And then, unlike any other rating system that I am aware of, we actually do an onsite inspection, so these people go to the building, they tour the building, and they spend time understanding what systems are in that building and make sure that they match with what the building owners have reported.

Senator LAUTENBERG. There is a board of directors of the organization?

Mr. HUBBELL. Yes.

Senator LAUTENBERG. How are they appointed or elected?

Mr. HUBBELL. Well, the board, as you probably know, elects itself. We have a very balanced governance model. We have one third of our seats devoted to producers; one third devoted to users, which we classify as builders, developers, architects, people who actually use our system; and then one third devoted to third parties, government, NGO's, academicians, that sort of thing.

The other thing, Senator, that we do that I think is unique is we have taken the content of our rating system and separated it from the organization. The organization, the staff, the funders, the board, cannot determine the content of our rating system. That is done through an independent consensus process through the American National Standards Institute.

So if you look on our Website, you can see that have a technical committee of 30 individuals that come from places like the U.S. EPA, American Lung Association, American Institute of Architects, as well as representation from industry and users. They determine the content of our standards. We don't.

Senator LAUTENBERG. Mr. Tonjes, what is happening in the homebuilding community? Is green a consideration? Are green

technology standards used today? Is the homebuilding industry in part saying that we build healthy homes in their advertising?

Mr. TONJES. I think it is a big issue to get consensus on, but I can tell you that over the last many years, a lot of what we consider green building practices have become mainstream as part of the regular construction practices. That includes engineered wood products, composite materials made up of grocery bags and grocery sacks and sawdust, as you will; increased insulation.

So one of the things is that I think you will find across the Country one of the major components of green building is the energy factor. Energy programs have been long in practice in a lot of parts of the Country. Most of these are regionally incentivized, if you will. I like to give the example in my home State and my home community, which is Austin, TX. I actually was one of the first Energy Star builders in a program that got started in Austin, TX in 1984. That program eventually evolved into the first green building program in 1991. Subsequent to that, Energy Star was picked up by the EPA and has been very successfully branded.

You know, a lot of green building practices are measured in the energy side of the component. Also in my State, we adopted a statewide building code in 2001 and 2003. We adopted a statewide energy code. Being in Austin, where we were already doing those things, I was quite surprised at the order of magnitude of what that did in our State. Texas, as you might suspect, is a very large residential building State, with over 100,000 homes each year. We have made significant gains in that.

Senator LAUTENBERG. It sounds like your focus is largely, certainly primarily, on energy savings, but I believe, as Mr. Fox says, there is more to green building than simply energy. We talked about water use. We talked about other kinds of things. How about what happens in the buildings that are sometimes so well insulated that the air gets stale and it creates its own problems? Is that a factor that you see? Or Mr. Fox, the architect, do you see it? Does green building have to go beyond just the energy issues, which is important, by the way.

Mr. TONJES. If I might address that? Indoor air quality is certainly a significant part. A lot of that has to do with the design of the home, the commissioning of the home, the mechanical system, sizing the mechanical equipment, basically your air conditioning, to have the adequate availability to both filter the air and get the humidity out of the air, which is a huge problem in our State.

Our State builders association was very successful when we first implemented the statewide energy code, of giving statewide training to our membership on high performance homes. This was done through our State Energy Conservation Office, which was supported by the Department of Energy.

So a lot of these practices go hand in hand, and ultimately the result was very startling to improve the indoor air quality.

Senator LAUTENBERG. Yes.

Mr. Fox, to my earlier question, is there more to green construction than energy saving? Is that the principal component? Or is it the emissions that are toxic, or at least greenhouse, there also? When you talk about a 40 percent saving of energy on the building

side of things, that create greenhouse gases, 40 percent of the total. It is more than energy, is it not?

Mr. FOX. Yes. Doing a green building, as I have said many times, is 100 little things. Some of those 100 have to do with energy, and energy is very important, because this is the primary issue with CO_2 and climate change. However, health is equally important.

So to put the right materials in a building is extremely important, those that don't have volatile organic compounds, known carcinogens, and they have existed in carpet and paint and wall coverings and fabrics and furniture. I dare say most of the furniture in this room was made with volatile organic compounds, and probably the carpet.

In addition, the indoor air quality is very important, so how that air gets filtered, how that air gets tempered, how it gets delivered. The delivery system in this room comes out of the diffusers in the ceiling, and comes out fairly cold, and relies on a mixing of air to warm up a little bit before it hits us. In the mixing of the air, it is picking up the dust, the pollen and the sneezes in this room and delivering it equally to everyone, so air delivery is equally important.

There is a relatively new science called Biophilia. There was a book written a number of years ago by E.O. Wilson and the ability of people to connect to the natural environment is extremely important in terms of health, and the sense of well being. I am sure that Claire Barnett would agree with me in terms of schools, the ability for these students to connect to a natural environment and not be in a classroom with little tiny windows is very important. It is the same in our homes.

The other issue is maintenance.

Senator LAUTENBERG. You must keep your eye on the mission in order to kind of find your way through the extra things that have to be done, the costs, et cetera, the appearances, all of those things.

Ms. Barnett, you touched a sensitive spot with me. I am a professional grandfather. I have 10 grandchildren. The oldest is 13 and the youngest is 3. What I want for them is what every grandparent in the Country wants for their kids: good health, able to get an education if they have the capacity, live in a peaceful Country.

So my oldest grandchild who is 13 has a fairly severe asthmatic condition, and when he goes to play sports, my daughter will first immediately find out where an emergency clinic is nearby, so that if he starts to wheeze or otherwise, they can get someplace quickly for some relief.

I see it in the growth of childhood diseases, or at least the awareness of a growth in childhood diseases, autism, for instance. In New Jersey in 15 years, we went from 240 cases diagnosed to 7,500. And so it is I believe for most of the Country. And diabetes, with one out of three children born today it is believed will be affected by diabetes before death, before their lives are over.

So we have a real mission there, Ms. Barnett. I thank you. I would guess that there are startling numbers. What percentage of classroom conditions are acceptable for the health of the children across this Country? Do you have any idea? Because the task is so enormous to correct it, but so again, the mission is critical.

Ms. BARNETT. Thank you for the question. I think that there is a tremendous intersection of issues when you begin talking about schools and children and environment and health. We know now a lot more about children and their environmental vulnerabilities than we did 5 or 10 years ago. We know a lot more now about healthy indoor environments in the peer-reviewed sciences than we did 5 or 10 years ago.

The evidence is clear that health indoor environments are good for children. This really is a back to basics call. In thinking about architectural design, what is so interesting about the old, old school buildings is that they were built to be very durable, with terazzo floors. They had very high ceilings. They had very tall windows that opened top and bottom. That was for natural ventilation and daylight.

School specifications for design, going back 100 years out of New Hampshire and Maine, for example, and New York, talked about "whence cometh the daylight" to fall on the desks in the center of the classrooms, because people then understood that children needed fresh air and sunshine to thrive and to learn indoors, and needed, lovely views and or having access to playgrounds and parks that were safe and usable, both of which are wonderful issues in terms of school siting.

I think that what I want to focus on in my remarks is the real need to design out common problems that schools have, and design in best solutions. We can all do that for children.

I think one of the challenges for a volunteer school board member, or locally elected official, or a school superintendent, is where in the world do you get the information and make it easy and accessible and usable within your mix of various State education or other aid or technical assistance from the State agencies? Connecticut, New York and New Jersey are not the same in how their educational systems operate, just as one close to home example.

Senator LAUTENBERG. Yes.

Ms. BARNETT. The education agencies have different capacities and interests and oversight. The energy offices do. The health departments have different interests and abilities. The ability to put together environment, energy, education and health and come up with what States really need to do to ensure that every child has a healthy, high performance school should be made simpler for local schools.

One of the things that happens to us when we are doing either public hearing testimony or making community presentations is the frequent question of, well, "I want a green school; I want a green building. Do I have to start from scratch? Do I have to have a new building? Is that the only way to get one? "

So my organization talks about the greening of existing buildings through greening of the operations and the purchasing of school, and then for local districts to plan to gradually upgrade their facilities as renovation projects and minor maintenance and repair take place.

The bigger question is: Is there great national data on who is doing what out there. The answer is no. There is no Federal Agency or system of oversight or recordkeeping that addresses the conditions of buildings within the States. There are estimates that

have been done by U.S. GAO and by the NEA, but there is not a formalized structured system. There are systems of facility inspection reporting in a few States, but not nationally.

Requested. Our office coordinated a national report on the topic, "Lessons Learned" with contributions from 28 groups nationally. It provides State by State data tables from Federal sources and estimates the numbers of children at serious risk.

[See report on page 123.]

Requested. As one example of how facility data is important, New York State initiated a system of school building inspection reporting in 1999, primarily to estimate school capital needs. In 2005, our NYS program did a study of all 100 schools in two upstate counties: we merged the facility data with the school 'report cards' (on student characteristics and achievement), and found that the conditions of the facilities were related to attendance, test scores, and—very surprisingly—suspension rates.

[See report on page 190.]

Senator LAUTENBERG. Thank you.

Mr. Templeton, in your testimony, you indicate that a dozen Federal agencies, 22 States, and 75 local governments have created policies that use or encourage the use of the LEED standard. Now, how does the LEED standard adapt to meet the needs of these different levels of government? How does the standard continually evolve to meet new problems and new technologies?

Mr. TEMPLETON. As you can imagine, the diversity of States and local municipalities in particular, but also the building types that are addressed within the Federal agencies does require a flexible system in order to respond to the diversity of project types and regions and scales of those projects.

LEED has been structured in a flexible framework that addresses environmental impact categories so that it can be applied universally across all of these factors. So we do see everything from school projects to commercial office projects to retail projects to high rise towers, all being able to use the same rating system in a much more diverse way. There are several dozen different building types that are currently using the LEED rating system across these different options.

Senator LAUTENBERG. Thank you.

One kind of last observation. Ms. Barnett, my bill directs EPA to develop model guidelines and provide grants to States to develop healthier schools. When we look at the magnitude of the problems to make existing buildings greener, and I assume that with rare exceptions it is possible to do it, but the cost may in some cases not be worth it, as opposed to starting over.

But without Federal money and guidelines from the EPA, Ms. Barnett, would States be inclined to implement these environmental best practices? How are the States doing now?

Ms. BARNETT. Some of the States are involved and doing very good work. One of the largest issues facing all schools nationally is the problem of indoor air pollution. Any building which is poorly sited, poorly constructed, engineered, designed, operated, maintained is going to have a collection of problems which generally reflect themselves in poor indoor air quality. So it is a layering effect of multiple issues.

There are more than 15 States now, probably closer to 20, which have adopted various best practices or regulations around indoor environmental quality and indoor air quality, specifically in

schools. There are more than 30 States that have adopted restrictions on pesticide use in schools.

So there are States that are taking action. There are a number of States, for example Washington, New York, New Hampshire, Massachusetts, California, and I think Oregon is getting involved, and Ohio as well, in doing statewide adaptations of "high performance school" design, and applying "LEED-plus high performance school" design to school construction. See Collaborative for High Performance School design at www.chps.net.

So it is very possible. States know they have a problem. Parents know that there is a problem, and school boards actually know that there is a problem. Trying to get your arms around the best solutions and how to accelerate the implementation of best practices in the field is a real challenge. That is why we particularly like the emphasis in S. 506, your bill of allowing EPA to work with the States to help them create comprehensive environmental quality plans for schools.

Senator LAUTENBERG. Our mission is green. It takes green to do it. Hopefully, that green will come from the Federal Government in some part so that we can encourage the development of these healthier buildings.

I think thematically what we ought to be saying is help children stay healthy or get healthier, and focus on that, and let people realize that while it may take some resources, that the mission is so well worth it.

I thank each one of you for your appearance here today. You contributed something to the debate. It is very important while we have some differences, once again I think the goal is more than an appropriate one. I thank you.

We will keep the record open for questions, and I would ask that if we have written questions to submit to you, that you respond as promptly as you can.

Thank you very, very much.

This committee is adjourned.

Whereupon, at 11:15 a.m. the committee was adjourned, to reconvene at the call of the Chair.]

[Additional statements submitted for the record follow.]

UNITED BROTHERHOOD OF CARPENTERS AND JOINERS OF AMERICA

Michael V Draper

Vice President, Western District

May 10, 2007

The Honorable Barbara Boxer
The Honorable James Inhofe
Senate Committee on Environment and Public Works
456 Dirksen Senate Office Building
Washington, DC 20510

Dear Senators Boxer and Inhofe,

On behalf of the United Brotherhood of Carpenters and Joiners of America, I am writing regarding two pieces of green building legislation currently before Environment and Public Works – S. 489, introduced by Senator Warner, and S. 506, introduced by Senator Lautenberg.

The United Brotherhood of Carpenters and Joiners of America strongly believe that we need to both protect the environment and create jobs for unionized workers in the forest products industry. Therefore, we support "green" or "high performance" buildings that incorporate the use of wood and efforts to promote construction that uses wood. We are encouraged by the overall goals of both pieces of legislation. By establishing a structure with the federal government to coordinate activities and information sharing among various agencies and to issue reports, the legislation will promote green building best practices. We look forward to working with the Committee as it considers the bills this year.

Unfortunately, as currently written, S. 506 only recognizes the flawed LEED system. In our review of green building legislation offered in states and cities across the country, we have always supported the inclusion of the Green Building Initiative (GBI)'s Green Globes tool as an equal standard to the LEED rating system. Therefore, we ask that the Committee consider amending the legislation to include Green Globes.

As you may know, Green Globes is a green management tool, based on the Canadian standard, which provides developers, architects and builders with an assessment protocol, rating system and guide to integrate environmentally friendly design into commercial structures. The program's core premise is that environmental leadership and responsibility make good business sense. We agree on two fronts.

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First, having reviewed Green Globes, our union can attest that it is both affordable and user friendly. It is accessible for use not only in large structures, such as government office buildings, but also with smaller structures including office parks, multi-family housing, schools and other public and private commercial structures. Green Globes' interactive, Web-based system speeds up certification time and reduces costs. By some estimates, a building certified by Green Globes costs 5-10 percent less than one certified by LEED. Certainly, in this era of tight budgets, these costs savings could be significant.

Moreover, Green Globes recognizes all credible sustainable forestry certification systems, including the Sustainable Forestry Initiative (SFI) program and the American Tree Farm System (ATFS). These two systems are the two largest sustainable forest management systems in the United States and Canada, yet are not recognized under LEED. SFI and ATFS account for some 68 million acres of forest land under development in the United States, while the LEED-preferred Forest Stewardship Council (FSC) system covers less than 13 million acres.

Last year, the Carpenters Industrial Council commissioned a study by Dr. Timothy Smith and his team at the University of Minnesota's Forest Products Management Development Institute to compare the Green Globes and LEED systems. The findings were very interesting. A full copy of the study can be obtained at http://www.cic-ubc.org.

First, in their review of how the two systems operate, the researchers confirmed that the Green Globes is more user friendly and cost efficient. They found that Green Globes "seems more in line with the real world conditions of scarce time and financial resources" than LEED.

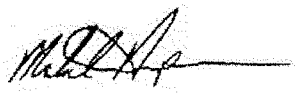
Next, they found that there is significant overlap between the two systems. The University of Minnesota researchers developed a system of common categories into which it reclassified both Green Globes and LEED elements to allow for comparison. They found that nearly 80 percent of the available points in Green Globes system are addressed in the current version of LEED and that over 85 percent of the points specified in LEED are addressed in the Green Globes system. The biggest difference the researchers found was that Green Globes placed greater emphasis on energy use, while LEED placed a greater emphasis on materials.

Finally, and perhaps most important, the Green Globes system reflects the concept of life-cycle assessment – a tool used to assess the overall environmental, energy and health impacts of products and buildings. Green Globes covers the entire life-cycle of building materials in its assessment, while LEED does not specifically address the topic. Similarly, Green Globes addresses the topic of functional quality – both the quality of the product and its durability – while LEED is silent on this issue.

The U.S. Departments of the Interior and Health and Human Services have accepted Green Globes as an acceptable green buildings rating system. Moreover, Arkansas, Connecticut, Hawaii, Maryland, Pennsylvania and Wisconsin have laws or executive orders on the books that recognize Green Globes as an accepted green buildings standard equivalent to LEED.

Given Green Globes' relative advantages compared to the LEED system, we believe that it has earned a position as an equivalent to LEED in any forthcoming legislation. We respectfully request that the Committee ensure that any legislation it passes includes references to Green Globes in addition to LEED.

Sincerely,



cc: Members of the Environment and Public Works Committee

March 26, 2007

Chairman Barbara Boxer
Ranking Member James Inhofe
Senate Environment and Public Works Committee
456 Dirksen Senate Office Building
Washington, DC 20510

Dear Chairman Boxer and Ranking Member Inhofe:

On behalf of the North American Coalition on Green Building, we are writing to inform you of our interest in working with you as you consider green building legislation through the Environment and Public Works Committee. The Coalition consists of over 30 organizations with a material interest in the green building movement. All members of the Coalition share the overarching goal of building more sustainable buildings, and we are committed to reducing the environmental and energy impact of buildings.

The Coalition supports a nationally-recognized, voluntary, and consensus process for the development of green building standards. A consensus process provides transparency and ensures meaningful opportunities for participation by all groups that will be affected by the standard, as recognized by the American National Standards Institute (ANSI).

We also believe that green building rating systems should be based on objective scientific criteria, including consideration of life cycle impacts. Life Cycle Analysis (LCA) is the process of measuring the impact of a building material from "cradle to grave," including during extraction, manufacture, distribution, installation and disposal (including its reuse or recycling).

Given our policy principles, the Coalition was unable to support S. 3591 when it was considered by the Committee in 2006. We were concerned primarily that the legislation, while allowing for consideration of other green building rating systems, appeared to endorse only one system, the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) rating system. The LEED rating system was not developed in a true consensus process and, while USGBC has begun a process to incorporate LCA into LEED, it will be some time before that process is completed.

We also believe that referencing only one rating system will have the unintended effect of stifling innovation and competition in the green building marketplace. LEED was developed in 1999 and for many years was the only recognized rating system in the U.S. It provided a mechanism for federal agencies to comply with policies requiring federal agencies to build "green buildings."

Approximately two years ago, however, another commercial green building rating system was launched in the U.S. named Green Globes, which is promoted by the

Green Building Initiative (GBI). Green Globes and the GBI have brought significant advancements in our two areas of primary concern – consensus-based processes and LCA. GBI was first to become designated by ANSI as a Standards Developing Organization (SDO) and is now on schedule to bring the Green Globes rating system for new construction through the ANSI-accredited process by early 2008. By contrast, while USGBC became accredited by ANSI a year after GBI, it has not yet committed to bring its LEED products through the ANSI-approved procedures. Furthermore, the GBI commissioned development of an LCA software tool that is now being reviewed by the Green Globes ANSI Technical Committee for inclusion in Green Globes. USGBC has a goal of completing a plan to incorporate LCA into LEED by the end of 2007 at the earliest.

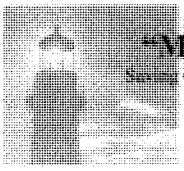
In the few short years since Green Globes has been available in the U.S., it already has been recognized in the EPA Federal Guide for Green Construction. Further, the Department of Health and Human Services has adopted a policy to use Green Globes, along with LEED, as the means to comply with the federal Memorandum of Agreement on green buildings issued in early 2006. The system also has been included in legislation promoting green buildings in six states to date.

Clearly, the entrance of Green Globes into the green building marketplace, and the subsequent competition between existing systems, has furthered important innovations and advancements. The competition has benefited green building designers and constructors, and most importantly, helped meet shared environmental and energy goals. However, when legislation only references and advances one particular rating system, such as LEED, this competition and its benefits are prevented.

Therefore, as the Committee considers green buildings legislation this year, we urge you to ensure that all rating systems are eligible to participate in their provisions. Doing so will not only continue to foster competition and improvements of the various rating systems, but will enable more sustainable buildings to be constructed.

Sincerely,

American Architectural Manufacturers Association
American Chemistry Council Plastics Division
American Forest & Paper Association
American Tree Farm System
APA-The Engineered Wood Association
The Association of Woodworking & Furnishings Suppliers
Composite Panel Association
The Formaldehyde Council, Inc.
National Lumber and Building Material Dealers Association
Plastic Pipe and Fittings Association
The Spray Polyurethane Foam Alliance
Structural Board Association, Inc.
Treated Wood Council
The Vinyl Institute



"MCS" Beacon Of Hope Foundation

Saving Our Environment Today – For A Healthier & Brighter Tomorrow!

We submit the following to become part of the record for S.506: High Performance Green Buildings Act of 2007

May 13, 2007
Senator Lautenberg (NJ)'s Legislative Assistant
Arvin Ganesan, at arvin_ganesan@lautenberg.senate.gov

Provided by:
"MCS" Beacon of Hope
Largo, Florida 33771
Ph. 727-530-0169

WHAT YOU DON'T KNOW CAN KILL YOU ~ PREVENTION is KEY!

May is Toxic Injury Awareness and Education month. Please help us STOP the Poisoning, stop the injuries, illnesses, disabilities and premature deaths caused from senseless toxic exposures and pollution through public awareness and education. Toxic Injury is a chronic, debilitating condition for which there is no known cure, causing serious financial, employment, learning, housing, health, social and other consequences.

Numerous Governors and the Mayor of the District of Columbia have signed or are signing proclamations proclaiming May 2007 Toxic Injury Awareness and Education Month. Our hats are off to each and everyone for their signatures and support. Without their support we would remain an often unseen, misunderstood; yet an enormous and unfortunately rapidly growing population of disabled citizens (including children) and the men and women of our military services. As we receive the 2007signed proclamations, they will be made available for your viewing at: mcsbeaconofhope.com.

Toxic Injury is a worldwide problem ~ demanding worldwide solutions. Toxic Injury can include multiple, often disabling illnesses affecting the respiratory, central nervous, immune, musculoskeletal, porphyrin, metabolism, circulatory, and hormone systems and can be life threatening.

Medical conditions caused and aggravated by toxic exposures include toxic encephalopathy, migraine, asthma, sinusitis, otitis, emphysema, autoimmune diseases, chronic fatigue, liver, kidney, and coronary problems, attention deficit, hyperactivity, autism, Parkinson's, fibromyalgia, and many more diseases involving inflammation. Once damaged, our bodies adversely react to more substances at much lower levels.

Some of the symptoms include but are not limited to difficulty breathing, impaired balance, seizures, tremors, loss of muscle control, short-term memory loss, inability to concentrate, difficulty retrieving words, trouble with multitasking and the list goes on.

Chronic effects can include permanent and chronic learning disabilities, autism, autoimmune, neurodegenerative disease, leukemia, brain and other cancers. Toxic Injury is also referred to as chemical sensitivities, environmental illness, gulf war illness, sick building syndrome, reactive airway disease, which many around the 9-11 tragedy are also experiencing, among other toxically induced illnesses. A medical study released found a high incidence of respiratory problems in September 11 rescue workers and warned that many had sustained serious and lasting damage. Years after the 9-11 attacks, thousands of workers, residents and rescuers have reported respiratory problems

that scientists believe to be linked to the fine particles released from the debris and inhaled deep into the lungs, and other toxic exposures.

Doctors are withdrawing children from school because medically required reasonable accommodations are being denied. Readily achievable accommodations are NOT costly and allow everyone access to an education and to interact with others in public sporting, and other social events. This information gap creates painful restrictions and social isolation.

Just as physical barriers prevent wheelchair access, invisible barriers (pesticides, scented products, mold, chlorinated cleaning products, "air fresheners" (petrochemical derivatives) and other toxic cleaners and chemicals, STOP those with toxic exacerbated illness from enjoying the same rights and privileges others take for granted. Un-necessary toxins are found in our homes, schools, churches, places of employment, hospitals, medical and dental care facilities, emergency, assisted and residential housing, and their presence prevents access and use of public and private facilities necessary for survival to those with toxic injury.

Many of these toxins are carcinogenic, endocrine/hormone disrupting, respiratory irritants, and sensitizers and are listed on the EPA, RCRA and CERCIA Hazardous waste lists.

Safer choices, products and practices are readily available, affordable, and effective.

For more information, statistics and ICD codes, please visit: www.mcsbeaconofhope.com

Toxic Injury knows "NO" boundaries. "EVERYONE" is at Risk! Don't let this happen to Your Child or Loved One - Get Involved - Become Aware - Make Safer Choices!

Sincerely, your friends in Hope & Health,
Peggy, Julia, Sharon and Jennifer

Peggy Troiano, CEO, Program Manager:
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THE AMERICAN INSTITUTE OF ARCHITECTS

May 11, 2007

The Honorable Senator Barbara Boxer and the Honorable Senator James Inhofe
Senate Committee on Environment and Public Works
Dirksen Senate Office Building Room 456
Washington, DC 20510

Dear Senators Boxer and Inhofe:

The American Institute of Architects and its 81,000 members are committed to improving the sustainability and energy efficiency of our nation's buildings. We are concerned about the effects that America's pattern of energy use is having on the world's climate. We are particularly concerned about the adverse effects that thoughtlessly designed buildings can have on the natural environment.

We believe that it is currently possible to design and operate buildings of all types in ways that conserve resources and drastically reduce their impact on the environment. For that reason, we commend you for calling this hearing today to explore the benefits of green buildings.

The AIA seeks to dramatically increase the number of green buildings constructed according to high performance and sustainable design standards in both the public and private sectors. Designing buildings in an environmentally friendly way will make a major, measurable contribution to significantly reducing U.S. energy consumption and greenhouse gas emissions. By holding this hearing, it shows that your committee is dedicated to examining the many positive effects of green buildings.

The High Performance Green Buildings Act of 2007 (S. 506) and the Green Buildings Act of 2007 (S. 489) are both excellent bills which will move the federal government in the direction of sustainable architecture. These bills are co-sponsored by a number of members of this committee and if enacted, will establish a specific Office of High Performance Buildings within the General Services Administration. This office will collect and disseminate information on the Federal Government's sustainable activities as well as establish a national research agenda that will focus on green building initiatives.

These bills will also mandate the consideration of life-cycle costing in the design and procurement of federal buildings, a concept long supported by the AIA. The bill will

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create a grant program for high performance and healthy schools, as well as health-based guidelines for school construction. It is a matter of great concern to the AIA that our Nation's school facilities are in a degraded condition. Significant improvement in student health and productivity can be achieved through upgrading the structures that house our students, especially when the renovations or new construction utilize the principles of high performance and sustainable design. The numerous benefits of high performance schools were illustrated in a study commissioned by the AIA, The American Federation of Teachers, the American Lung Association, the Federation of American Scientists and the U.S. Green Building Council. We are happy to provide this study, "Greening America's Schools: Costs and Benefits," at the Committee's request.

The AIA commends your leadership in taking on these complex issues that are closely intertwined with the nation's environmental, energy, and educational future. The AIA supports the efforts of this Committee and looks forward to working with the Committee to ensure that legislation promoting green, high performance buildings is enacted into law.

Sincerely,

Christine W. McEntee
Executive Vice President & CEO

Alliance for Sustainable Built Environments

May 22, 2007

The Honorable Frank Lautenberg
United States Senate
Hart Senate Office Building
Suite 324
Washington, DC 20510

Dear Senator Lautenberg:

The Alliance for Sustainable Built Environments is a group of industry leaders who practice and are recognized for leadership in sustainability; that is economic, social and environmental responsibility. We are committed to delivering high performance sustainable solutions for the built environment.

The Alliance is composed of Forbo, Johnson Controls, JohnsonDiversey, Kohler, Milliken, Phillips, Owen Corning and U.S. Gypsum. In 2003, this exclusive group of international building industry manufacturers, sharing a similar, sustainable approach to business development, banded together and committed to an aggressive, coordinated campaign to inform decision-makers at all levels that the choices they make with regard to their facilities can be economically and environmentally sustainable.

We commend you for requiring the GSA to report on the barriers that prohibit new and existing buildings from meeting the LEED silver criteria. The fact that an Office of High-Performance Green Buildings will exist and coordinate research and development on ways for government buildings to become energy efficient, sustainable and healthy places to work will help spur the sharing of best green building practices. Hopefully, it will also act as a catalyst for the private sector to meet this standard as well. Additionally, using LEED as the benchmarking tool for your efforts will help establish consistency between the public and private sector, a crucial step to further the sustainability movement.

Thank you again for your leadership in taking on this important issue. The Alliance supports your efforts, supports your bill, and would like to work with you to get it passed into law.

Sincerely,

Craig Zurawski
Executive Administrator
The Alliance for Sustainable Built Environments

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NATIONAL EDUCATION ASSOCIATION
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Reg Weaver
President

Dennis Van Roekel
Vice-President

Lily Eskelsen
Secretary-Treasurer

John I. Wilson
Executive Director

May 14, 2007

Senator Frank Lautenberg
United States Senate
Washington, DC 20510

Dear Senator Lautenberg:

On behalf of the National Education Association's (NEA) 3.2 million members, we would like to express our support for the High Performance Green Buildings Act (S. 506). This critical legislation will help strengthen public education by creating safer, healthier teaching and learning environments.

Every day, 53 million children in grades K-12 and the 6 million adults who serve them enter school buildings to teach, learn and work. And every day, half (57,500) of those very buildings have problems associated with poor indoor environmental quality (IEQ). According to the U.S. Department of Education, more than 50 percent of America's public schools are in need of major repair or renovation. Schools are often sited next to industrial plants or on abandoned landfills. New schools are built beyond safe walking or biking distance for students. In a recent five-state survey, more than 1,100 public schools were built within a half-mile of a toxic waste site. Polluted indoor air, toxic chemical and pesticide use, growing molds, lead in paint and drinking water, and asbestos also impact the health of our nation's students and school staff.

Poor IEQ is linked to a wide range of illnesses including asthma, headaches, upper respiratory infections, and dizziness. In addition, studies show that poor IEQ reduces student and staff performance. In contrast, studies show that energy efficient facilities designed for air quality, good lighting and acoustics, and ease of maintenance are associated with attendance, academic performance, and productivity.

Deferred maintenance and improper construction and renovation practices (including the use of substandard materials and unskilled labor) play a major role in the prevalence of unhealthy schools. Unfortunately, school districts faced with the need to renovate or repair a school facility often proceed based solely on the lowest cost estimate (using low-bid labor and materials), rather than taking into account the need to improve IEQ.

By creating an office of High-Performance Green Buildings to coordinate research and development on ways for government buildings to become "green," sustainable and healthy, S. 506 will ensure that school districts have the information and assistance they need to ensure every student the safest, healthiest learning environment. We thank you for your leadership on this important issue and we look forward to continuing to work with you to fulfill every child's basic right to a great public school.

Sincerely,

Diane Shust
Director of Government Relations

Randall Moody
Manager of Federal Advocacy

Johnson Controls, Inc.
507 East Michigan Street
Post Office Box 423
Milwaukee, WI 53201-0423

JOHNSON CONTROLS

The Honorable Frank Lautenberg
United States Senate
Hart Senate Office Building
Suite 324
Washington, DC 20510

May 22, 2007

Dear Senator Lautenberg:

Building owners and managers are struggling to control increasing energy costs and their financial impact. According to the Energy Information Association, the United States spent more than $250 billion on electricity in 2000, and demand is expected to increase almost 2% per year through 2020. Not only does this increase in demand have a financial cost, but an environmental cost as well.

Johnson Controls is the single largest provider of sustainable energy solutions in the world. In fact, a report from The Leonardo Academy, an independent, nationally recognized non-profit organization, indicated that Johnson Controls projects implemented through the year 2020, will cumulatively reduce energy usage by 971 million mWh: enough to power all the households in California for nearly 12½ years.

Financially, that represents $95.2 billion in projected energy costs savings. More importantly, from an environmental standpoint, that represents: 15 brand new 400MW power plants that do not have to be built; and, removes 1.3 billion tons of carbon dioxide, equivalent to planting 3.8 billion trees or removing the pollution from 250 million mid-sized cars.

Considering the enormous portfolio of buildings currently under ownership and lease by the Federal government, our extensive green building experience tells us that the proposed bill S. 506 would significantly reduce operating costs of those buildings and positively impact the environment in a monumental way.

Johnson Controls commends you for your forward thinking and your charge to action in regards to The High Performance Green Buildings Act of 2007, which you are sponsoring. You have my full support, as well as many within the Johnson Controls organization, as you work to get this important piece of legislature passed into law.

Most Sincerely,

Paul von Paumgartten

Paul von Paumgartten

ENVIRONMENTAL AND ENERGY STUDY INSTITUTE

April 18, 2007

The Honorable Frank Lautenberg
United States Senate
Washington, DC 20510

Dear Senator Lautenberg:

The Environmental and Energy Study Institute (EESI) strongly supports the High Performance Green Buildings Act of 2007 you have recently introduced to advance the development of green building facilities for both federal agencies and schools. This legislation will:

- increase U.S. competitiveness in the increasingly global green building market
- accelerate expansion of the green building market within the United States through widespread federal procurement, expanded research, and establishment of a green building information clearing house.
- increase U.S. energy savings and reduce greenhouse gas emissions significantly
- improve student and worker health productivity through better indoor air quality
- support the growth of domestic recycled and biobased products markets that can help reduce the country's reliance on imported oil and
- reduce the environmental impacts of the country's built environment

The General Services Administration (GSA) owns and operates more than 50,000 buildings with over 3 billion square feet, making it the largest landlord in the United States. With this amount of owned space, the GSA has the influence to ensure that federal buildings across the country are shining examples of smart building design. Through incentives laid out in this legislation, the federal government can lead the country by example in incorporating green building designs that save buildings money in operational costs. That is good government!

U.S. buildings account for 39 percent of the country's annual primary energy use and nearly 40 percent of total greenhouse gas emissions. Over the next 25 years, CO_2 emissions from buildings are projected to grow faster than any other sector. Provisions in your bill will enable the federal government to be at the forefront of efforts to reduce energy usage and greenhouse gas emissions, helping to save money and improve the environment.

Furthermore, green buildings improve indoor air quality; this too saves the federal government money due to reduced sickness and absenteeism among its workforce. The American Lung Association estimates that indoor air pollution costs businesses more than $100 billion a year due to death, sick days, direct medical costs, loss of productivity, and damage to materials and equipment. The United States Environmental Protection Agency projects that 3,500 to 6,500 premature deaths per year are the result of the effects of indoor air pollutants.

Due to the heightened susceptibility of children to airborne pollutants because of their less developed immune systems, EESI applauds your bill's provisions to provide school grant assistance as well as technical assistance in developing green building design. In fact, 20 percent of the U.S. population, nearly 55 million people, are in

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U.S. elementary and secondary schools, 110,000 of which were reported to have unsatisfactory air quality in the 1990's. Without grants like those outlined in your bill, most school districts would not be able to fund green building projects. EESI's previous work on this topic has found that schools need federal studies; need a clearinghouse to provide information; and they need grants to implement these projects and realize their far-reaching benefits.

EESI strongly supports the use of recycled and biobased products as components of the bill's green building design. Fabricated from renewable domestic crops, biobased products do not "off-gas" or emit airborne toxins like their petroleum-based counterparts which can aggravate respiratory systems and negatively affect health. Biobased products, along with improvements in ventilation, enhance indoor air quality and improve occupant health. They are also biodegradable and therefore not harmful to the environment. Furthermore, biobased products can be produced domestically, providing evermore economic opportunities to every state's agricultural sector.

Even as U.S federal agencies and schools face tightening budgets, many green building measures can be incorporated with minimal up-front costs while yielding enormous savings during a building's lifetime. Your bill's provision to establish an Office of High Performance Green Buildings would elevate attention to this issue and would play an essential role as provider/distributor of solid information so that agencies can pursue "greening" of buildings more easily, efficiently and economically. Learning from peers through good examples can lead to cost-effective replication in many other places.

Demonstration projects can engage undergraduate and graduate students – the leaders of tomorrow – who will learn first-hand about these innovations and take the experience with them in their careers. These projects also will incorporate smart siting and planning so that commuters can access them through many modes of transportation including mass transit, biking and walking. By incorporating these concerns, these projects not only address the energy consumed by the buildings themselves but the energy consumed in the transportation sector. And, this too can improve public health.

We commend your efforts to address the challenge of reducing energy costs, combating the threat of climate change and improving the health of millions of Americans nationwide through this comprehensive legislation and we look forward to working with you on its passage and implementation.

Sincerely

Carol Werner

Carol Werner
Executive Director
Environmental and Energy Study Institute

CHILD PROOFING OUR COMMUNITIES
Project of the Center for Health, Environment & Justice
P.O. Box 6806 * Falls Church, VA. * 22040 * 703-237-2249 ext 21 * childproofing@chej.org * www.childproofing.org

Senator Frank Lautenberg
The United States Senate
Hart Senate Office Building
Suite 324
Washington, DC 20510

April 19, 2007

Dear Senator Lautenberg,

The Child Proofing Our Communities Campaign, a coalition of over two hundred organizations working to protect children's health in the places they play, pray, live and grow, commends you for your leadership and tireless work to pass the High-Performance Buildings Act of 2007.

The Act is a tremendous step forward to protect the health of our most precious resources, our children and our environment. Of great concern to our campaign is the lack of federal guidance to assist school districts select, test, and remediate, if necessary, sites, so that they are safe and free of contamination. In a 2006 study, we discovered that 45 states in this country are essentially silent on site contamination as it relates to school construction. To fill this gap in public knowledge and understanding of how to safely address this issue, the Child Proofing campaign created model school siting guidelines, which have been used as guidance by the American Public Health Association (2005), the US Green Building Council LEED for Schools program (2007), and by communities nationwide. In 2002, our Executive Director, Lois Marie Gibbs, testified at a federal Senate Hearing on the state of school siting in this country, and called for the federal EPA to develop guidelines.

We applaud that the High-Performance Buildings Act of 2007 includes this important directive, which will go a very long way to prevent siting disasters such as the recent Kiddie Kollege debacle in New Jersey (in which a nursery school was sited on a mercury contaminated site), and so many others.

Additionally, as highlighted through the structure of this act, the implementation of a true comprehensive approach to designing and constructing healthy and high performance buildings will require dedicated staff and funding. In this day of high energy prices, increasing construction costs, and dwindling available land for public facilities, the High-Performance Buildings Act will serve as a catalyst for innovation within the industries of development, construction, affordable energy alternatives, and healthy building and maintenance materials. We hope that the pilot buildings will provide case studies, examples, and market drivers that will help influence schools to take the same path and embrace green building design.

As has been documented by organizations we work with, and in countless other programs across the country, energy efficient facilities save a tremendous amount of monetary resources, and increase the comfort and quality of the indoor environment. The intent to work with the Office of Management and Budget to restructure budgets to include full energy and environmental-cost accounting, and to reinvest cost savings from high-performance initiatives into future projects will create a true incentive to implement this program and reap the benefits.

The Green Building Advisory Committee will be a tremendous asset to glean lessons learned from best practices in this burgeoning industry, and the breadth and depth of leadership in the areas of children's health, worker health and safety, indoor air quality, toxics use reduction, alternatives assessments and building design will truly help make this Act reach its potential.

Once again, thank you for your leadership to make our schools and federal buildings places in which children can breathe easier, staff can be more productive, and that will contribute to a healthier population.

Sincerely,

Stacey Vaeth Gonzalez
Child Proofing Our Communities Coordinator
Center for Health, Environment and Justice

collaborative for high performance schools

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May 9, 2007

Senator Barbara Boxer
112 Hart Senate Office Building
Washington, D.C. 20510

RE: May 15, 2007 Hearing on "Green Buildings: Benefits to Health, the Environment, and the Bottom Line"

Dear Senator Boxer,

On behalf of the Collaborative for High Performance Schools (CHPS, Inc.) I am writing in support of your testimony on green school buildings for the U.S. Senate Committee of Environment an Public Works in May of 2007 and to provide some information about our organization that you may use in your testimony.

Founded in 2000, CHPS is a non-profit organization that works to improve the quality of California schools. CHPS is the nation's first high performance schools program. Our goal is to help create school learning environments that are healthy, comfortable, energy efficient, resource efficient, water efficient, safe, secure, adaptable, and easy to operate and maintain. High performance schools help school districts achieve higher student performance, retain quality teachers and staff, reduce operating cost, increase average daily attendance (ADA), and reduce liability, while at the same time reducing environmental impact and resource use.

The following are some details:

- CHPS offers a nationally recognized six volume Best Practices Manual on how to build, construct and operate high performance, green schools. See www.chps.net.
- In 2005, under Executive Order S-20-04 (EO) the Governors Green Action Plan and the State Architect recommended CHPS as the standard to assist school districts with the design and construction of green schools.
- In 2006, California voters passed Proposition 1D, a $10 billion package to improve school infrastructure, which included $100 million in incentive grants for high performance school construction. California has adopted the CHPS criteria as the standard for awarding these incentives.
- In 2006, in a letter sent to all 1054 school district superintendents from the California Secretary of Education, the Chair of the California Energy Commission and the State Architect, singled out CHPS as the recommended resource for schools pursuing high performance projects.
- Over 21 school districts in California have committed to building CHPS Schools for all future project including some of the largest (i.e. Los Angeles, San Diego, San Francisco, Palo Alto and Vacaville).
- Over 20 CHPS School projects have been completed and over 100 are underway.
- CHPS beyond California: CHPS has recognized regional and state adaptations in New York, Washington, Massachusetts, and other New England States, and much of the CHPS Criteria has been incorporated into LEED for Schools. In addition, USDOE licensed the CHPS material to develop a national Best Practices Manual.

Best regards,

Charles Eley, FAIA, PE
CHPS Executive Director

Statement of Stockton Williams
Senior Vice President/Managing Director
Enterprise Community Partners

On "Green Buildings: Benefits to Health, the Environment, and the Bottom Line"
For the Senate Environment and Public Works Committee
United States Senate
March 15, 2007

Introduction and Overview

Enterprise appreciates this opportunity to submit this statement for the record in connection with the above referenced hearing. Enterprise is a national nonprofit organization whose mission is to see that all low-income people have the opportunity for fit and affordable housing and the opportunity to move up and out of poverty into the mainstream of American life. Enterprise invests $1 billion a year to create affordable homes and economic development in low-income communities across the United States, working mostly with community-based organizations.

We commend Senator Lautenberg for introducing the "High Performance Green Buildings Act of 2007" (S.506). The bill constitutes a significant step forward for the federal government to support a higher quality, more environmentally sustainable built environment in this country. Enterprise has a deep stake in this issue.

Enterprise is the national leader in developing environmentally sustainable homes and communities for low-income families. We have committed $555 million to create 8,500 sustainable affordable homes through the Green Communities initiative, the largest effort of its kind in the country. More than 8,000 homes in 187 developments in 23 states are underway. Enterprise's ultimate goal is for "green" and "affordable" to be one and the same. We simply should not settle for anything less. As the body of our testimony describes, the potential benefits of green building can be especially profound for the residents of affordable homes.

Enterprise's financial resources and technical expertise enable affordable housing developers to incorporate energy efficient technologies, healthy building materials and environmentally smart site planning on a cost-effective basis. Enterprise and our community developer partners are proving that it is possible to create higher quality homes and communities for low-income families without compromising on affordability.

We recognize that this hearing and Senator Lautenberg's bill do not directly address affordable housing. Nonetheless we wanted to take this opportunity to provide a statement to the Committee about the importance of green building for low-income families and communities. We would look forward to working with the Committee on bills that would ensure that the benefits of green building are available to all the members of our society. The balance of our testimony summarizes the health, energy, economic and environmental benefits of green affordable housing and concludes with recommendations for federal policy to support more sustainable and affordable homes and communities.

Healthier Homes and Communities

A growing body of research shows how the built environment can have "profound, directly measurable" physical and mental health outcomes. "Studies have shown that negative aspects of the built environment tend to interact with and magnify health disparities, compounding already distressing conditions… particularly adding to the burden of illness among ethnic minority populations and low-income communities."[i] Low-income and minority communities are more likely to live in worse environmental conditions and experience greater rates of disease, limited access to health care and other health disparities.

Housing conditions have long been seen as important factors influencing health. According to David E. Jacobs, research director at the National Center for Healthy Housing and former director of the Department of Housing and Urban Development's Office of Healthy Homes and Lead Hazard Control:

> "The physical structure of housing, together with the social and psychological aspects of home and the surrounding neighborhood are related to many key determinants of health…Specific housing hazards include exposure to allergens that may cause or worsen asthma, lead-based paint hazards, mold and excess moisture, unintentional injury, pesticides, indoor air quality and others."[ii]

Green design and building practices can create healthier home environments through better indoor air quality and healthier building materials. Sustainable developers are still learning which practices have the most positive health outcomes. As Jacobs notes:

> "There is new evidence that housing interventions are indeed effective in reducing the onset and severity of asthma [and] there is similar evidence for other health outcomes…[although] considerably more research is needed to understand which interventions hold the greatest promise."[iii]

The bottom line, according to Rebecca Morley, executive director of the National Center for Healthy Housing:

> "It is clear that we can expect substantial health gains by building green. Instead of paying for medical care that could have been avoided, occupants in Green Communities will be able to keep more of their income and avoid the suffering and loss associated with poor health."[iv]

A growing number of affordable housing developers are adopting basic "healthy homes" practices to keep homes dry, clean, well ventilated and free of pests, combustion products and toxic materials.[v]

Smarter site planning and development that creates a sense of community, encourages walking and provides access to parks and mass transit is also healthier. Research suggests that people who live in sprawling areas walk less, weigh more and are more likely to suffer from high blood pressure.[vi]

Lower Energy and Water Costs

High utility costs often impose a substantial financial hardship on low-income households, forcing many to make tradeoffs between heat or electricity and other basic necessities.

A recent national study documented the brutal choices that poor families make when faced with unaffordable home energy bills. The study found that during the prior five years, due to their energy bills, 57 percent of non-elderly owners and 36 percent of non-elderly renters went without medical or dental care; 25 percent made a partial payment or missed a whole rent or mortgage payment; and 20 percent went without food for at least one day.[vii]

In addition, energy costs have increased much faster than incomes for low-income households in recent years. Today a family earning minimum wage pays more than four times as much a share of their income for energy as a median income household.

A report by New Ecology and the Tellus Institute found strong evidence of financial benefits of green affordable housing for low-income residents over time. "*For residents of affordable housing units, the life-cycle financial outcome is almost always positive*" (emphasis supplied).[viii] The same study found that:

> In virtually all the cases, energy and water utility costs are lower than their conventional counterparts. In many cases, decreased operating expenditures alone more than pay for the incremental initial investment in greening the project in present value terms.
>
> The use of more durable materials and equipment in several of the case study projects result in reduced replacement costs and provide additional life-cycle financial benefits. Moreover, the value of improved comfort and health for residents, as well as reduced environmental impacts, is substantial, although not captured quantitatively in our analyses."[ix]

Green buildings use a wide range of strategies for reducing energy and water use, including more efficient systems and appliances, smarter construction practices and site improvements to manage storm water more effectively.

Another indicator of *potential* energy savings in affordable housing is that the U.S. Department of Housing and Urban Development spends an estimated $4 billion a year on energy, more than 10 percent of its annual budget, through utility allowances in connection with rental assistance payments to low-income renters and indirect operating subsidies to public housing authorities. A savings of just 5 percent a year over five years could generate $1 billion to invest in affordable housing, including efforts to achieve greater energy reductions.

A Stronger Environment

Greenhouse gases from the burning of fossil fuels to generate electricity from coal and gas is the primary cause of global climate change. Carbon dioxide (CO2) is by far the most important greenhouse gas, accounting for more than 85 percent of total GHG emissions in America since 2002.

Buildings account for 38 percent of annual CO2 emissions, and more than half of that comes from residential buildings.[x] The construction and operation of multifamily residential developments, including affordable housing, generates significant CO2 emissions. More broadly, the manufacturing of conventional construction materials, transportation of supplies and materials to building sites and common construction waste disposal methods also cause CO2 emissions.

Buildings also account for 30 percent of both raw materials waste and landfill waste and 12 percent of potable water consumption. The residential building sector accounts for a substantial amount of it. New home construction alones generates nearly 7 million tons of construction waste every year.[xi]

Sustainable development of affordable housing can help reverse these trends in a number of ways: achieving greater energy efficiencies through better systems as well as use of renewable resources such a solar and geothermal; reusing and recycling construction materials; capturing and filtering stormwater; and incorporating natural landscaping and irrigation systems, to name just a few.

Green affordable homes and communities can also reduce the environmental impacts of excessive driving and traffic congestions by locating in areas with easy access to goods, services, recreation and mass transit.

These features can also deliver economic benefits to low-income families. Consider that transportation costs consume a large share of low-income family incomes. A study of 28 metropolitan areas found that families with incomes between $20,000 and $50,000 spend an average of 29 percent of their income on transportation and an average of 28 percent on housing.

More broadly, poorly planned development can isolate low-income people in distressed areas and make it harder to get to better schools and job opportunities.

Policy Recommendations

Enterprise is working with members of Congress to advance policies to help create healthier, more efficient and more environmentally sustainable homes for low-income people. We would look forward to working with the Committee on these and other proposals. Our recommendations in summary form include:

Ensure local communities plan for and support sustainable development.[xii] Require states and cities to identify and report on strategies for encouraging sustainable development through their Consolidated Plans and annual action plans to the U.S. Department of Housing and Urban Development, with specific benchmarks such as greater energy efficiency; increased conservation and reuse of resources; and more effective use of existing infrastructure.

Increase local capacity to develop sustainable projects in low-income communities.[xiii] Provide seed capital to enable affordable housing developers to plan and implement sustainable projects in the amount of $10 million annually over five years, subject to a dollar-for-dollar match from non-governmental sources by grant recipients.

Create an incentive for energy- and water-efficient construction and rehabilitation. Provide a one-year federal income tax credit to owners of affordable rental properties for eligible costs to achieve a specified, substantial level of energy efficiency in the property.

Ensure Fannie Mae and Freddie Mac support sustainable affordable housing. Amend current law to provide the companies bonus points towards their Affordable Housing Goals for purchase of mortgages on properties that meet a verified level of energy efficiency. Amend the pending Committee-passed legislation (H.R. 1427) to require states to give priority in awarding grants from the Affordable Housing Fund to projects that meet a verified level of energy efficiency as described above.

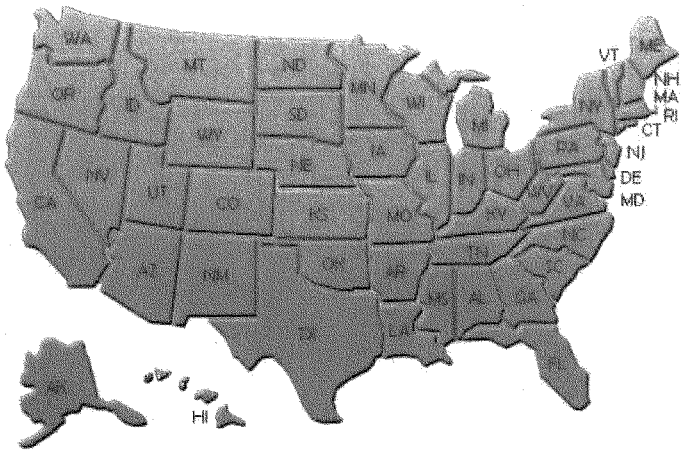
Establish sustainability as a priority in comprehensive community revitalization. Establish the Green Communities Criteria as a threshold requirement in HOPE VI reauthorization. Establish the Green Communities Criteria as a threshold requirement in any reallocation of previously appropriated HOPE VI funds.

Coordinate and integrate federal support for sustainable affordable housing. Create an Interagency Council on Sustainable Development, to include representation of the appropriate federal agencies – including Department of Energy, the Environmental Protection Agency and HUD.

[i] Ernie Hood, "Dwelling Disparities: How Poor Housing Leads to Poor Health" *Environmental Health Perspectives*, May 2005.
[ii] Jacobs, D.E., "Housing and Health: Challenges and Opportunities," Keynote Address, Proceedings of the 2nd WHO International Housing and Health Symposium, WHO European Centre for Environment and Health (Bonn Office), Noise and Housing Unit, Bonn Germany, September 29 - October 1, 2004, (Vilnius Lithuania, October 20, 2005), 25.
[iii] Ibid, 41.
[iv] Statement of Rebecca Morley, MSPP Executive Director, National Center for Healthy Housing Before the Environmental Public Works Committee United States Senate May 15, 2006
[v] See Ellen Tohn, ERT Associates, *Building Guidance for Healthy Homes*, (Dorchester, MA: Asthma Regional Council of New England, Revised 2006).
[vi] See Barbara McCann and Reid Ewing, *Measuring the Health Effects of Sprawl: A National Analysis of Physical Activity, Obesity and Chronic Disease*, (Washington, D.C.: Smart Growth American and Surface Transportation Policy Project), 2003.
[vii] National Energy Assistance Directors' Association, *2005 National Energy Assistance Survey*, (Washington, DC: National Energy Assistance Directors' Association, 2005), pp. i-iv.
[viii] William Bradshaw et. al., *The Costs and Benefits of Green Affordable Housing*, (Cambridge, MA: New Ecology, 2005), 10.
[ix] Bradshaw, et., al., Ibid.
[x] www.architecture2030.org
[xi] Wilson, Your Green Home (Gabriola Island, British Columbia: Canada, New Society Publishers), 5.
[xii] Incorporated into the "High-Performance Building Act of 2007" (H.R. 1259), introduced in the House by Representatives Smith (D-WA), Lewis (D-GA), Blumenauer (D-OR) and Gilchrest (R-MD).
[xiii] Incorporated into the "High-Performance Building Act of 2007" (H.R. 1259), introduced in the House by Representatives Smith (D-WA), Lewis (D-GA), Blumenauer (D-OR) and Gilchrest (R-MD).

Lessons Learned

A National Report



32,000,000 children: victims of a public health crisis

LESSONS LEARNED

Preface

Lessons Learned is a collaboratively prepared national report revealing the widespread human health, family, and community impacts of school facilities that are poorly designed, constructed, operated, or maintained. Coordinated by Healthy Schools Network, Inc., the report represents the cumulative work of extraordinarily persistent and talented individuals and energetic organizations dedicated to ensuring that all children and personnel have environmentally healthy schools, and if not, then access to preventive public health services.

Lessons Learned is designed to be read with **WHO's IN CHARGE**, a new research report from Healthy Schools Network, Inc. documenting the surprising lack of public health agency oversight, interventions, and research to prevent harm to children who are at risk due to environmental hazards common to schools-- such as chemical spills, unchecked renovations, pesticide misapplications, leaded drinking water, and indoor air pollutants such as mold infestations. Readers will note that in some states, health departments are increasingly involved.

Healthy Schools Network, Inc. is a national 501c3 not for profit environmental health organization dedicated to ensuring every child and school employee an environmentally safe and healthy school. With its founding a decade ago, it put a top priority on preventing harm to children with policies, legislation, and funds to address facility problems. It has also assisted countless other not for profits, as well as fielding daily requests from parents, personnel, schools, and agencies on school environments.

Readers seeking assistance: for help with a school issue, or to get involved in your area, call or visit the websites of the Contributors, or see additional information in the Appendix to this report.

Disclaimer: *Individual, local, and state Contributors are responsible for the accuracy of their individual "voices" or first-hand reports and have reviewed the text in advance of publication. The state data tables were developed from national sources and may not be the most current data available within each state.*

April 2006

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Contributed by Healthy Kids: The Key to Basics, www.healthy-kids.info and referencing *Schools of Ground Zero: Early Lessons Learned in Children's Environmental Health (2002, Healthy Schools Network and American Public Health Association)*, a documentary account of the evacuations and clean-ups of public schools in lower Manhattan after September 11th: no federal, state, or city agency assisted parents.

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Healthy Schools Network, Inc. also thanks SUNY Albany (NY) School of Public Health MPH Graduate Student Intern Zoe' B. Gibson for her diligence and hard work to assemble this report. The report's development was coordinated by Claire L. Barnett, Executive Director.

LESSONS LEARNED

32,000,000 American children at high risk of health and learning impairments.

There is simply no public health system in place to prevent harm to children from the very same exposures that many adult employees of schools have some protection from. Yet, this report is not a call for a 'kid-sized OSHA' or a demand to fix schools. It is a strong reminder that our children are without any system of preventive environmental public health services that address children's specific situations and vulnerabilities.

Lessons Learned shows the impact. 32,000,000 children at high risk every day just by attending schools that have self-reported facility environmental problems that can affect health and learning. Hazards common to schools include indoor air pollution including mold infestations, airborne fiberglass particles, lead and copper contaminated drinking water, pesticided playgrounds and classrooms, unchecked furnaces and buses leaking carbon monoxide, chemical spills, uncontrolled renovations filling occupied buildings with fumes, demolition dust, and exhaust from gasoline-powered equipment, or emissions from hazardous facilities next door. As a nation, we must ask why are our prisons are in better shape than our schools (American Society of Civil Engineers).

This report reveals the heartbreaking personal impacts and the pernicious effects of having no agency in charge of preventing harm to children. Story after story shows that no matter where you live, public health agencies-- and more importantly we as parents, grandparents, aunts and uncles, and all who care about children-- have long ignored our collective obligation to protect those who cannot protect themselves.

As the accompanying **WHO'S IN CHARGE** research report reveals, federal and state public health agencies understand that children are more vulnerable to environmental hazards than adults—for example, children breathe more air per pound of body weight. It also shows that the education and environment agencies are aware of compelling evidence that environmental conditions of schools influence test scores, attendance and possibly even suspension rates.

Thus the lack of any system to respond to children's environmental health needs and the lack of focused interagency strategies harm children, overwhelm parents, teachers, school administrators, and board members, and disadvantages both public and private educational systems. All are without the benefits of consistent expertise, independent oversight, and interventions. No one is accountable for schools as children's 'worksites'. As a result, children are the victims.

"Each day over 53 million school children and 6 million adults - 20 % of the entire U.S. population - enter our nation's 120,000 school buildings to teach and learn. Unfortunately, in too many cases, they enter "unhealthy" school buildings," that undermine learning and health. Many school facilities have been poorly maintained and thousands of our nation's schools remain severely overcrowded, even schools piloting "small school" policy initiatives. Schools are often sited next to industrial plants or on abandoned landfills; new schools are

built beyond safe walking or biking distance for students. In a recent five-state survey, more than 1,100 public schools were built with in a half-mile of a toxic waste site. Polluted indoor air, toxic chemical and pesticide use, growing molds, airborne fiber glass, lead in paint and drinking water, and asbestos are also factors that impact the health of our nation's students and school staff. These problems contribute to absenteeism, student medication use, learning difficulties, sick building syndrome, staff turnover, and greater liability for school districts.

.... Clear and convincing research shows that simple steps to improve school indoor environmental quality, siting, and design, to use non-toxic products for cleaning, maintenance and instruction, to provide more natural daylight, and to create energy efficient, neighborhood schools with adequate, safe space for outdoor activities, will all contribute to promoting the health and learning of our children, to improving public education, and to creating healthier communities.... " *(Coalition for Healthier Schools Position Statement, supported by over 380 individuals and organizations nationwide.)*

Children's disorders associated with environmental risks appear to be increasing yearly. Autism is one such condition: current estimates are that one child out of 166 in the US is autistic. In 2005 there were 166,302 students in the US diagnosed with autism, an increase of 25,382 from the previous year. This is significant because it has tremendous implications for susceptibility to environmental stressors. Asthma is another condition that is plaguing children. Indoor air problems in schools could be a major contributor to the peak in asthma hospitalizations at the start of the school year, as well as exacerbating existing cases.

In December 2004 the ***Journal of School Health*** published "Science Based Recommendations to Prevent or Reduce Exposures...in Schools" that summarized a decade of peer-reviewed literature of how school environments impact children. In the same year, the US Department of Education published its **National Priority Study** pursuant to No Child Left Behind law (*Section 5414*) that reviewed a similar set of scientific findings. It found strong evidence that school environments adversely impact children.

Congress has yet to call for the Education Department's study or to ask what the department or any other federal agency recommends as next steps. While federal and state interagency coordinating bodies are needed to ensure effective policies and actions, the ability to truly address children's will require new health actions and executive, legislative, and judicial leadership.

Children at High Risk for Health and Learning Impacts. State data tables in this report showing the estimated numbers of children at high risk should be carefully considered. The federal Department of Education collects information from the states on the number of school facilities, students, students in special education, and personnel. The percents of school facilities that are inadequate and that have deficient environmental factors are taken from American Society of Civil Engineer's *Infrastructure Report Care 2005*, in turn taken from 1996 and 1999 self-reported information from schools-- remarkably, the only such data available.

Using this data and the experiences of its regional staff, the US Environmental Protection Agency currently estimates that about half of all schools have indoor air

pollution, a top human health hazard. Indoor air can be five to 100 times more polluted than outdoor air. To estimate a number of children at high risk of health and learning impairments, Healthy Schools Network (HSN) took the average of 1) the percent of schools reporting at least one unsatisfactory environmental condition in each state and 2) the percent of schools reporting at least one inadequate building feature in each state, then multiplied the average percent by the state's total enrollment. HSN did not do additional calculations for children with existing impairments, such as asthma or developmental disabilities, who may at even higher risk. Facility factors such as poor indoor air, inadequate heat, light, plumbing, and ventilation, and poor acoustical controls can impact health and learning.

Since the facility detail was self-reported by schools, it is important for readers to understand that in states that provide state financing or have bond acts pending, it is in the interest of districts to show need. It may not be in the interest of districts to report problems absent a source of capital funds. Meanwhile, the studies of America's school facilities have not considered mold or pest infestations, lead in drinking water at the tap, nearby hazardous facilities, failed kitchen inspections, pesticide use, the presence of an indoor shooting ranges, or if the schools had a chemical management plan. US EPA pilot studies in Maine and Minnesota showed that school buildings contained an average of four to seven pounds of elemental mercury. CDC found elevated blood lead levels in teenagers on school rifle teams.

LESSONS LEARNED

Schools should be designed, built, operated and maintained to be healthy facilities, inside and out. Federal and state programs in each of these areas are expanding and-- given the vulnerabilities of children and the national desire to improve school achievement-- should be implemented even faster. In the absence of appropriate local actions, children need local advocates and need preventive public health programs.

In 1996, the US GAO estimated that over 13 million children were in schools that daily eroded their health. Today, we put the number at 32,000,000 at risk of health and learning impairments.

- Federal and state executive leadership is urgently needed to coordinate, build, and define an effective and efficient array of federal and state agency efforts to address children's environmental health and to speed up the improvement of school environments.
- Federal and state initiatives should pilot environmental public health clinical and support services that are empowered to intervene to prevent harm to children and provide support services for parents.
- Federal agencies should develop a research agenda on environmental health at school and on school indoor environmental quality.

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Alabama

Lessons learned

-Be aware of your child's school environment
-Be relentless
-Remember that change takes time-anything that is worth changing, is worth waiting for

The voice

"When do we actually take the time to look around and see what they live in for seven hours a day?"

I became involved with the school environmental issues last year when my oldest child entered fourth grade. My straight A student started failing. She struggled with ear infections, headaches and sinus infections. I took a long look around her classroom and was horrified. There was mold growing everywhere, dirt covering the vents, and sewer gas coming from the bathroom- enough to make anyone sick. We drop our kids off and pick them up at the front door; when do we actually take the time to look around and see what they have to live in for seven hours a day?

I have preached from my soapbox to anyone that would listen. I've been laughed at, dismissed and told that cleaning dust off the ceiling pipes "looks like a job for the PTO moms", but I eventually got through to the right person. After a year and a half, I'm finally seeing something happen. The pipes and vents are being cleaned and an inspection has been scheduled. Regarding any effort to remove the carpet-I won't hold my breath, however, I would recommend that approach for anyone entering the restroom.

Alabama PTO Parent

No. School Buildings	1,526
No. Students	731,220
No. Minority Students	293,015
No. Students in Special Education Program	122,698
No. Employees in School System	90,098
% Children with asthma (under 18)	9.6%
%Schools with at least one inadequate building feature	59%
%Schools with at least one unsatisfactory building condition	63%
No. Students At High Risk Daily*	446,044
State Education School Facilities Office	Y
State OSHA Plan	N/A
State Grants for Construction	Y

See Appendix for sources of data in state by state tables.

Alaska

Lessons learned

- Physicians should always consider school environmental exposures, and prompt parents to find out more.
- Federal health data show school rifle team members can have elevated blood lead levels. Ask if your school has or used to have a shooting range. Get the dust tested and cleaned up.

The voice

"When the schools are good, they are very, very good, and when they are bad they are horrid."

In 2002 at least 148 Alaska schools were identified as needing major repairs. Over 40 schools in Alaska have contamination on school grounds that is significant enough to limit school activities.

In 2001, over 81 Alaska schools, out of 131 that have their own drinking water systems, violated state drinking water requirements. The 81 schools received a total of 896 violations of which 74 were health based, meaning either bacteria or a contaminant was found in the water at unsafe levels. The remaining 822 violations were due to lack of monitoring, meaning the schools did not have their water tested as frequently as needed to determine its safety.

While there is very little information about indoor air quality in Alaska's schools, it is important to pay attention because of the large amount of time spent indoors, overcrowding, the airtight construction common in cold climates, and deferred maintenance.

Concerned Pediatrician

No. School Buildings	**521**
No. Students	**133,933**
No. Minority Students	**55,052**
No. Students in Special Education Program	**17,851**
No. Employees in School System	**16,388**
%Children with asthma (under 18)	**8.3%**
% Schools with at least one inadequate building feature	**69%**
% Schools with at least one unsatisfactory environmental factor	**80%**
No. Students At High Risk Daily*	**99,780**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Arizona

The voice

Mold Attacks!

He may have been the healthiest health nut in Gilbert. The former collegiate runner coached Gilbert's junior high and high school cross-country teams by running out ahead of his athletes, playing rabbit to make his greyhounds stronger. In 1987, a new Gilbert High School was built. That year, Corn and the other junior-high teachers moved into the old high school, a collection of 24-year-old buildings just south of Gilbert's downtown. And all of a sudden, the 40-year-old superhuman needed a doctor.

He began having sinus infections and high blood pressure. He began getting fungus growths on his body. Through the 1990s, he was visiting the doctor almost monthly -- sinus infection, fungal growth, fatigue, pneumonia, eye ulcers, cysts. In 2000, he was diagnosed with testicular cancer, and 13 lymph nodes were removed. Several months later, new cancer was found, which led to more chemotherapy. Again, he beat the cancer. Corn kept returning to work, kept coaching. But by 2003, he was barely making it through the school day. When he wasn't at school, he was usually asleep. In August 2003, Corn returned to school after the summer break. What he found in his office, he says, explained everything: **It was the building that was killing him**. When he arrived, men in hazard suits were tearing out parts of the gymnasium's ceilings and walls. Most of the gym was cordoned off and locked up, but teachers and students could still walk through the girls' and boys' locker rooms. The gym was full of mold and asbestos. It had been that way for years and the wall against which Corn's desk sat for 17 years was one of the worst spots. What Corn discovered from speaking with other employees, and a *New Times* investigation seems to confirm, is that Mesquite Junior High had been a breeding ground for black mold since at least the early 1990s. For years, though, school officials essentially told maintenance crews to just paint over the problem, not fix it. And school officials spent that time ignoring staff concerns that the buildings might be toxic.

The health effects of their actions on students and teachers can never be fully known. Corn now has no medical insurance and no job. He recently sold his home to free up money for living and medical costs.

From: Phoenix News Times, by Robert Nelson, Oct 13, 2005

Lesson Learned

-Prevention First

-Solve problems before they overwhelm occupants

No. School Buildings	2,031
No. Students	1,012,068
No. Minority Students	492,106
No. Students in Special Education Program	109,477
No. Employees in School System	95,885
%Children with asthma (under 18)	8.6%
% Schools with at least one inadequate building feature	64%
% Schools with at least one unsatisfactory environmental factor	69%
No. Students At High Risk Daily*	673,025
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

Arkansas

Lessons learned

-Those wishing to have the wonderful benefits of a new school must insist on getting them.

- Bait and Switch is a commonly used tactic, and many are not afraid to use it if they think the customer can be duped.

- In selecting a school architect or builder, check references.

The Event

Bait and Switch-What Happened at Hector

The two new, concrete school buildings at Hector, Arkansas are concrete domes built on top of concrete walls. They are **not** Monolithic™ Domes. Consequently, they will not have the energy efficiency of Monolithic Domes, which is what the Hector School District thought they bought. Monolithic is a trademark for a specific, concrete/urethane composite shell with energy efficiencies that are far greater than what Hector purchased.

Bait and Switch is a tactic where you offer to sell an excellent product at a very good price. But then when the customer agrees to buy it, you say, "Oh, we are out of that," or "It was on sale for only one day," or "ta-da ta-da ta-da. But, do have this; it's just as good or better, etc." This can be done with schools as well as pots and pans. What bothers me the most about the Hector situation is that the chosen architect never allowed us to help him. He either did not believe what we did tell him or he chose to ignore it. The dome they have under construction is to be coated with a ceramic coating. It is good stuff for reflecting sunshine, but none of the manufacturers I have dealt with consider it a total replacement for thermal insulation. And if Hector insulates above the classrooms and below the domes, that will be like attic insulation in a conventional home. Done this way, the "thermal battery" effect of the dome is totally ignored and its benefit is lost.

From: Dome News, by David South, July 20, 2001

No. School Buildings	**1,150**
No. Students	**454,523**
No. Minority Students	**136,647**
No. Students in Special Education Program	**57,793**
No. Employees in School System	**62,465**
%Children with asthma (under 18)	**8.2%**
% Schools with at least one inadequate building feature	**42%**
% Schools with at least one unsatisfactory environmental factor	**62%**
No. Students At High Risk Daily*	**236,352**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

California

Lessons learned

-There are no laws to protect children

-Keep decision makers informed of possible health hazards

-Schools are required by federal law to provide a free appropriate education to all students, especially those who are health-impaired

-Los Angeles' children will benefit from the new green schools currently being built by LAUSD. These schools have superior acoustics, good ventilation, daylight, and use low-emitting materials.

-California, the creator of CHPS, is on the cutting edge for green school programs nationally with dozens of districts involved.

The voices

"There are no laws to protect children from bad decisions made by local administrators"

A California lawyer and a parent of a new kindergartener was stunned to find her district superintendent had decided to move the diesel bus parking lot to within six feet of her child's portable classroom-this is at the district's "choice" school.

When her urgent and finally public appeals went unheeded, she went online with her fellow law school graduates only to learn that there are no laws to protect children from bad decisions made by local administrators.

California Parent & Lawyer

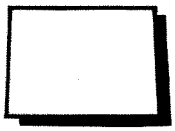
"He has been diagnosed with Sick Building Syndrome"

My son was in a classroom where he had three back to back episodes of strep, chronic fatigue, daily migraines and bloody noses, itchy skin, and red eyes. I kept him home schooled until I could figure out an appropriate accommodation with a doctor's note stating his reactions. The school counted him as unexcused and said they didn't know why I was keeping him home. The teacher would not give him any work from his class to work on. The counselor said it wasn't the teacher's responsibility to give him any work. He has been diagnosed with Sick Building Syndrome and has serious health compromises. His chemical intolerance keeps him isolated at home most of the time. I am afraid his future has been sabotaged by lack of building maintenance

Another California Parent

No. School Buildings	9,237
No. Students	6,413,862
No. Minority Students	4,166,409
No. Students in Special Education Program	680,831
No. Employees in School System	557,143
% Children with asthma (under 18)	7.4%
% Schools with at least one inadequate building feature	71%
% Schools with at least one unsatisfactory environmental factor	87%
No. Students At High Risk Daily*	5,066,951
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

Colorado



Lessons learned

-Parents should approach their school administrators with plenty of well researched, fact based information

-Parents should make every effort to minimize any emotional component and show a willingness to work together for the best possible solution

The voice

"A technician walked every area of the school with the monitor"

My children's school planned to paint and re-carpet. Over the summer the upgrades were completed. The school used low volatile organic compound (VOC) paint, ventilated extensively and purchased new HEPA filter vacuum cleaners.

After expressing my concerns about VOC outgassing and the effects on children's health to the principal, she suggested that I present the information to the school board. Several EPA studies and research by various pediatricians were presented to the school board. The school board voted to form a committee to investigate the problem and the committee decided to have the air quality tested.

Our local fire department offered their VOC monitor to test the school at no charge. A technician walked every area of the school with the monitor. He found virtually no VOC's and good overall air quality. In explaining his results, the technician cited ventilation and low VOC paint as beneficial for reducing VOC's.

The leaky windows in our old school building allow for continuous ventilation even during winter months-when they are closed- further reducing the presence of VOC's. The committee agreed the issue had been addressed and considered it resolved

Colorado Parent

No. School Buildings	1,672
No. Students	757,693
No. Minority Students	268,351
No. Students in Special Education Program	75,618
No. Employees in School System	89,529
%Children with asthma (under 18)	7.7%
% Schools with at least one inadequate building feature	58%
% Schools with at least one unsatisfactory environmental factor	63%
No. Students At High Risk Daily*	458,404
State Education School Facilities Office	N
State OSHA Plan	N
State Grants for Construction	Y

Connecticut

Lessons learned

Schools that effectively implement an ongoing indoor air quality (IAQ) program like EPA's *IAQ Tools for Schools* benefit from:
-Decreases in rates of absenteeism, use of inhalers, asthma episodes and overall health complaints
-Increases in student and staff comfort and productivity

Schools that do not have an IAQ program are more likely to:
-Defer maintenance and spend more money later on remediation or rebuilding
-Cause long and short term health problems for students and staff

The voice

For years the number one complaint received by the CT Department of Public Health (DPH) was from parents and employees concerned about poor air quality in schools. Building problems usually involved moisture incursions, mold contamination and a lack of ventilation. Among the health problems reported were headaches, fatigue, itchy eyes and asthma attacks. In 1999 the CT School Indoor Environment Team (CSIERT) was formed by the CT DPH as well as a consortium of groups including the American Lung Association of CT and the CT Education Association. Even before CT law mandated in 2003 that schools adopt and implement an indoor air quality program, the "Resource Team" was providing free training to assist school systems in the effective implementation of the EPA's Tools for Schools program. School systems such as Hamden, Chester, Hartford, North Haven and Waterford have been able to demonstrate measurable improvements in indoor air quality by using Tools for Schools. These improvements have included a significant reduction in absenteeism and a marked decrease in the use of student inhalers and in the number of asthma incidents. Every school in the country should adopt a high quality indoor environment program that includes a written IEQ management plan developed, implemented and evaluated by a trained IEQ coordinator and school-based team.

Former Teacher and IEQ Activist

No. School Buildings	**1,250***
No. Students	**577,203**
No. Minority Students	**182,036**
No. Students in Special Education Program	**69,829**
No. Employees in School System	**80,352**
% Children with asthma (under 18)	**8.6%**
% Schools with at least one inadequate building feature	**58%**
% Schools with at least one unsatisfactory environmental factor	**68%**
No. Students At High Risk Daily*	**363,638**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

*ConnFESS reports 1,026 public schools

Delaware

Lessons learned

-Districts need reliable support for necessary construction and repairs

-Construction costs are not flat, and the delays in funding approvals by the state or by local entities can impact the construction timeline and thus the bid and actual costs

-Be wary of 'change orders' which may undercut desired health and environmental benefits

The Event

Plan Would Allow Temporary Tax Hikes for Del. School Construction

Dover, Del- A plan submitted to a state legislative committee would allow some school districts to temporarily raise taxes without voter approval when costs rise for major construction projects.

The cost overruns are being driven by recent price hikes for construction materials. The state routinely covers two-thirds of the additional cost, but at least six local districts do not have enough to cover the other third.

Under the plan submitted Tuesday by a state budget director, Jennifer Davis, the districts could raise taxes for the higher costs without voter approval. In some cases, supporters say it would cost the district more to hold a referendum than they would earn from the tax hike.

From: Delmarva's News Leader 3/29/2006

No. School Buildings	205
No. Students	177,668
No. Minority Students	Not available
No. Students in Special Education Program	17,171
No. Employees in School System	14,586
%Children with asthma (under 18)	11.9%
% Schools with at least one inadequate building feature	70%
% Schools with at least one unsatisfactory environmental factor	65%
No. Students At High Risk Daily*	119,923
State Education School Facilities Office	Y
State OSHA Plan	N
State Grants for Construction	Y

District of Columbia

Lessons learned

-Older schools located in low income neighborhoods need recognition and repair in order to preserve environmental quality-In 1998, the Corps of Engineers surveyed the DC Public Schools and from a list of 105 elementary schools, they chose Cooke the Worst Elementary School Facility in the city – a considerable distinction, given the overall poor condition of the entire system

-Get involved and stay involved, in as many ways as you can – don't complain, but help

-Poorest children have the schools in the worst condition

The voice

"This went beyond unpleasant or unhealthy – it was dangerous."

Our neighborhood polling place for as long as I can remember was HD Cooke Elementary School in Washington, DC. We'd go there every two years to vote, but I never really looked around and imagined what it would be like to be a student or teacher -I grew up in neighboring Montgomery County MD, went to a brand-new high school where you could eat off the floor. HD Cooke, on the other hand, was built in 1908 and had received very little maintenance since – the custodian had to nail the disintegrating windows shut so they wouldn't fall into the classroom.

In 1998, a neighbor who worked for Stand For Children persuaded me to take a quick 'photo tour' of the school with the Facility Manager – one of the first stops was the perpetually flooded Boiler Room, The Building Engineer showed us how he had to hit the Boiler Gas Valve with an iron pipe to start the boilers in the morning; this was on a 5" high pressure gas line that would have annihilated the kids upstairs if the valve were ruptured and the gas ignited. I realized that this went beyond unpleasant or unhealthy – it was dangerous.

I didn't really know what to do; my neighbor's roommate took my 4x6" prints to a City Council hearing that happened to be covered by Fox News. The next day, a reporter was standing with the Facilities Director in front of the school, in a week, an 18-month-old repair order was processed and the valve was replaced.

That got me thinking about how the kids on the block- why they chose to work for the local drug dealers and turned to crime instead of going to school. This is why good schools are a priority, not just for parents, but for society.

DC Children's Advocate

No. School Buildings	**207**
No. Students	**78,057**
No. Minority Students	**Not available**
No. Students in Special Education Program	**13,263**
No. Employees in School System	**10,184**
% Children with asthma (under 18)	**11.8%**
% Schools with at least one inadequate building feature	**91%**
% Schools with at least one unsatisfactory environmental factor	**73%**
No. Students At High Risk Daily*	**64,007**
State Education School Facilities Office	**Y**
Public Employee OSHA Plan	**N**
State Grants for Construction	**Y**

***DC Smart Schools reports updated data: No. School Buildings= 147 plus charters (67); No. of students= 59,616 plus charters (17,398); adjusted No. students at high risk daily= 63,151**

Florida

The voices

"All I did was send my little girl to a public school"

In the third grade they are still so small. She got sick right away! At open house I knew the portable classroom Megan was assigned to should have been condemned! I spoke with the Principal and tried to get her moved. I even went on record proclaiming, "I'm a parent with a portable child", at every SAC meeting. She began to have eye infections, rashes, headaches, stomach pain, throat pain and a persistent cough! I went on television and wrote to everyone you could think of from the school board to the (federal) CDC. Other parents and teachers called me with horror stories. Our schools are falling apart, water damage from hurricanes breed molds!

The good ole' boys in Tallahassee should spend a week in the substandard, toxic school conditions, then maybe then they'd claim some accountability and stop failing our kids.

Lessons:

-Policy makers should visit schools regularly
-Organize- the more people advocating, the better
-Get everything in writing- verbal is no good, keep copies
-Go outside of the school to report- File written reports
- Use the internet- research group help

Florida Portable Parent

"Who wants their children to be exposed to more indoor environmental pollutants?"

Every child deserves to learn in a healthful and safe indoor school environment. Yet they are being unnecessarily exposed to toxic chemicals in cleaning products, paints, pesticides and mold on a daily basis with minimal oversight from outside agencies. How can a child learn if he/she is sick?

The health effects of many indoor pollutants are known, and others will not be known until too late. The trends are clear: 150% rise in asthma in the past decade, increased cancers, and environmental pollutants are known contributors.

Who wants or needs their children to be exposed to more indoor environmental pollutants?

Lessons:

- Preventing problems is easier than fixing them
- Organize, organize, organize

Energized Parent Advocating Statewide

See next page for FL data

Florida

No. School Buildings	**3,529**
No. Students	**2,587,628**
No. Minority Students	**1,260,936**
No. Students in Special Education Program	**400,719**
No. Employees in School System	**270,746**
% Children with asthma (under 18)	**9.5%**
% Schools with at least one inadequate building feature	**57%**
% Schools with at least one unsatisfactory environmental factor	**80%**
No. Students At High Risk Daily*	**1,772,525**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

Georgia

The voice

Al Boudreau, Facilities Director for Glynn County Schools, did a nearly super human feat over this last summer and has not received the credit or recognition he deserves. The Board of Education learned in April 2005 that Goodyear Elementary school soils were contaminated-enough to be included on Georgia's list of Hazardous Sites. Starting from scratch in May 2005, Al Boudreau contracted services and started to test the schoolyard to get a handle on the extent of the toxic soil problem.

Initial estimates were a few hundred cubic yards of soil. Once areas that would need removal were identified, they were removed and retested to see if cleanup goals had been reached. When clean up levels were not met, more was removed until goals were achieved. The few hundred cubic yards ballooned to 3500 as toxic soils were discovered much deeper than expected.

May, June, and July rushed by as the August 10th school- reopening date approached. The final soil removal took place late July, excavations filled with clean soil, and landscaping completed. While Al Boudreau put the final touches on the schoolyard, a report was prepared for the GA Environmental Protection Division.

Just to put what Al Boudreau did into perspective, the Hercules Plant was not able to determine the extent of the soil contamination after investigating for 18 years, and even less progress has been made on cleaning up their mess. Since Al Boudreau's acts, we have learned that the likely source of the contaminated soil was from the LPC Chemicals Superfund Site. Al has shown what a competent and determined person can do when they put their mind to getting the job done.

Hats off to Al Boudreau for a job well done.

GA Environmental Advocate

Lessons Learned

-Superfund sites must be thoroughly investigated because the toxic chemicals CAN draft, seep, or get put onto schoolyards.

No. School Buildings	**2,458**
No. Students	**1,552,611**
No. Minority Students	**729,218**
No. Students in Special Education Program	**186,342**
No. Employees in School System	**200,519**
%Children with asthma (under 18)	**9.6%**
% Schools with at least one inadequate building feature	**37%**
% Schools with at least one unsatisfactory environmental factor	**48%**
No. Students At High Risk Daily*	**647,109**
State Education School Facilities Office	**Y**
State OSHA Plan	**N/A**
State Grants for Construction	**Y**

Hawaii

Lessons learned

- People in Hawaii are largely unaware of environmental concerns, period, let alone children's environmental health and school grounds without chemicals.

- People of a minority race are sometimes less inclined to complain to government, even if it has to do with their family's health and well being.

- I have learned how terribly unjust our government has been to The Hawaiian people and I truly believe a form of cultural genocide is occurring here.

Hawaiian Parent

The voice

"They are our future-they deserve a clean, peaceful and safe environment"

In 2000, my son developed exacerbated asthma, migraines, nausea and fibromyalgia. At the pediatrician, I met a neighbor whose son was similarly affected; he showed me websites regarding Toxic Air Pollution. It seemed our neighborhood was completely surrounded by facilities emitting unmonitored amounts of chemicals-unmonitored because these were "small" facilities. Our elementary school, two preschools and a Language Immersion School, sit in the center of our neighborhood. The elementary school has had poor test scores for 25 years (the airport was enlarged in this time period) and the principal was recently removed for his lackadaisical attention to the matters at hand.

As a community we are trying to best help our "Keiki" realizing that they are our future-they deserve a clean, peaceful and safe environment. A casual health survey of the neighborhood showed just cause for investigation; an asphalt plant as well as an illegal fuel depot was recently closed.

This is a Hawaiian Homestead: the situation is called 'Environmental Justice' and we don't feel protected at all.

Hawaiian Parent

No. School Buildings	**284**
No. Students	**183,609**
No. Minority Students	**146,540**
No. Students in Special Education Program	**22,533**
No. Employees in School System	**21,061**
% Children with asthma (under 18)	**11.8%**
% Schools with at least one inadequate building feature	**57%**
% Schools with at least one unsatisfactory environmental factor	**78%**
No. Students At High Risk Daily*	**123,936**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Idaho

Lessons Learned

- Idaho taxpayers and schools have an opportunity to invest in healthy and high performance school design, to increase indoor air quality, energy efficiency, and test scores.

The Event

School Facilities Bill Passes the House

A construction bill that passed the House on Wednesday won't increase the state's portion of the proposed Twins Falls School District bond, but it will provide additional funds for school buildings in all districts.

The School Facilities Improvement Act is the legislators answer to an Idaho Supreme Court ruling forcing the state to revise the way it funds the building of schools. Under the bill, the state will come up with about $5.6 million in 2007 to go toward maintaining school facilities. The Legislature will set aside $25 million that could be used in loans to school districts. The House voted 52-14 to send the bill to the Senate.

From: Times-News, Michelle Dunlop, 2006

No. School Buildings	691
No. Students	252,120
No. Minority Students	40,160
No. Students in Special Education Program	28,841
No. Employees in School System	25,137
%Children with asthma (under 18)	5.7%
% Schools with at least one inadequate building feature	56%
% Schools with at least one unsatisfactory environmental factor	64%
No. Students At High Risk Daily*	151,272
State Education School Facilities Office	N
State OSHA Plan	N/A
State Grants for Construction	Y

Illinois

Lessons learned

-Some schools will take action, but they have to be informed

-IAQ committees within schools can be very beneficial and effective in addressing health concerns of building occupants

-People must come forward and talk about what they are experiencing

The voice

"Many people are afraid to speak up because they don't want to be seen as complainers."

As a science teacher I am not someone to allow a problem to go unaddressed. My training as a microbiologist taught me that just because you couldn't see something, didn't mean it wasn't there.

In the case of my classroom at Naperville Central High School, that something consisted of contaminants that aggravated her sinuses. It became so bad I considered leaving the profession I loved. Not even multiple surgeries helped. As many as 40% of my colleagues reported persistent respiratory symptoms too.

Armed with a letter from my doctor, I went to her administrator. As a result, they set up an IAQ committee to investigate and solve IAQ issues; they eventually renovated the building. Naperville's efforts were recognized nationally by the EPA for excellence in 2003.

Many people are afraid to speak up because they don't want to be seen as complainers. But things will only change if people come forward and talk about what they're experiencing.

Illinois Science Teacher

No. School Buildings	**4,416**
No. Students	**2,100,961**
No. Minority Students	**895,179**
No. Students in Special Education Program	**316,733**
No. Employees in School System	**132,794**
% Children with asthma (under 18)	**7.6%**
% Schools with at least one inadequate building feature	**62%**
% Schools with at least one unsatisfactory building condition	**70%**
No. Students At High Risk Daily*	**1,386,634**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**N**

Indiana

The voices

Sunnyside Elementary
Carbon Monoxide Poisoning

At the request of the Henry County Health Department, IKE's Tom Neltner served as mediator/consultant to evaluate the situation at New Castle's Sunnyside Elementary School. The school has an unusual situation where each classroom has its own furnace. The furnaces were over 25 years old.

The school was closed after a teacher collapsed and students exhibited the symptoms of carbon monoxide poisoning. While carbon monoxide was detected at various times in the indoor air, the levels did not exceed recommended indoor or outdoor air quality standards.

About 100 parents, staff and faculty as well as school leadership attended the three-hour session. Keeping the kids' best interests in mind, the school district replaced all of the furnaces and found cracks in 11 of the 13 units. IKE congratulates the school superintendent, facilities manager, staff and concerned parents who worked through the issues to a reasonable resolution.

From: Improving Kids Environment, April 2004

Indy High School Evacuated Due to Pesticides

On March 7, a maintenance worker at a high school in Indiana accidentally switched the herbicide he intended to use with the organophosphate insecticide, Dursban, in order to kill the spring weeds. Then the worker proceeded to spray it on the grass while school was in session — right outside the open cafeteria windows. The school was evacuated when the pesticide was sucked into the ventilation system.

Five adults and one student were hospitalized, but they were not seriously hurt. It is unlikely that the worker had received specific training to use the pesticides.

Indiana's recommendations would have made difference for students at this Indianapolis public school — had the school followed them. The training requirements could have prevented the problem. Training would have helped the worker better understand the implications of switching the insecticide for the herbicide and how to properly apply the mixture.

The prohibition on using pesticides during schools hours would definitely have prevented it. Spraying pesticides during school hours, two hours before, and one hour after is prohibited under the recommendations.

From: Improving Kids Environment, Dec 2005

Lessons learned

It's easy to prevent harm. It is harder to undo harm.

No. School Buildings	1,986
No. Students	1,011,130
No. Minority Students	186,754
No. Students in Special Education Program	170,754
No. Employees in School System	127,754
%Children with asthma (under 18)	10.9%
% Schools with at least one inadequate building feature	56%
% Schools with at least one unsatisfactory environmental factor	67%
No. Students At High Risk Daily*	621,845
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	N

Iowa

Lessons learned

-Both school personnel and parents of students need to be involved in school environmental health and safety

-States with facility offices can set regulations to protect school occupants from construction hazards

The voice

"The roof has been leaking for at least three years and the carpets smell like musty dumpsters."

I am working in an inner-city high school in Iowa. We are currently undergoing major reconstruction- inside and outside of the building. The construction takes place during the school day. It's common to have jack-hammers going on the outside walls or under the floor of the classroom. Construction workers are transporting wheelbarrows loaded with old plaster (and other debris from the walls and ceilings) through the building out to dumpsters in the back while school is in session. Naturally, there is dust cloud of who-knows-what as a constant irritant. The roof has been leaking for at least three years and as our recent snow is melting again the rooms and their 10 year old carpets smell like musty dumpsters. Windows are boarded up and utility lights like (the ones hung when doing car repairs) are the only light source hanging from the ceiling, which has exposed duct work, pipes, and electrical cords. Administrators want the chain of command to be followed, but their attitude is to grin and bear it. Teachers who have spoken to outside sources have been reprimanded. The union can only intervene if someone is willing to file a grievance. The bottom line is teachers have gone through the chain of command; there have been few changes. It seems we will only have power when something dramatic and life-threatening happens.

Iowa School Teacher

No. School Buildings	1,495
No. Students	481,226
No. Minority Students	56,885
No. Students in Special Education Program	63,886
No. Employees in School System	63,992
%Children with asthma (under 18)	6.5%
% Schools with at least one inadequate building feature	50%
% Schools with at least one unsatisfactory environmental factor	67%
No. Students At High Risk Daily*	281,517
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	N

Kansas

Lessons learned

-Airborne allergens are going to arrive from the outside air every time the students and teachers return to the room. This is not a building problem; it is a people density problem

-The health care costs because of these issues can typically run $200 to $300 per month for up to 40% of the class population.

-HEPA air filter can have substantial benefits and financial payback. Allergens arrive on the students in every classroom

-Teachers and students do perform better in cleaner classroom air

The voice

"The average class was spending $2,000 to $3,000 per month on health costs related to allergies."

There were repeated regional and national news stories from parents and staff about schools fighting sick-building syndrome. This led us to do investigation on airborne allergens. We found that when they get stirred into the air, and are inhaled, upper respiratory tract infections (URI's) are the result along with allergy symptoms and more serious health problems.
We installed low-cost, high-volume ceiling fan HEPA air filtration system in about 70 classrooms in 8 schools that filtered all the classroom air about 40 times per hour. Amazing things happened to the way students and teachers felt in class; they needed medication like inhalers and daily allergy meds a lot less often. Filtering the air produced very positive results in new and old schools. The average class was spending $2,000 to $3,000 per month on health costs related to allergies, asthma and repeat URI's. The air cleaning system cost only $400 to $800 with $10 per month on-going filter costs- it only takes a modest improvement in class health to generate a huge payback. We are working with other schools to put air filtration systems in their classrooms. More researchers are joining in these studies to gather more controlled test results and measure the impact on attendance, health costs and student achievement.

Concerned Engineer

No. School Buildings	**1,413**
No. Students	**470,490**
No. Minority Students	**109,208**
No. Students in Special Education Program	**65,092**
No. Employees in School System	**60,388**
%Children with asthma (under 18)	**10.6%**
% Schools with at least one inadequate building feature	**55%**
% Schools with at least one unsatisfactory environmental factor	**74%**
No. Students At High Risk Daily*	**303,466**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Kentucky

Lessons learned

-Schools must have anti-bullying policies that are effective and enforced, especially to protect students with health and other disabilities

-Schools are required under federal law to provide a free appropriate public education for all students, even those with health impairments

The voice

"Our daughter cries.
We will pursue further action."

The 16 year old cries when she thinks about what she's missing while confined to the house. She hasn't been to school since she reported that a campus bully sprayed her in the face with perfume a year ago, causing a severe asthma attack that landed her in the hospital.

She is afraid to return to school until administrators ban perfume, cologne, and other smelly aerosol sprays that could be used as weapons against asthmatics.

The parents intend to continue our action until the school district provides necessary accommodations to ensure that she will be safe. The school board rejected a proposal last fall (2005) to ban students from bringing cologne, body spray or perfume to school.

The situation has set off another "cosmetics" debate in a school district that actually suspended a student five years ago for wearing black lipstick.

From: www.n-jcenter.com, October 2003

No. School Buildings	1,438
No. Students	663,885
No. Minority Students	82,314
No. Students in Special Education Program	103,709
No. Employees in School System	88,284
%Children with asthma (under 18)	10.2%
% Schools with at least one inadequate building feature	59%
% Schools with at least one unsatisfactory environmental factor	63%
No. Students At High Risk Daily*	404,970
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

Louisiana

Lessons learned

- There are no standards to protect the public, especially vulnerable populations, from the hazards of reoccupying contaminated homes, schools and other private and public buildings.

- Children are not adults. Children need to be prohibited from encountering or protected from occupational health risks, especially when volunteering on hazardous clean-up crews.

The voices

The coastal areas of Louisiana that were hard hit by Hurricanes Katrina and Rita offer striking examples this spring in how children are not even considered for 'worker' protection, while adults are. This year, thousands of student-volunteers, some as young as 14, like a middle-schooler from Massachusetts, are at risk of developing acute and life-long environmental and occupational diseases as they joined recovery workers and resident volunteers doing demolition and clean up work in hurricane-damaged and flood-contaminated areas.

PTA Activist

After 9/11, no agency had standards for 'clearing' a building for safe re-occupancy by children. Four years later, there is still no answer, creating more headaches for families who want to return.

Healthy Schools Advocate

Neighborhoods in the New Orleans area have dangerously high lead levels, and one residential neighborhood around the old Agriculture Street landfill has high levels of a cancer-causing petroleum constituent, federal and state environmental regulators said Tuesday, as they released the latest results from contamination tests following Hurricane Katrina.

From: New Orleans Times-Picayune, April 5, 2006

No. School Buildings	1,551
No. Students	727,709
No. Minority Students	375,099
No. Students in Special Education Program	101,288
No. Employees in School System	102,989
%Children with asthma (under 18)	10.7%
% Schools with at least one inadequate building feature	50%
% Schools with at least one unsatisfactory environmental factor	66%
No. Students At High Risk Daily*	422,071
State Education School Facilities Office	N
State OSHA Plan	N
State Grants for Construction	N

Maine

The Voice

The Cost of High Hazard Chemicals at School

Maine funded a chemical clean-out program in the early 1990's, but most schools did not take advantage of the opportunity. From 2002 through 2004, the Maine Department of Environmental Protection (DEP) did some level of chemical clean-out in 80 of the approximately 452 middle and high schools in Maine through a DEP program that paid for the disposal of any mercury or mercury containing instruments and the transportation costs of the hazardous waste contractor. Some schools took the opportunity to do a complete clean-out; others did not due to perceived budget constraints or unknown other reasons.

In 2005, the Maine Legislature approved Chapter 93, Resolve, Directing the Department of Education and the Department of Environmental Protection To Implement Procedures To Remove Hazardous Materials from Maine Schools.

In response, the Department of Education (DOE) required all Maine's middle and high schools to inventory laboratory chemicals annually. In addition, schools are required to have a Chemical Hygiene Plan and a designated Chemical Hygiene Officer who is an employee of the school. The State is providing chemical management training through a joint effort of the Departments of Labor and Environmental Protection. The two agencies have also collaborated on the development of a model Chemical Hygiene Plan which is provided to schools on both agencies' web sites, and DEP developed an electronic inventory form to further assist schools with chemical management.

To ensure the best use of scarce resources, and increase them to much needed levels to improve children's everyday environment, requires action from a wide variety of people and organizations including government agencies at all levels, school administrators teachers and staff, parents and members of the community. It will take all of us to make schools safe and healthy places!

Former Teacher and IAQ Activist

Lessons Learned

- Schools should adopt Environmentally Preferable Purchasing Policies to avoid re-introducing high hazard or toxic chemicals and to avoid future disposal costs. ALA of ME's Environmental Management System includes chemical management.

No. School Buildings	694
No. Students	202,084
No. Minority Students	8,472
No. Students in Special Education Program	33,514
No. Employees in School System	35,865
% Children with asthma (under 18)	10.6%
% Schools with at least one inadequate building feature	60%
% Schools with at least one unsatisfactory environmental factor	71%
No. Students At High Risk Daily*	132,365
State Education School Facilities Office	Y
State OSHA Plan	N
State Grants for Construction	Y

Maryland

The voices

"Who isn't allergic to mold? It isn't healthy for anyone."

My son attended a public school in Michigan for preschool and flourished. Then my family moved to Bethesda, Maryland for my husband's job. At the beginning of the kindergarten year my son had a lot of breathing problems and at his first parent conference the teacher told me that he is always sneezing and has a runny nose in class. She asked if he was allergic to molds because the school had some mold problems. I said "Who isn't allergic to mold? It isn't healthy for anyone". As the year went on, he was only using his breathing machine on school days and never on weekends or school breaks. I approached the principal who made me feel like I was nuts and stated that there was no mold issue. By spring, we headed back to Michigan for the summer and put my son back in school there; he was never sick again that year.

I knew we would be going back to our home in Bethesda in the fall, so I requested a school transfer explaining my son's health issues and was rejected! I was furious! Here we owned a new, expensive home that we paid taxes on, and my son is supposed to go to a moldy, disgusting school. I felt beaten and didn't have a clue of how to change the situation. I talked to a lawyer who suggested appealing. I did just that; we won our case after threatening to bring the media into the picture. We moved our son to the newer school less than a mile away. We were happy, but I still felt like we didn't win at all because there were other children being subjected to the conditions at Bethesda elementary.

I strongly urge parents to follow their best instincts and fight for all of our children to be able to learn in healthy environments. I made sure that every parent I knew at Bethesda elementary school heard my story and my opinions on the state of the school their children were occupying. The following year my neighbor told me the principal at the old elementary school finally admitted that there was a mold problem in the school. I wish I could have gotten that in writing!

A Victorious Mother

My children need their civil and educational rights enforced.

Ten years ago, my two children became hypersensitive to pesticides and other chemicals while enrolled at an elementary school that was routinely treated with DURSBAN. Prior to attending this school, neither child had any allergies or medical conditions.

Since 1997 we have tried to put some protections in place at the school level, including attempting to obtain (accommodation) 504 Plans. We also worked successfully in the effort to adopt Integrated Pest Control legislation for public schools in Maryland. School IPM laws now exist in Maryland, but to date nothing we have pursued at the local level to control or remove hazardous chemicals has been successful. Our children continue to be injured at school due to avoidable contact with hazardous materials. These incidents not only cause physical harm, pain and injury, they are barriers to education. Each child has experienced extensive medical absences following such exposures, often with little or no academic support from the school.

Instead of addressing the problems, the problems are suppressed and the school threatens us with child neglect and truancy charges- including threats of jail time.

The children are denied protection because the district bases its criteria on whether the condition **substantially limits education**, not on whether it substantially limits basic life functions. My children can continue to be injured at school because they maintain a high grade-point averages. Apparently in this public school system, students deserve protection only if they fail academically. All children, even smart kids, deserve to go to school without fear of harm or injury. Children should not have to pay for their education with their health and their parents should not have to give up professional work, make emergency trips to school, and pay avoidable medical bills, just to educate their children.

PTA Officer and Parent

Maryland cont'd on next page

Maryland

Lessons learned

- Children are legally obligated to attend school, but they are not entitled to legal protection from exposure to known hazardous chemicals while there

- Make your children's health and well-being a priority. Listen to your children when they complain about health problems. Track health problems daily, especially if the problems increase when they are in school and subside when they are not. Look for patterns: changes in health and performance.

- All students can be routinely exposed to known hazardous materials while they are in school. These materials can be used in such a way that the students and staff can come in contact with the material or its residues. Yet, effective alternatives to highly toxic pesticides and cleaning products are easy to find and use.

- Unfortunately, some school administrators can hinder proper interpretation, monitoring and enforcement of existing federal or state laws. Schools can—

1 classify absences as truancies and threaten parents
2 request that Child Protective Services investigate the parents
3 pressure parents to remove children from the public school system
4 ignore the parent's documented complaints or physician letters
5 refuse to approve or to implement accommodation plans, resulting in costly delays in educational services or in health protections

- Lack of communications between administrators, maintenance, custodial, construction/renovation and pest control departments can cause situations where students and staff are placed in harm's way

- Common problem: principals not aware of facility workers in the school or what they are working on

A Maryland Parent

No. School Buildings	**1,408**
No. Students	**869,113**
No. Minority Students	**430,663**
No. Students in Special Education Program	**108,141**
No. Employees in School System	**102,470**
% Children with asthma (under 18)	**10.4%**
% Schools with at least one inadequate building feature	**67%**
% Schools with at least one unsatisfactory environmental factor	**65%**
No. Students At High Risk Daily*	**573,614**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Massachusetts

The voices

"My daughter is affected by IAQ, she must be in school, and the building is held up by cables and jacks."

Southbridge, MA is a town of about 17,000 residents near the Connecticut border, a town that lost thousands of manufacturing jobs in the late 1980s and early 90s. The schools have suffered from lack of support from local community leaders. Mike is a parent who has mobilized neighbors and the town to support the public schools but he has had to focus on getting his daughter through high school in a sick building.

Poor air quality, including high carbon dioxide levels, has made his daughter's chronic health problems worse causing her to miss most of her first 3 years of high school. "Some of the problems we face are broken ventilations systems, lack of maintenance, mold and water infiltration through the roof and old broken windows. After years of complaining, the school recently ordered high efficiency filters for the old univents and is putting together an IPM plan and monitoring its asbestos plan.

Meanwhile there are parts of the building that are being held up by hydraulic jacks and suspension cables to keep the library from slipping… Said Mike, "Not only has my daughter's health been jeopardized by these conditions, but the school system's struggle to improve education while experiencing some of the biggest budget cuts. We need to recognize that healthy school building condition is an important part of providing a … decent education. We need to hold our healthy school building standards at least as high as the educational standards we are demanding our kids to meet within these buildings."

Mobilizing Dad in Massachusetts

Was the worst, now the best.

It is both the worst and the best example of the problem and its solution. Westborough Schools went from being a horror story, featured on ABC's *Good Morning America* with the title "Girl's Illness Traced to Toxic School," to become an authentic living model of community improvement that everyone is proud of. Thanks to the combined efforts of School Committee members, officials, employees, and parents, the schools are now a success story that proves that good documentation, open communication, transparent decision making, high standards for health and safety, and parent involvement can be keys to real improvements.

Westborough now has a successful system of self-inspection, documentation, and accountability for repairs and remediation. Everyone shares responsibility for monitoring conditions and contributing to maintenance and improvement. It avoids expensive problems and reduces risk of illness and school disruption. Everyone understands the benefits of fixing air quality problems before they become health problems.

MA-PTA Parent and Health Advocate

MA cont'd on next page

Massachusetts

"We know what the problem is and we have the findings, so why does it take so long to get repairs done? It should be about the health of our children. The money should be in the budget to fix our schools."

The Boston Urban Asthma Coalition (BUAC) and the Massachusetts Coalition for Occupational Safety and Health (Mass COSH) conducted a preliminary analysis of childhood asthma rates for Boston Public School (BPS) students and compared them to the 2004-5 environmental audits of the top 10 schools with environmental problems. Parts of Boston have five times the state average for childhood asthma hospitalization rates, with children of color having much higher rates. BPS students are primarily children of color. Some of the findings:

- Inspections of schools with high asthma rates noted an overwhelming presence of environmental issues which contribute to the incidence of asthmatic children in schools.
- Approximately 85 percent of Boston Public Schools reported leaks or water stains; 36 percent reported visible mold growth; 63 percent reported overt pest signs; 83 percent reported repairs needed; 61 percent reported improper chemical storage.[1]

To address concerns about poor school conditions and health, the BUAC and Mass COSH won compliance with a 1996 ordinance stating that Boston Public Schools must conduct bi-annual environmental inspections for all schools in 2002. Another outcome was the creation of a citywide Healthy Schools Taskforce. This taskforce will continue to address the issues raised by this report which can be read in full, along with recommendation for City and State officials at: www.masscosh.org .

BUAC Parent Leader

Lessons Learned:

- MA suffers from: 1) lack of enforcement of regulations; 2) lack of budgeting and funding at the state and local level to enable schools to comply with regulations and best practices; 3) lack of coordination between environmental health and safety agencies and the Department of Education.
- There needs to be technical assistance from the DOE on school environmental safety as well as incentives in place to address all the factors that contribute to struggling schools.

No. School Buildings	**1,867**
No. Students	**980,459**
No. Minority Students	**249,148**
No. Students in Special Education Program	**154,391**
No. Employees in School System	**102,241**
% Children with asthma (under 18)	**10.2%**
% Schools with at least one inadequate building feature	**75%**
% Schools with at least one unsatisfactory environmental factor	**80%**
No. Students At High Risk Daily*	**759,856**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

Michigan

The Issues

LANSING -- Students attending classes in districts with low property values must contend with leaky roofs, poor air quality, over- and under-heated rooms and even sewage smells emanating from a seeping septic field, school officials testified Monday. That's not fair to Michigan schoolchildren in those districts, said **Sen. Ron Jelinek**, R-Three Oaks. Jelinek is chair of the Senate Appropriations subcommittee on educational spending, which held a daylong hearing on infrastructure problems. Jelinek said he hopes to craft legislation this year addressing the disparity between school conditions in wealthy and poor districts. "I think the problem is pretty obvious," he said."I don't think most people would argue with the need." He said the answers, however, are far less clear.

Many of the fixes offered Monday involved statewide tax increases, such as a statewide property tax or sales tax. Those are considered a difficult, if not impossible, to sell in the GOP-controlled Legislature. Some school officials said the disparities are painful, and unfortunate for school districts losing students to charter schools or schools of choice. River Valley **Superintendent Chester Sanders** said one of two wells serving the River Valley High School in Southwest Michigan was closed because of arsenic contamination and a septic field has been damaged by cars driving over it at football games. "You can certainly smell the odor," he said.

From: Mlive.com, March 21, 2006

Grand Rapids school administrators are reviewing an incident that forced 300 students from their classes. It happened around 10 am this morning at Ken-O-Sha Elementary.

A custodian discovered a leak from the school's pool had mixed with some chemicals in a storage area. Some potentially hazardous fumes and smoke were filling the air, so students were evacuated as a precaution. Many of Ken-O-Sha's student's have special needs. We're told all handled the incident just fine and were returned to school two hours later when it was determined safe. They were dismissed at the end of the day as usual.

From: WZZM radio broadcast, Grand Rapids, MI, October 15, 2005

Lessons Learned

- "The poorest children occupy the schools in the worst condition" (US GAO, 1996)

-Using less toxic chemicals reduces hazards

No. School Buildings	4,008
No. Students	1,757,604
No. Minority Students	478,955
No. Students in Special Education Program	244,610
No. Employees in School System	106,312
%Children with asthma (under 18)	10.0%
% Schools with at least one inadequate building feature	52%
% Schools with at least one unsatisfactory environmental factor	61%
No. Students At High Risk Daily*	993,046
State Education School Facilities Office	N
State OSHA Plan	Y
State Grants for Construction	N

Minnesota

Lessons learned

-The escalating cases of autism disorders and the special needs of this population should be emphasized in school design, acoustics, sizing, and operations

-The needs of children in special education and with health impairments must be addressed in school facility design and maintenance

The voice

"Too many kids, too much noise, too much distraction"

Schools and noise, the two go hand in hand. Many don't see this as a problem, but what about those children who are profoundly affected?

My son is autistic. He is out of the mainstream 80% of the time, dividing his day between several school programs. He is in the Compass program, a restricted classroom with 5 other kids; the small number and relative quiet helps him cope. He spends some time in the special ed "Learning Center", an internal classroom with no windows (which he hates) and about one hour is spent in the mainstream classroom. Hallways are hard, lunch is hard, and recess is hard.

He even rides the small special ed bus home because the big bus carries the same problems as the big school.

Minnesota Special Education Parent

No. School Buildings	**2,552**
No. Students	**842,854**
No. Minority Students	**166,950**
No. Students in Special Education Program	**113,828**
No. Employees in School System	**103,745**
% Children with asthma (under 18)	**6.2%**
% Schools with at least one inadequate building feature	**57%**
% Schools with at least one unsatisfactory environmental factor	**66%**
No. Students At High Risk Daily*	**518,355**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Mississippi

Lessons Learned

- Schools everywhere need ongoing support for emergency repairs

- Schools everywhere need special funds to dispose of products and to clean- up toxic spills

The Events

Schools Spring Leaks

Foul weather from seasonal thunder storms has taken its toll on some of the roofs within the McComb School District, superintendent, Dr. Pat Cooper told trustees. "There are some massive leaks in a couple of these places that are endangering our health", Cooper said. One of them is Denman junior high school band room, where Cooper said the constant rainfall, collecting on the flat roof has resulted in less than healthy conditions. "I have to say, I was appalled when I walked in there this morning, the chairs and the instruments had mold growing on them". Leaky roofs plague the school cafeteria at Kennedy Elementary School. School officials must cough up an estimated $20,000 to fix the leak at Denman's band room and patch other leaks at Denman, McComb High and Oktken Elementary. .....

From: enterprise-journal.com, August 15, 2001

Mercury Spill Costs $200,000

Hancock High School, Kiln, Mississippi

On September 10, 2003 at the request of the Mississippi Department of Environmental Quality (MDEQ) an emergency response removal commenced at the Hancock High School, Hancock Co. Votech facility, and the Charles B. Murphy Elementary School located in Kiln, Mississippi. The response was conducted by the MDEQ, EPA, and Coast Guard.

Mercury air concentrations were measured and found to be above EPA levels. Contaminated areas were cleaned up using a spill control product and a mercury vacuum system. Three school buses were contaminated with mercury. The seats and flooring were removed. After a thorough cleaning of the buses, all seats were wiped down and the flooring disposed. Children's clothing was tested and some disposed. Private residences were screened and none were found to exceed EPA's action level. Mercury contaminated debris was transported as hazardous waste for disposal. Total cleanup costs were $200,000.

News: Natl' Clearinghouse for Educational Facilities
www.edfacilitites.org

See next page for MS data

Mississippi

No. School Buildings	**1,051**
No. Students	**493,540**
No. Minority Students	**260,269**
No. Students in Special Education Program	**66,727**
No. Employees in School System	**64,515**
%Children with asthma (under 18)	**9.1%**
% Schools with at least one inadequate building feature	**50%**
% Schools with at least one unsatisfactory environmental factor	**54%**
No. Students At High Risk Daily*	**256,641**
State Education School Facilities Office	**Y**
State OSHA Plan	**N/A**
State Grants for Construction	**Y**

Missouri

Lessons learned

- Your child has rights.
- Don't give up on getting your child's needs accommodated and education needs fulfilled.

The voice

"The school is well aware of her condition as well as the doctor's orders to stay out of school."

My daughter had been missing one day of school per week for 3 months because of her extreme bouts with chronic illness. She was sent home several times complaining of severe headaches, which would normally fade after some time at home. When the chronic illness including migraines, upper respiratory infections, congestion, asthma and other symptoms increased we scheduled a doctor's appointment; the doctor recommended that she stay home from school for 2 weeks to rebuild her strength. We have to be extremely cautious in managing her asthma because she is allergic to a lot of the medications that help, so we followed doctor's orders without hesitation.

Shortly after her school absence, I discovered that the school had reported me to Social Services for educational neglect! This was a shock because the school is well aware of her health problems as well as the doctor's order to stay out of school, however, they fail to acknowledge either one. The school nurse has failed us and forming a support group with other parents has been impossible because the school has made me out to be the bad guy. I'm not sure where to start.

Distressed but Not Defeated Missouri Parent

No. School Buildings	2,372
No. Students	905,941
No. Minority Students	201,670
No. Students in Special Education Program	144,752
No. Employees in School System	126,107
%Children with asthma (under 18)	8.7%
% Schools with at least one inadequate building feature	54%
% Schools with at least one unsatisfactory environmental factor	58%
No. Students At High Risk Daily*	507,327
State Education School Facilities Office	Y
State OSHA Plan	N
State Grants for Construction	N

Montana

Lessons learned

- State leaders should adopt health-promoting policies.

- Policies on chemical management can guide schools.

The voice

Selected Policies on School Health

Montana does not have education policy regarding the administration of medications.

State Code 20-3-324 (1997) does, however, give a physician or a registered nurse the responsibility to inspect the sanitary conditions of a school or the general health conditions of each pupil, and make health records available to any parent or guardian upon request.

Montana does not require schools or districts to identify students with asthma.

From: www.nasbe.org/healthyschools

School Lab Inventories Surveyed

Science Classrooms in Montana's schools have chemicals from A to Z on their shelves and the assortment includes some that are dangerous and perhaps unnecessary, the state Department of Environmental Quality said. The agency released results of a survey that asked 406 middle and high schools in Montana to inventory their supplies of chemicals. Half of the 146 schools responding to the survey reported having more than 120 chemicals, and Reinke acknowledged some advanced chemistry classes may need chemicals beyond those on the core list. The survey found Montana schools to have as few as 2 and as many as 432 chemicals present. Reinke said expense is one of the difficulties in disposing unwanted chemicals. He noted that one school, informed him Friday that it received a bid of $8,000 for laboratory cleanup. DEQ is unable to offer cash assistance and the financial burden rests with the school districts, he said.

From: www.edfacilities.org, March 14 2005

No. School Buildings	860
No. Students	148,356
No. Minority Students	22,062
No. Students in Special Education Program	19,267
No. Employees in School System	13,848
%Children with asthma (under 18)	7.1%
% Schools with at least one inadequate building feature	45%
% Schools with at least one unsatisfactory environmental factor	69%
No. Students At High Risk Daily*	84,563
State Education School Facilities Office	N
State OSHA Plan	N
State Grants for Construction	N

Nebraska

The Voice

COLUMBUS - The construction project at Columbus High School has at least one parent concerned over his daughter's health. Carl Munford claims the dust, fumes and other airborne materials from the renovation project have caused his daughter to have asthma attacks, one so severe that she had to be taken to the hospital and admitted overnight. His daughter, who is a senior at the school, has had asthma all her life, but Munford said it has usually been kept under control - that is, until last September when the construction started.

Munford said his daughter was attending class on Sept. 10 when she requested to see the school nurse because of breathing problems. When she arrived at the nurse's station, her lips were blue, and she needed life-saving treatments administered to her at the school, he said. She was then taken to the hospital where her blood was re-oxygenated.

That asthma attack was one of the most severe she had experienced, Munford said. "She never had one like that before ever. We are usually able to get her stabilized," he said. CHS Principal Amy Romshek said she has personally been contacted by three parents who are concerned about their child's health because of the construction. Since the $17.68 million renovation project began, there have been about 15 students who have come into the nurse's office complaining about asthma and allergies due to the dust, said school nurse Jean Kamrath.

Among the precautions being taken are hanging plastic sheets and boarding up areas where construction is taking place, changing air filters more frequently, bringing in another janitor to assist in cleaning and using large fans to suck the dust out of the air, Romshek said. Some students' class schedules have also been rearranged to keep them out of areas where construction is taking place. According to the Nebraska Department of Education's Rule 59, Nebraska schools are required to have an asthma emergency protocol program in place. Schools also are supposed to provide a safe and secure environment for students under Rule 10 ....

"The only reason I'm threatening legal action is for safety," he said.

From: Columbus Telegram.com, by Julie Blum, 2006

Lessons Learned

.-Fumes and dust impacting occupant health must be avoided.

-Preventative public health actions are better than a lawsuit.

No. School Buildings	1,248
No. Students	285,452
No. Minority Students	58,499
No. Students in Special Education Program	45,825
No. Employees in School System	40,389
%Children with asthma (under 18)	6.8%
% Schools with at least one inadequate building feature	44%
% Schools with at least one unsatisfactory environmental factor	61%
No. Students At High Risk Daily*	149,862
State Education School Facilities Office	N
State OSHA Plan	N
State Grants for Construction	N

Nevada

Lessons learned

-Investigate pesticide practices in your school district

-Integrated Pesticide Management is a method that has proven to be safe and effective

The voice

"I was pleased to find out that the school district practices Integrated Pesticide Management"

One of my children is in second grade and the other will be entering the schools system before we know it. I had long been concerned with the schools use of pesticides and pest control practices. I initially contacted the superintendent who referred me to the plant manager.

I was pleased to find out that the school district practices Integrated Pesticide Management (IPM), meaning they only do spot spraying for dandelions (no mass pesticide use). As for pest control, they set out traps for evidence of pests. The school even takes it a step further to call and inform me of the scheduled spot sprays, so I can keep my children home if I so choose.

IPM is the best option for this school district because it is growing rapidly and there will soon be many more children and staff at stake.

Pleased Nevada Parent

No. School Buildings	**558**
No. Students	**385,401**
No. Minority Students	**189,721**
No. Students in Special Education Program	**45,201**
No. Employees in School System	**31,659**
% Children with asthma (under 18)	**6.9%**
% Schools with at least one inadequate building feature	**42%**
% Schools with at least one unsatisfactory environmental factor	**57%**
No. Students At High Risk Daily*	**190,773**
State Education School Facilities Office	**N**
State OSHA Plan	**Y**
State Grants for Construction	**N**

New Hampshire

The voice

My own path to appreciating the value and importance of a high quality indoor environment in schools started with a love and respect for the out-of-doors and the need to clean up the messes that were – and sadly still are, in many cases – our rivers, urban landscapes, and polluted air sheds. That was an effort to clean up mistakes already made, to sort of "mop up" the pollution after it was already out in our living environment. Gradually, along with many others, it became clear that to be effective and sustainable, efforts to clean up pollution must focus on prevention and keeping the "gunk," whatever it is, out of our living spaces in the first place. Energy, and the inevitable pollution that comes with supplying heat and power with conventional fossil fuels, quickly became a focus of mine and for the last 30 years I have been involved in trying to move society away from dirty fuels to clean ones, to energy resources that provide heat and light and power without polluting our air, land, and water, that are renewable and local and don't involve long transportation supply lines, complex security measures, and volatile prices.

Indoor air quality has a direct connection to outdoor air quality, especially in schools where cost-cutting often affects land acquisition and siting relative to highways and industrial plants, where ventilation design can be short-changed, where pesticide applications can be tracked into the building, etc. Energy efficiency, and all that is involved in making a building tight and comfortable, is also a prescription for improving indoor air quality because high performance, energy-efficient buildings pollute less, are sited to take advantage of the sun and daylighting, are designed for simpler operation and maintenance, and provide – by intention and forethought – a healthier learning environment.

Former NH State Official and Advocate for High Performance School Design

Lessons Learned:

-Durable, long lasting buildings are a good investment

-The sun can provide high quality heat and light when building design is done to take advantage of it.

No. School Buildings	474
No. Students	207,417
No. Minority Students	11,938
No. Students in Special Education Program	29,390
No. Employees in School System	30,825
% Children with asthma (under 18)	7.9%
% Schools with at least one inadequate building feature	59%
% Schools with at least one unsatisfactory environmental factor	78%
No. Students At High Risk Daily*	142,080
State Education School Facilities Office	*Y
State OSHA Plan	Y
State Grants for Construction	*Y

*Data contributed by: The Jordan Institute's NH Partnership for High Performance Schools

New Jersey

Lessons learned

-Be aware of your child's health-it took us so long to make the correlation between her illness and the school.

-Parents must educated themselves-other kids were experiencing problems-headaches, nosebleeds-, though not as severe, they are cause for action

-Encourage children to speak out and take leadership roles-currently my daughter chairs the green cleaning committee at her school and advocates safe environmental conditions within and around schools.

The voice

"Finally, she was diagnosed with scalded skin syndrome."

When my daughter entered fifth grade, the nightmare began. Construction was taking place and she became very asthmatic, but over the summer, she was fine. As soon as school re-convened, she got extremely ill-headaches, body rashes and sores. No physician could diagnose it, no even her father who's an MD. She got worse; her skin began peeling, she was losing hair and developed dark spots all over. Finally, she was diagnosed with "scalded skin syndrome" and prescribed high-dose cortisone. After a while, she went back to school. Within two hours of entering, I was called to pick her up because she had completely relapsed!

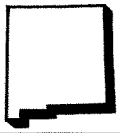
That's when it hit me; it had to be the school environment. I called the head of the school board and a swab test was conducted. I could not understand the results, so I personally hired an environmental expert, who told me that the tests conducted were insufficient.

My husband and I offered to pay to have a full inspection, but they refused, and agreed to pay for my daughter to be home-schooled: now I wonder why. We hired a law firm to force the school to get adequate testing, but it pulled out because of a conflict of interest since one of the lawyers' spouses worked for the district. We decided to place my daughter in another school nearby and she's not had a health problem since.

New Jersey Mother

No. School Buildings	2,467
No. Students	1,380,753
No. Minority Students	581,591
No. Students in Special Education Program	223,144
No. Employees in School System	185,837
%Children with asthma (under 18)	8.5%
% Schools with at least one inadequate building feature	53%
% Schools with at least one unsatisfactory environmental factor	69%
No. Students At High Risk Daily*	842,259
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

New Mexico



An Example

LEED, or Leadership in Energy and Environmental Design, is a voluntary, national standard established by the U.S. Green Building Council. The USGBC certifies buildings in four categories, including Certified, Silver, Gold and Platinum, based on the number of LEED credits achieved through the project's design and construction. "The LEED market in New Mexico is growing exponentially at this time," says Stace McGee, principal of Environmental Dynamics Inc, an architecture and sustainability consulting firm. McGee also is a member and former president of the USGBC's local chapter....

The Baca Dlo'ay azhi Community School is currently the only LEED-certified building in the state. Within the past year, both Albuquerque Mayor Martin Chavez and Gov. Bill Richardson mandated that more city and state government buildings achieve at least LEED-Silver status.

.... Some of the Leadership in Energy and Environmental Design elements include a "night-flush" air cooling system, which essentially takes advantage of thermal properties in the building's materials by reducing extremely hot and cold temperatures. The library uses various recycled materials in its construction, and collects precipitation and recycles the landscaping runoff into a water reharvesting process that is expected to harvest about 93,000 gallons per year. The school also has been recycling about 75 percent of its construction waste.

"Environmental sustainability is a very important and responsible choice," Leonard says, adding that the LEED certification really will exemplify the values his school advocates.

From: New Mexico Business Weekly, March 13, 2006

Lessons Learned:

-One school can lead the way

No. School Buildings	**824**
No. Students	**323,066**
No. Minority Students	**217,243**
No. Students in Special Education Program	**63,727**
No. Employees in School System	**40,479**
%Children with asthma (under 18)	**8.8%**
% Schools with at least one inadequate building feature	**69%**
% Schools with at least one unsatisfactory environmental factor	**75%**
No. Students At High Risk Daily*	**232,607**
State Education School Facilities Office	**N**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

New York

Lessons Learned

-New York State needs new Public Health services for children

- New York State is setting guidelines for Healthy and High Performance School Design

- New York State is setting standards for green cleaning products to be used by all schools and state agencies

- New York City will require all public school construction to meet new green design standards

- A new facility data study shows that facility conditions affect test scores, attendance, and maybe suspension rates.

The voices

"Green cleaning supplies in schools provide a safer and less toxic environment for our children"

I was very concerned with certain environmental issues in NY schools, including; the health affects of mold in schools, chemical exposure to children, and cell tower construction at or near schools.

New York State recently created legislation insisting on the use of "green" cleaning supplies to be used in schools, which will provide a safer and less toxic environment for our children. As an environment and health advocate, I've become increasingly aware of scientific research, which demonstrates the relationship between children's exposure to chemicals and development of disease later in life.

It is up to us to provide and insist on a healthy and safe environment for our children.

NY Environmental Advocate

"My 'suspension' from school stripped me of my parental rights as well as my civil rights."

I am a parent of three children attending a public school in Pendleton, NY. In fall 2003, I formed a parents' group to address health and safety issues after my daughters' health was further compromised by unregulated school construction. I have spent 2 1/2 years doing research and investigation on health and safety issues at our school. In January 2006, the Superintendent of my children's school suspended me from the district for three months because I disobeyed his demand to cease investigating and questioning environmental and air quality issues affecting all students and staff at our school. The new school has been evacuated several times; last winter when children and adults smelled putrid fumes, more than thirty children, some unconscious, were taken to the local emergency room. The suspension stripped me of my parental rights as well as my civil rights….. I and other concerned parents have written to federal and state agencies, providing them with documentation to investigate health and safety concerns regarding our public school. The situation has been in the media often and is well known to the Education and Health Departments, yet the major problems are still not being addressed and public documents are often withheld. There are minimal laws that protect children at school and a real reluctance or lack of authority to enforce those laws.

One More Parent Fighting for Healthy & Safe Schools

NY cont'd on next page

New York

"The results of my testing led to a $300,000 PCB soil clean-up."

In the fall of 2004, I discovered PCB contamination at my son's elementary school in Yorktown Heights, NY. Based on a recent Harvard study on PCBs in window caulking, I sent a piece of window caulking from the school's grounds to a lab for analysis. The results yielded very high levels pf PCBs.
When the Westchester County Health Department refused my request to do indoor and soil testing, I decided to test the soil. The sample yielded PCB levels that exceeded state and federal regulations. The results of my testing led to a $300,000 PCB soil clean-up. This remediation was the first that NYS Health officials had seen due to PCB-laden caulking.
Further testing revealed high levels of PCB in several locations; on the window sills, windows and building masonry joints that prompted school officials to take action.
To educate the public and help change existing laws, I created a website called www.pcbinschools.org

NY Parent

Lessons Learned:

-PCB contamination can occur on the inside and outside of school buildings
-State and federal government officials did not mandate testing for PCBs in caulking materials
-Existing laws do not protect children from contamination
-This is not an isolated incident
-One person can make a difference

No. School Buildings	**4,531**
No. Students	**2,864,775**
No. Minority Students	**1,321,845**
No. Students in Special Education Program	**409,816****
No. Employees in School System	**360,358**
% Children with asthma (under 18)	**9.9%**
% Schools with at least one inadequate building feature	**67%**
% Schools with at least one unsatisfactory environmental factor	**76%**
No. Students At High Risk Daily*	**2,048,314**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

**NCES data not available. Estimated at 409,816 by VESD Dec 2004 report. Found at www.vesid.nysed.gov/sedcar/state.htm

North Carolina

Lessons learned

-All children are required to go to school; therefore schools must provide a healthy, safe learning environment

-With serious health or learning impairments, schools must not only search out children who will be entering school, but also provide a facility that they can access and programs that are apptopriate

The voice

"I want him to be able to have social experiences and an education in public school."

I am a concerned parent with two extremely chemically sensitive children; my youngest is asthmatic as well. We converted our home 2 1/2 years ago to make it safer, environmentally friendly, and more cost effective. We changed the products- laundry cleaners, household cleaners, personal hygiene and dental care- that we use as well. We also took a closer look at our nutrition level- it wasn't bad, but it's now much better than others.

My daughter who is already in school often has stomachaches, and her hands are extremely dry, red and irritated from the soaps used in the school.

Next year my son will enter kindergarten and my husband and I are rightfully concerned. We have asked the Principal, accompanied with a letter from the allergist, to make sure that safer, healthier cleaning products that he can tolerate be used in his classroom. I want him to have a social education in public school, but some changes have to be made to ensure his health and education.

Alert North Carolina Parent

No. School Buildings	**2,268**
No. Students	**1,360,209**
No. Minority Students	**567,168**
No. Students in Special Education Program	**193,418**
No. Employees in School System	**166,713**
%Children with asthma (under 18)	**9.0%**
% Schools with at least one inadequate building feature	**55%**
% Schools with at least one unsatisfactory environmental condition	**68%**
No. Students At High Risk Daily*	**863,528**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**N**

North Dakota

Lessons learned

-Every state should ensure that its students are as safe-- or safer-- at school than they are at home.

The Need

North Dakota has no School Health Promoting Policies for:

- Special Populations
- Vending Machines
- Recess
- Bullying
- Hazing
- Collaboration with Law Enforcement
- Air Quality
- Pesticide Use
- Playground/Facility Safety
- Individual Health Plans

From: www.nasbe.org/healthyschools

No. School Buildings	**556**
No. Students	**102,233**
No. Minority Students	**12,271**
No. Students in Special Education Program	**13,774**
No. Employees in School System	**15,065**
%Children with asthma (under 18)	**6.6%**
% Schools with at least one inadequate building feature	**49%**
% Schools with at least one unsatisfactory environmental factor	**62%**
No. Students At High Risk Daily*	**56,739**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**N**

Ohio

Lessons learned

-Renovations should be prohibited unless precautions are in place

-Superintendents need to be more aware of school environmental conditions and appreciate the effects on the health of the students and staff.

-School closings are a costly process, especially in areas that struggle economically

-Be persistent, and be honest in advocating change; don't ever give up

- Ohio officials now cite 'let's not create another problem like this one'

The voice

"Why should we continue to teach in a building that's making everyone ill? Teach out!"

Sept 2001- The district decided to erect a brand new school building. It went up fast, but we were all happy to relocate. After we adjusted to the change of setting, we thought we'd be fine. I began feeling ill and having problems with my eyes. Meeting with several teachers in the lounge revealed they were experiencing similar problems. We hadn't heard about any kids getting ill- yet. I informed administration about the teacher's complaints and suggested that it may have something to do with the new building. They brushed me off, insisting that the building was flawless. I took action; I began tracking the kids. They were ill; symptoms flared during the week and subsided over the weekend. Soon after, I broke out with a severe rash and a few other teachers were diagnosed with new occupational asthma. Before long parents were inquiring, "what's going on at the school? My child is ill."

Nov 2001- Official school opening. By now it was no secret; the school was making us sick! As the Union Building Representative, I tried going through my local to effect change, but the President was close to the Superintendent, so the buck stopped. I didn't give up. I contacted every agency you can think of and eventually got media attention. The Superintendent said on camera, "It's only 1 or 2 teachers and 3 or 4 children." The nerve! I immediately went to the TV station and showed them my data as well as my rashes.

April 2001- Teach out! We'd had it. We decided to take our classes outside; all but 90 students left the building. This is when things started to change: the school was closed for 16 months and cleaned up. It was a long road to recovery, 25% of teachers retired, resigned or just left. Many children were sick and may still be, but justice finally prevailed.

Heroic Ohio Teacher

No. School Buildings	**3,988**
No. Students	**1,845,428**
No. Minority Students	**372,406**
No. Students in Special Education Program	**257,078**
No. Employees in School System	**242,518**
%Children with asthma (under 18)	**10.0%**
% Schools with at least one inadequate building feature	**76%**
% Schools with at least one unsatisfactory environmental factor	**83%**
No. Students At High Risk Daily*	**1,467,115**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

Oklahoma

Lessons learned

-Always ask school about scheduled renovations and construction; gas powered equipment should be banned in occupied buildings

-US EPA's *IAQ Tools for Schools* is proven effective, but must be utilized properly to produce desired results; it can help avoid these problems

-Be prepared: school might not tell you what you need to know to protect your child

The voice

"Not one person at school told me my child was suffering due to the school renovations"

Thick particulates and fumes filled the halls for weeks outside classes for medically fragile special education students. Although my daughter's already precarious health was affected and she missed more school days, needed more doctors appointments, and took more medications, not one person at school told me about the renovations which were also known to be affecting the health of staff.

Not one: not the teacher, not the nurse, not the aide, and not the Principal. I learned the full extent of the school's dangerous contamination when a member of the support staff called me to pick up my daughter after a gasoline powered engine had been operating indoors.

She was very ill, just days before the end of the school year. Now I wonder if my older child was also affected since she developed a chronic cough.

The school district was working with a designated US EPA *IAQ Tools for Schools* consultant at the time.

Oklahoma Special Education Parent

No. School Buildings	**1,786**
No. Students	**626,160**
No. Minority Students	**241,311**
No. Students in Special Education Program	**93,047**
No. Employees in School System	**67,045**
% Children with asthma (under 18)	**9.2%**
% Schools with at least one inadequate building feature	**54%**
% Schools with at least one unsatisfactory environmental factor	**64%**
No. Students At Risk Daily*	**369,434**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**N**

Oregon

Lessons learned

- Don't be afraid to speak out; it could save your child's life
- Never give up
- Unintended toxic exposures can have lifetime impacts
- Schools and districts with problems can turn into environmental leaders

The voice

"He was so ill he couldn't attend school for 5 years."

A 9 year old boy became very ill after his school was carpeted and he was exposed to many chemicals. He was so ill he couldn't attend school for 5 years. It took a little less than a year to really begin to figure out what was wrong with him and, of course, many years were spent attempting to alter his compromised health. Three years of medical care and it still took some time after the treatments were stopped before the effects were seen. He was re-injured within a few months when he was inadvertently taken to a newly carpeted library. His entire education was impacted by these exposures.

His parents became advocates on environmental issues in schools. The district is now a leader in school environmental quality in the state. One parent went on to help found the National Education Association "Healthy Schools Caucus" and continues to advocate for educators nationwide.

They knew they were right and that they had a voice that no one else had and somehow a responsibility to speak out. The doors keep opening and they keep walking through....

Oregon Parent and Educator

No. School Buildings	1,239
No. Students	551,273
No. Minority Students	126,668
No. Students in Special Education Program	70,548
No. Employees in School System	49,339
%Children with asthma (under 18)	6.5%
% Schools with at least one inadequate building feature	63%
% Schools with at least one unsatisfactory environmental factor	84%
No. Students At High Risk Daily*	405,186
State Education School Facilities Office	N
State OSHA Plan	Y
State Grants for Construction	Y

Pennsylvania

Lessons learned

-Rally together to push for laws regulating school environmental conditions-schools must maintain a sanitary environment for our children.

-Parents need to keep children out of harm's way.

-Children are not trained workplace supervisors and have no OSHA protection.

The voice

"I never thought sending my children off to school would turn out to be such a stressful experience"

My 7 year old daughter and 5 year old twins immediately began to suffer from chest pains, shortness of breath, headaches, itchy eyes, itchy nose, and irritated throat. Alexis came home every day with dark black circles under her eyes. Their activity level was very low. One was later diagnosed with environmental asthma and mold allergies.

The twins were diagnosed with allergic conjunctivitis and severe nasal congestion. Symptoms worsened during the school week and improved over the weekends. A letter sent to parents before the start of this school year indicated that mold had been detected in several classrooms throughout the school. Insufficient mold remediation took place; the district cleaned the school themselves. But the crew that cleaned the school was "supervised" high school children hired by the district!

Public schools are "off limits" for governmental inspections unless they are invited.

My child was the first to be transferred to a new school within the same district. Within one week she was off all her asthma medication and has not suffered from any asthma attacks! The twins were also approved for transfer (eventually). We met many obstacles along the way.

Pennsylvania Parent

No. School Buildings	**3,267**
No. Students	**1,821,146**
No. Minority Students	**431,511**
No. Students in Special Education Program	**253,129**
No. Employees in School System	**216,711**
% Children with asthma (under 18)	**8.4%**
% Schools with at least one inadequate building feature	**42%**
% Schools with at least one unsatisfactory environmental factor	**57%**
No. Students At High Risk Daily*	**901,467**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

Rhode Island

Lessons learned

- Extermination is not permanent. It results in a short-term 'kill', then continued chemical treatments.

- Steps to dry out buildings and to block or screen out insects and other pests must be a requirement in all school districts

The voice

"Spring brings an annual insect disaster"

"Today they just came out of the woodwork. They came our like an army", said the 15 year old veteran teacher. "It's disgusting."

Like a snippet form Alfred Hitchcock's film "The Birds", the termites, which have turned wood moldings into flimsy, deteriorating tunnel chambers over the years, came without warning as the morning turned warm yesterday.

"How am I supposed to do my job when I have to battle with these things every spring? Every year the exterminator comes to spray the school. When temperatures drop after exterminations and the heat is needed, you can't tell me this spray isn't coming up through the vents. I feel like I'm breathing in a toxic waste dump"- teacher.

"This is gross. This is not just a few things in the air; this is thousands of those things. We've had parents tell us they didn't let their kids in the house with their school bags. I think it's a wakeup call to the community that this facility is not what it was years ago. The parents and teachers have a right to be upset; we're doing the best we can with the resources we have."- School Committee Chair Person

March 2006, www.woonsocketcall.com

No. School Buildings	**341**
No. Students	**159,375**
No. Minority Students	**45,475**
No. Students in Special Education Program	**33,443**
No. Employees in School System	**Not available**
%Children with asthma (under 18)	**10.1%**
% Schools with at least one inadequate building feature	**61%**
% Schools with at least one unsatisfactory environmental factor	**75%**
No. Students At High Risk Daily*	**108,375**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

South Carolina

Lessons learned

-It's recommended that the administration be involved every step of the way.

-There are no established levels of "safe" mold exposures.

-Groups that conduct testing do not always have good or established procedures for administering accurate tests. An individual came to our school to take air samples and did it right by a window that had been opened all morning. If comparing that air to the outside air, no wonder the levels matched and were found 'safe'.

The voice

"The Fungus Among Us"

I was teaching an environmental science class and we were covering current environmental stories in the newspaper. Buena Vista, a local elementary school where my children attended, was in the news for having a potential toxic mold. The class voted to research that article together and verify the facts. The further we investigated the more concerned I became for the health of me and my children.

I noticed that there was mold all over our school in the ceiling tiles and later found out it had been there for many years. When I brought the attention of the dangers of the mold to those in authority, I was informed that the "powers that be" did not want to know. Hoping this was merely a lack of education, the class decided to "present their facts" to the school administration in a business-type setting; we collected a lot of data and put it into graphs. The *IAQ Tools for Schools* kit was acquired from the Healthy Schools Network, which also advised us.

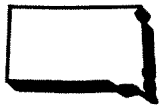
We were surprised to find that we had *Stachybotrys chartarum*.... The results were given to the Principal and only released to the students with approval. A local representative helped get the school a new roof. Currently, most of Greenville County schools are being renovated. Our children can breathe better now and our community is much more aware of the dangers of mold.

USA Weekend published a cover story about the work the students had done; their results were supported by experts all over the country. Suddenly, these kids had the lesson of a lifetime. They made a difference. Not only in their school, but the entire nation was educated about the dangers of indoor molds with their help.

South Carolina Advocate and Teacher

No. School Buildings	1,162
No. Students	669,198
No. Minority Students	318.812
No. Students in Special Education Program	109,561
No. Employees in School System	56,241
%Children with asthma (under 18)	9.2%
% Schools with at least one inadequate building feature	52%
% Schools with at least one unsatisfactory environmental factor	66%
No. Students At High Risk Daily*	394,827
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

South Dakota



Lessons learned

-The New London, TX school explosion in 1937 killed more than 300 people.

-Every school needs to be inspected by outside independent agencies.

-There are no human health standards set for molds, and mold testing is expensive.

-The best website for mold remediation is www.epa.gov/molds.

The Events

Blast Guts School, Two Dead

A gas explosion tore apart a school and ignited a fire, killing two men and injuring a third. One of the men dies after being trapped for hours under debris. The fire marshall said the explosion was caused by a propane gas leak that was somehow ignited. The blast fire gutted the original brick school building and heavily damaged a new addition. School officials had smelled the gas about 5:30 pm Friday and evacuated wrestlers from the gym. The explosion happened 2 hours later when there were only three men present. The school housed grades kindergarten through twelve. Schools in other towns have offered to take the students and donate books and other supplies.

From: Nation and World, November 19, 2000

Schools to Test for Molds

Small patches of peeling paint and discoloration in a few spots at a local elementary school and a high school have prompted administrators to bring in a specialist to test for mold. "We're going to be very proactive". We don't think it is mold, and we just want to be sure. If it is mold, we're going to deal with it immediately."

From: Press and Dakota, February 16, 2002

No. School Buildings	741
No. Students	125,537
No. Minority Students	18,899
No. Students in Special Education Program	17,130
No. Employees in School System	18,026
%Children with asthma (under 18)	5.7%
% Schools with at least one inadequate building feature	45%
% Schools with at least one unsatisfactory environmental factor	50%
No. Students At High Risk Daily*	59,630
State Education School Facilities Office	N
State OSHA Plan	N/A
State Grants for Construction	N

Tennessee

Lessons learned

-Parents, teachers, board members, or anyone suffering from indoor air pollutants should not be afraid to speak out-- small incremental changes can make a huge impact.

The voice

"No one at the school would admit that the school had mold issues"

My 9 year old son started experiencing breathing problems as soon as he started kindergarten four years ago; he was diagnosed with asthma. He had never had any previous problems so this was news to us. His asthma was under control through kindergarten, but upon entering first grade he became really sick. We took him to an allergist and he immediately started four medications plus weekly allergy shots. Besides a PE teacher refusing to let him use his inhaler when he needed it, his first grade year was OK and the summer was great.

When he returned to school in the fall, he became extremely sick again. I called the superintendent to inform him that there was something in the school making my child sick. I was told that the school was fine and there was nothing the school could (or would) do to help me, so I began the long journey of phone calls, from the EPA to local health departments-- anyone who might be able to help. In the spring of 2005, my son had to stay home from school for six weeks due to problems with molds.

No one at the school would admit the school had mold issues, but many of staff and students were ill. The school system has since replaced part of the roof and taken out moldy ceiling tiles. My son is now allowed to call home and inform me of any attacks that he has.

Tennessee Parent

No. School Buildings	1,677
No. Students	936,681
No. Minority Students	269,541
No. Students in Special Education Program	171,594
No. Employees in School System	115,115
%Children with asthma (under 18)	8.5%
% Schools with at least one inadequate building feature	56%
% Schools with at least one unsatisfactory environmental factor	64%
No. Students At High Risk Daily*	562,009
State Education School Facilities Office	N
State OSHA Plan	Y
State Grants for Construction	Y

Texas

Lessons learned

-Did anyone diagnose school children with breathing problems?

-School district decisions may not be in the best interest of the occupants' health and safety

-Many school districts have sub-standard facilities with poor indoor air quality

The voice

"That night I was diagnosed with reactive airway disease"

On December 6, 2001, I entered the underground "crawl space" situated on the other side of our basement-area classrooms to photographically document the conditions that the occupants were being subjected to. This immense dirt dungeon contained untold toxins including an area that looked hauntingly like a pit of raw sewage; there were also blankets of white powder.

That night an ER doctor diagnosed me with Reactive Airway Disease. The white powder turned out to be lime, which is used to treat raw sewage and decompose dead bodies. After pointing out the egregious conditions of the crawl space, a huge clean-up operation commenced and district personnel rerouted the ductwork located in the crawl space.

This dispersed the lime powder into our classrooms via the compromised ventilation system. Since that time, I have learned that the return air for the building was pulled through this horrific space.

I have also learned that I have two precursors to lymphoma and that the school district has civil immunity and is self-insured, which might insulate them from the voices of the students and teachers.

Texas Community Member

No. School Buildings	**8,110**
No. Students	**4,331,751**
No. Minority Students	**2,653,701**
No. Students in Special Education Program	**511,016**
No. Employees in School System	**562,705**
%Children with asthma (under 18)	**9.9%**
% Schools with at least one inadequate building feature	**46%**
% Schools with at least one unsatisfactory environmental factor	**60%**
No. Students At High Risk Daily*	**2,295,828**
State Education School Facilities Office	**Y**
State OSHA Plan	**N**
State Grants for Construction	**Y**

Utah

Lessons learned

-Schools, their communities, and the agencies that should be overseeing children's health need to ensure that all students have adequate health protections in place in school.

-Parents, like Paul Tuck, are leading petition and lobbying drives to improve basic services for children who attend school.

The Event

.... There was no nurse at Michaela's school that day, no medical equipment to ease the frightened girl's ragged breathing and racing pulse. During the 15 minutes it took Paula Tuck to rush to the school, the 70-pound girl began twitching. Scared and alone, she had taken eight more puffs of medication, enough to trigger seizures. The attack ultimately landed Michaela in a hospital for three days.

It also spurred her mother to launch a campaign aimed at getting more full-time nurses for Utah schools. "I was lucky. My child didn't die," says Tuck, 35. "She's too young to baby-sit. She's too young to stay home by herself. She shouldn't have her life in her own hands at school." ....

... A 2004 survey by the National Association of School Nurses estimated there was one nurse for every 5,834 Utah students. That's the worst state ratio in the nation.....

"For a state like Utah that values families so highly, it's amazing to me that children stop to matter when they walk out the door to go to school," she (Tuck) said....

www.usatoday.com, Kevin McCoy, Dec 12, 2005

No. School Buildings	887
No. Students	485,981
No. Minority Students	81,922
No. Students in Special Education Program	57,745
No. Employees in School System	38,974
%Children with asthma (under 18)	6.2%
% Schools with at least one inadequate building feature	62%
% Schools with at least one unsatisfactory environmental factor	72%
No. Students At High Risk Daily*	325,607
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

Vermont

Lessons learned

- We need a federal policy that mandates every school meet High Performance School Standards and provides the funding to back it up

- Schools lack the resources or expertise to deal with IAQ issues. Many times the response is to ignore the problem hoping it will disappear

- I've heard from other parents of children whose health has been compromised by exposures they have received in their schools- we are not alone, so speak out

The Voice

"The school is now proactive in addressing IAQ issues."

My son entered a brand new school on his first day of kindergarten. Unfortunately, the heating, ventilating, air conditioning (HVAC) system was linked to the light switches to save energy. This resulted in also "saving" all the toxic emissions from new carpet, particle board furniture, drapes, cleaning products etc. for the children to breathe when they entered their classroom the next morning. We realized what was making him sick when measurable levels of formaldehyde, a carcinogen, were found in his blood. We removed him from the school and asked the administration to improve the air quality for all the students, with little success.

With the help of a lawyer, we received accommodations for his education and the HVAC system was de-coupled from the light switches. Many thousands of dollars and incredible amounts of stress later my son is attending college on a scholarship, but he still suffers from health problems as well as learning disabilities. The school is now proactive in addressing IAQ issues.

Schools should be a safe place for our children and staff. We need to make Healthy Schools our number one priority; the improvement in test scores and attendance rates will follow.

Vermont Parent

No. School Buildings	**393**
No. Students	**99,103**
No. Minority Students	**4,090**
No. Students in Special Education Program	**14,737**
No. Employees in School System	**16,940**
%Children with asthma (under 18)	**8.0%**
% Schools with at least one inadequate building feature	**53%**
% Schools with at least one unsatisfactory environmental factor	**58%**
No. Students At High Risk Daily*	**55,002**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Virginia

The voices

"The school was evacuated immediately for the remainder of the day."

There are so many things going wrong. At one local elementary school four teachers-all working in the same wing- developed cancer over a very short period of time. In one case the doctor determined it to be environmentally stimulated. At another local elementary school, a floor cleaning procedure took place. Shortly after school was in session (9am) masses of children were coughing and choking. The school was evacuated immediately for the remainder of the day.

I have joined the local PTA and have spoken with the school board about petrochemicals and their association with childhood illnesses. I recently found out that the school district does have some form of Integrated Pesticide Management, but they have not completely converted to safe products. Currently, I am writing letters to local newspapers, asking for support on these issues that are affecting the children.

Virginia Community Member

"Survivor's do not want to see cancer continue in their families. If we have an opportunity to intercede- from a preventive perspective- we should; especially in the case of children."

After I lost many friends and associates to cancer, my wife and I founded a free mammogram program. Recognizing the importance of early diagnoses to cancer cures, I also felt that early diagnosis was just not enough. I wanted to inform communities to reduce the unnecessary and preventable environmental exposures that have been linked to cancer, while emphasizing that only sound science must prevail in evaluating environmental harm to human health.

While embarking on the efforts to reduce environmental cancer links, I became aware of a new vineyard coming in next my children's school. Virginia's wine industry was quick to defend the practice of agricultural spraying adjacent to pre-existing schools, but I have continued to raise the issue through public speaking and writing articles in Virginia newspapers. My first step in battling theses types of collective exposures to children in school was to introduce the idea of best practices to Governor Warner's Administration. Best practices to reduce pesticide drift are now being advocated by the state and I was recently recognized by Virginia's Secretary of Agriculture and Forestry. But they are still spraying.

Next Generation Choices Foundation

VA cont'd on next page

Virginia

Lessons learned

-There is no record keeping on school health risks and problems.

-We need accountability for children's health.

No. School Buildings	**2,074**
No. Students	**1,192,092**
No. Minority Students	**453,961**
No. Students in Special Education Program	**172,480**
No. Employees in School System	**167,977**
%Children with asthma (under 18)	**8.3%**
% Schools with at least one inadequate building feature	**60%**
% Schools with at least one unsatisfactory environmental factor	**58%**
No. Students At High Risk Daily*	**703,334**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

Washington

Lessons learned

-Fiberglass is a relatively new identified hazard that all school systems need to be aware of and to address to avoid long-term health effects. It is commonly found in ceiling tiles and ductwork insulation. Uncontrolled renovations will release fiberglass particles that will sparkle in the sun.
- Washington State has not revised their Washington State Administrative Codes since 1971.
-Schools are given citations by the Dept of Labor and Industries for serious violations, but fines are reduced if they say they have complied.
-$61.00 per student is spent to make sure they pass the WASL's, yet there is no money for IAQ.
-The State Dept of Health must have a prompt response system for when IAQ or emergency situations occur

The voices

"We needed a population of 20% affected or "someone to die" in order for them to become involved."

I've been working on environmental problems as a parent since 1993 when our Elementary School had **asbestos tiles removed with a solvent.** I took my child (now a senior in High School) out of Kindergarten classes there because of them. His school had had a **history of failed water tests since 1974.** Despite these historical problems, I am always told by the state health department that "we needed a population of 20% affected or 'someone to die' in order for them to become involved." Eighteen months passed before the school reacted to complaints and numerous lawsuits. This school is not unique in its problems.

Another school district had 9 years of IAQ problems. Students and teachers had symptoms of facial paralysis, chronic diarrhea, swollen lymph glands, scalp and body rashes, and ovarian cysts. The school district was slow to act....so parents stood up. They began collaborating and created a website to educate other parents on the state of the school and the health problems it was causing.

I have contacted over 150 agencies pleading for help. Parents are so frustrated that we are going to turn to our legislators to fund these problems. I have waited 13 years for the soup of agencies-- OSPI, DOH, SBOH -- to find the necessary funding and formulate an emergency response for IAQ problems.

Never-Stop Washington Parent

WA cont'd on next page

Washington

The voices

FIBERGLASS and chemicals at school with life consequences: "at 22 he took his life".

I live in a dry climate. After several years of chronic illness and unexplained symptoms that improved during the summer, I started looking for answers in the air at my school.... We didn't have a moisture or a chemical problem, so what else was there? Through simple luck ... **we found we were breathing fiberglass**.... It took a year and a half in the building for my first symptoms to appear.... It took me over three years before I recognized a pattern of getting better in the summer and then worsening again by the end of the school year.... Other staffers have developed symptoms also, but it's dangerous to complain..... Though the district did some cleaning, they refused to replace the deteriorating ceiling tiles--the source of the problem.... Since there are no state standards to prevent this, children and adults in the school are still breathing fiberglass, a possible carcinogen and a definite allergy and asthma trigger. Today, I have a permanent disability caused by fiberglass that makes working and living a nightmare. If you suspect fiberglass, get out. Don't end up like me.

At a recent public hearing, I told my story. But nothing prepared me for the **story told by a mother** whose son was exposed to **chemicals used in asbestos tile abatement**.... She told of her child's excruciating pain and fatigue, of the district's assurance that all was safe and of the subsequent effects of the exposure. ....she told of his inability to tolerate vehicle exhaust or going to stores and his need to wear a mask, of the district's refusal to provide a healthier environment, and of a long legal battle.

I understood these things, because I've worn a mask to escape fiberglass and overpowering fragrances.... But I'm not a child. I'm not looking forward to an incredible number of years of horror. After a long battle, **at 22, he took his life.** As his mother finished her testimony, I was ashamed. I was ashamed that this is what we do to children. I was ashamed of school and government officials and parents of healthy children turning a blind eye.

Disabled Teacher and Health Advocate

No. School Buildings	**2,251**
No. Students	**1,021,349**
No. Minority Students	**291,137**
No. Students in Special Education Program	**110,659**
No. Employees in School System	**104,332**
%Children with asthma (under 18)	**7.4%**
% Schools with at least one inadequate building feature	**60%**
% Schools with at least one unsatisfactory environmental factor	**74%**
No. Students At High Risk Daily*	**684,304**
State Education School Facilities Office	**Y**
State OSHA Plan	**Y**
State Grants for Construction	**Y**

West Virginia

Lessons learned

-State education and environmental agencies need to prevent the citing of hazardous facilities near existing schools

-State health and environmental agencies should have a program to help parents and schools when children's health is at risk and/or already affected

The voice

"Coal dust is visible inside and outside the school."

Years after Marsh Fork Elementary in Sundial, WV was built, a coal mining operation moved in next door. Today this includes a huge mountaintop removal mine, a coal preparation plant, and a seeping 2.8 billion-gallon toxic coal waste dam directly above the school. A coal silo 200 feet behind the school loads as many as 250 coal cars a week, mostly during school hours. Coal dust is visible inside and outside the school.

Children complain of headaches, nausea, asthma, and noise.

The school board refuses to test for the obvious coal dust. These children need a new school in a safe area of their community.

No government agency has yet taken responsibility for the health and welfare of these children. Through apathy, fear of job loss, or a sense of hopelessness, most parents will not speak out. Who will intervene?

West Virginia Community Resident

No. School Buildings	799
No. Students	281,215
No. Minority Students	16,563
No. Students in Special Education Program	50,538
No. Employees in School System	34,634
%Children with asthma (under 18)	8.7%
% Schools with at least one inadequate building feature	67%
% Schools with at least one unsatisfactory environmental factor	82%
No. Students At High Risk Daily*	209,505
State Education School Facilities Office	Y
State OSHA Plan	N
State Grants for Construction	Y

Wisconsin

The Voice

"Don't worry. There is just one parent and she is just a housewife with too much time on her hands." School Administrator to School Board Member

I have heard it all in our school system: "Don't tell the parents. They don't need to know any of this." "Tools for Schools-- sure, we have those kits lying around somewhere. We don't use them." Comments like that propelled me into action. As did agency responses such as: "That's the Health Department's jurisdiction. No, that is Commerce's jurisdiction." Fundamentally, the agencies referred me back and forth, with neither agency really able to do anything.

In the end, Commerce did come in and issue citations, but they were for OSHA violations pertaining to the custodial staff for Right-to-Know and Personal Protective Equipment, because those were the only rules on the books that could be cited and enforced.

While that was somewhat helpful for workers, it had nothing to do with our ventilation and exhaust systems deficiencies that were old and improperly designed and installed; and nothing to do with pigeons and pigeon droppings in the air ducts; or molds; or lead in the drinking water; or pesticides applied without notifying parents and staff, and without regard to integrated pest management techniques.

OSHA rules don't pertain to children. That is when I realized that children in K-12 schools in Wisconsin are basically unprotected, and I made a vow to work to change that. Work, I have done. We have legislation pending in the state: it is a start. I will continue to work to make sure that children's health is placed at the forefront in Wisconsin schools – where it should be.

One Mom Pushing for Change

Lessons Learned

-OSHA does not protect children

-No one does

No. School Buildings	**2,250**
No. Students	**880,031**
No. Minority Students	**186,264**
No. Students in Special Education Program	**127,129**
No. Employees in School System	**106,225**
%Children with asthma (under 18)	**8.7%**
% Schools with at least one inadequate building feature	**49%**
% Schools with at least one unsatisfactory environmental factor	**60%**
No. Students At High Risk Daily*	**479,617**
State Education School Facilities Office	**N**
State OSHA Plan	**N**
State Grants for Construction	**Y**

Wyoming

Lessons learned

- Education leaders, assisted by health and environment leaders, can adopt preventive policies to promote student health and safety.

The Need

Wyoming Policies Regarding Student Health

Wyoming has no health policies for:

Violence Prevention Education regarding bullying or hazing
Special Populations
Food Vending Machines
Tobacco Use
Pesticide Use
Playground/Facility Safety
Recess
Individual Health Plans
Reporting Incidents of Violence
Cooperating with Law Enforcement

Wyoming Rule 3991, Chapter 2, Section 6, requires the construction of a school bus to be "reasonably dust-proof"

www.nasbe.org/healthyschools

No. School Buildings	380
No. Students	87,462
No. Minority Students	12,277
No. Students in Special Education Program	13,430
No. Employees in School System	14,037
%Children with asthma (under 18)	6.4%
% Schools with at least one inadequate building feature	49%
% Schools with at least one unsatisfactory environmental factor	68%
No. Students At High Risk Daily*	51,165
State Education School Facilities Office	Y
State OSHA Plan	Y
State Grants for Construction	Y

Appendix

Endnotes for Introduction

1. Enrollment and Employees: 53 million total public and private; public only enrollment projected at 48.2 million for 2004, 6m public school employees. National Center for Education Statistics, "State Nonfiscal survey of Public Elementary/Secondary Education: School Year 2001-05", 2003.
2. Walkable Communities: US EPA, Travel and Environmental Implications of School Sitting, EPA 231-R-03-004, 2003.
3. Contaminated sites: Agency for Toxic Substances and Disease Registry, with US EPA and Morehouse School of Medicine Regional Research Center for Minority Health, Oral Presentation at APHA, October 2001; also, Poisoned Schools: Invisible Threats, Visible Actions", Center for Health, Environment, and Justice, March 2001.
4. Asthma: US EPA, America's Children and the Environment, Second edition, 2003, p69, citing data from the Centers for Disease Control and Prevention, www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm
5. Schools and air quality: US EPA "IAQ Tools for Schools"; number of public schools, 94,112 in 2001-02, National Center for Education Statistics, "Overview of Public Elementary and Secondary Schools and Districts: School Year 2001-02", 2003.
6. Students in Special Education: 23rd and 24th US Department of Education/Office of Special Education Programs (OSEP) Annual Reports to Congress.
7. Gurney, JG. Fritz, MS et al. Analysis of prevalence trends of autism spectrum disorder in Minnesota. Arch Pediatr Adolesc Med. 2003. Jul; 157(7):619-21.
8. Provided by American Association on Mental Retardation, The Autism Autoimmunity Project, http://www.taap.info/epidemic.asp
9. Journal of School Health, *Dec 2004, Science-Based Recommendations to Prevent or Reduce Potential Exposure to Biological, Chemical, and Physical Agents in Schools,* Shendell, et al.
10. M Mendell et al. "A Summary of Scientific Findings on Adverse Effects of Indoor Environments on Students' Health, Academic Performance and Attendance", US Department of Education, PPSS #2004-06, completed pursuant to Section 5414 of No Child Left Behind.

Footnotes to State Data Tables

11. **See data table below for detail.**
    www.nces.ed.gov/programs/stateprofiles/
12. American Lung Association. www.lungusa.org >research>data and statistics> asthma
13. American Society of Civil Engineers Infrastructure Report Card. www.asce.org/reportcard/2005.
14. No. Students at risk daily calculation.
    Example: Alabama
    % Schools with at least one inadequate building feature = 59%

% Schools with at least one unsatisfactory environmental factor = 63%
No. Students = 731,220
Calculation: 59%+63%= 122/2 = 61%
61% X 731,220 = 446,044 (Estimated Number of Students at High Risk Daily*)

15. Council of Educational Facility Planners. www.cefpi.org/pdf/state.doc
16. American Federation of State, County, and Municipal Employees. www.afscme.org/health/safe14.htm
17. Education Week and Teacher Magazine. January 5, 2006. p 95

See data table below for sources

No. School Buildings (2003-2004 survey)	FN. 11
No. Students	FN. 11
No. Minority Students	FN. 11
No. Students in Special Education Program	FN. 11
No. Employees in School System	FN. 11
%Children with asthma (under 18)	FN. 12
% Schools with at least one inadequate building feature	FN. 13
% Schools with at least one unsatisfactory environmental factor	FN. 13
No. Students At Risk Daily*	FN. 14
State Education School Facilities Office	FN. 15
State OSHA Plan	FN. 16
State Grants for Construction	FN. 17

Additional Resources

US EPA Healthy School Environments, www.epa.gov/schools, especially Healthy SEAT (School Environmental Assessment Tool) to help policy makers and districts assess facility conditions and prioritize management actions and repairs.

US Department of Education-sponsored **National Clearinghouse on Educational Facilities**, www.edfacilities.org

Pediatric Environmental Health Specialty Units (PEHSU), co-located at medical centers with occupational health clinics, federally designated by US EPA and CDC to assist communities and providers with environmental health issues, www.aoec.org

Environmental Law Institute, online Bookstore, reports on school environments, including Indoor Air, High Performance Design, and School Liability for IAQ, www.eli.org

National Association of State Boards of Education, for state education policies on children's health at school, www.nasbe.org/healthyschools

NEW YORK STATE SCHOOL FACILITIES

AND

STUDENT HEALTH, ACHIEVEMENT, AND

ATTENDANCE:

A DATA ANALYSIS REPORT

ACKNOWLEDGEMENTS

Healthy Schools Network wishes to acknowledge the inspirational leadership, advice, and generous support of the Rockefeller Foundation's Working Communities Program that encouraged us and gave us the support we ne4eded to attempt this unique and heretofore unattempted data analysis of new York State Schools Facilities. The work is possible only because New York State makes public school academic report cards available and has laws that require school facility reports as well.

We also wish to thank the Mount Sinai School of Medicine's Department of Community Medicine and the State University of New York at Albany School of Public Health for their Masters in Public Health Interns who assisted with data collection, data entry, and data analysis in 2004 and 2005.

Finally, we are particularly grateful to consultant John D. Shaw, CEO, Next Wave, Albany, NY, without whose knowledge and expertise in data systems this project would not have happened.

New York State School Facilities

and

Student Health, Achievement, and Attendance:

A Data Analysis Report

Executive Summary and Recommendations

Students who attend schools with environmental hazards that impact indoor air quality are more likely to miss class, and therefore lose learning opportunities.

Yet school environmental health and safety remains largely unregulated and there is no state or federal agency in charge of protecting children's environmental health in schools. This report, *School Facilities and Student Health, Achievement, and Attendance: A Data Analysis*, looks at information compiled from all public schools in two New York counties, and from a select group of schools from around the state that have reported environmental health and safety problems.

The findings show that, despite the lack of an up-to-date system for collecting data on environmental hazards in schools, it is still possible to correlate existing information with state funding to repair hazards and to show that unhealthy schools rob students of valuable classroom learning time.

As a result of the Campaign for Fiscal Equity lawsuit, discussion and debate concerning New York State education policy in recent years has centered on funding. The New York State Court of Appeals has upheld a ruling ordering New York to increase the amount it spends per student in New York City, although the State has yet to act on the ruling. State political leaders are searching for ways to meet that mandate, while also increasing spending on students in school districts outside the City. Making sure students are learning in healthy school environments is one cost-effective way to meet state education spending goals. This involves holding the state and school districts accountable for spending funds on new and renovated facilities that are designed to improve student health and learning from the beginning.

Unfortunately, very little work has been done to explore the relationship between the condition of school facilities and student performance. Demonstrating such a link would provide an important new element to the discussion about the efficient use of valuable, yet limited, educational resources. With generous support from the Rockefeller Foundation, Healthy Schools Network (HSN) has conducted this relatively small research project to survey the landscape that can lead to a full large scale study researching the link between the environmental health of school facilities and student performance.

To achieve this goal, HSN has carried out the most thorough study ever conducted into how New York State records the data necessary to make such important evaluations.

Our report looks at schools in two of New York State's fastest growing counties: Dutchess and Columbia. These two Hudson Valley counties, typical of so much of Upstate New York, were selected for their mix of small cities, suburbs and rural communities. In the past decade, New York State has put in place rules and procedures to track environmental quality in schools, notably the 1999 Re build Schools to Uphold Education (RESCUE) program initiated by the Commissioner of Education. Nevertheless, we found that the lack of consistent reporting criteria and data collection makes it very difficult to track and correlate official individual school and district reports of hazards in schools.

This necessitated solving a problem that was unanticipated at the start of the project: the lack of an interfaced reporting system that would allow us to compare school facilities data reported to the State Education Department (SED) from building condition surveys (BCS) and annual visual inspections (AVI). Healthy Schools Network solved this problem by creating a model reporting system that worked for this report and that could serve as a template for SED to improve the future quality of its facilities conditions database.

Healthy Schools Network next correlated the results of the building surveys with existing data on student health complaints from a sample of 30 schools across the state. For the latter, we relied mainly on reports to our own student health hotline from students, parents and teachers and school staff. Through this research, we were able to determine that the current school facility assessment tool is a fair indicator of potential student environmental health problems.

Finally, we correlated our facility data from the two county area with NYS Education Department School Report Cards, reflecting a measure of student academic achievement. From this limited study we learned that there is indeed a correlation between poorer academic achievement for students attending schools where environmental hazards have been identified. Again, this limited study examines the landscape for a potential next phase, large study looking at the effect of the condition of school facilities on student achievement.

Based on the conclusions of our research, we are making the following recommendations:

1. Replace the current system of annual school facilities reports with one using evidence-based assessments actionable in a short (one year) time frame and link it to state funding that is currently available under the minor maintenance and repair (MMR) program to mitigate identified hazards.
2. Create unified linking codes for each school and collect the data via the internet for better accuracy and public accessibility.
3. The New York State Education Department should make the facilities environmental quality data available to parents and the general public to facilitate improvement efforts.
4. The methods used for this study, in particular the linked building and performance data, should be replicated in other counties around the state for more precision of analysis and targeting of priorities.

Data for this report came from 18 separate school districts, six in Columbia County and 12 in Dutchess County, for the 2002-2003 school year. It was augmented by data collected from 11 of the same districts for the 2003-2004 school year.

New York State School Facilities and Student Health, Achievement, and Attendance: A Data Analysis Report

November 2005

Prepared by

Stephen Boese, New York State Director, Healthy Schools Network, Inc.

and

John Shaw, Consultant, CEO, Next Wave

New York State is home to over 4000 schools, receiving nearly three million children everyday. An estimated 20% of the state's population is in a school facility on any given school day. Assuring the health and safety of children, teachers and all school staff should be among the highest priorities of state policymakers.

Yet in New York State, and throughout the country, school environmental health and safety remains largely unregulated. School officials are, for the most part, unaccountable for assuring environmentally healthy and safe schools for students, teachers and staff. While children are especially vulnerable to school facility related environmental hazards, there is no regulatory authority equivalent to OSHA that protects children's "occupational health" at school. Many, especially parents, are also surprised to learn that neither the state nor local health departments have jurisdiction to regulate environmental health and safety in school, except for cafeterias and swimming pools. Even code enforcement officers may be denied entry to public educational facilities unless invited in by local school authorities.

To its credit, New York State has taken a few steps forward in attempting to address school environmental quality.

- Ten years ago, the Board of Regents approved the groundbreaking recommendations of the Regents Advisory Committee on Environmental Quality in Schools. They provided a groundbreaking analysis of environmental health and safety in NYS schools and a set of guiding principles and a detailed set of recommendations for addressing school environmental quality.

- In 1999, the Commissioner of Education's RESCUE (Rebuild Schools to Uphold Education) regulations represented an unprecedented effort by the State to improve school facilities. These regulations require schools to conduct periodic facility inspections, including five year building condition surveys, and annual visual inspections. Yearly school facility report cards are supposed to be made public. The RESCUE regulations also require schools to adhere to a process for resolving environmental health and safety problems, including establishment of school district health and safety committees.

- In 2004 State Education Commissioner Richard Mills and New York Energy Research and Development Authority (NYSERDA) President Peter Smith agreed to co-develop new healthy and high performance school design guidelines for New York State schools.

- In 2005 Governor Pataki signed the Green Products Cleaning bill. This legislation that will require schools to use healthier, environmentally preferable green cleaning products. The green products cleaning program for schools will begin with the new 2006 school year.

- This, combined with other legislation of recent years protecting children from pesticides, mercury exposure, arsenic treated playground equipment, the Minor Maintenance and Repair Fund, and other initiatives show a genuine bipartisan commitment by New York State to address issues of children's environmental health, learning and schools facilities.

For this study, Healthy Schools Network has assessed the adequacy of the New York State Education Department's (SED) school facility inspection and accountability system, as it pertains to environmental health and safety. This analysis examines a limited set of school facility data, to identify certain patterns, and to pose questions for further research regarding a potential future large-scale study to more broadly assess the condition of school facilities on student health and learning. The specific SED data used includes;

- Building Condition Surveys (BCS) -- a facility inspection report required by regulation to be completed every five years by the district and signed by a licensed architect or engineer for each school facility (see attachment # 1)- Note that the BCS has been revised and reformatted for 2006. This analysis used the first version of the BCS.

- Annual visual Inspections (AVI) -- a facility inspection report to be completed by the district annually (see attachment # 2). As with the BCS, the AVI has been revised and reformatted for 2006.
- Minor Maintenance and Repair Aid (MMR) – forms completed by districts to apply for aid for minor facility repair and maintenance projects (see attachment # 3)
- Building Aid – data available from the SED website regarding district expenditures for renovation and construction of school facilities.

We looked at the relationship of building aid and MMR data to the school inspection data and also examined SED school facility inspection data in relationship to student health and learning. This analysis also produced findings regarding the adequacy of SED facility data and the SED facility data collection process.

Our objectives in this analysis are to determine: 1) if the current New York State facility reporting system is adequate for predicting financing needs for renovation and repair; 2) if this data suggests that the condition of school facilities has a measurable and tangible impact on student performance, and 3) if the current facility reporting system is adequate to document and measure the condition of school facilities in relation to student health and achievement.

Data Sources

- Building condition survey data for Columbia and Dutchess Counties (year 2000).
- Annual visual inspection data for Columbia and Dutchess Counties (years 2001, 02, 03).
- Data regarding building aid expenditures for Columbia and Dutchess Counties (ongoing database).
- Data on Minor Maintenance and Repair expenditures for Columbia and Dutchess Counties.

- Data regarding student academic achievement from the NYS database of School Report Cards (SRC)(?)
- Healthy Schools Network data from our NYS database of environmental health complaints for NYS schools (ongoing database).

Findings: Limitations in SED Data

In general, we found that significant improvement is needed in the content of the tools, the process to collect the data, and the process to retrieve and effectively use the data.

- The NYS SED's system of data collection is disjointed. Each data source is designed independently, using different codes and code formats to represent each school. Some data is computer collected, while other data is collected on paper, creating manual retrieval and data entry effort. Pulling together data from all sources for each school required creating of a linked table of all applicable codes for all data sources for each school.
- SED control numbers are not listed on MMR forms; we had to look up in BCS and put them in the database.
- Inconsistent building numbers for SRC and facilities inspection reports.
    - Inconsistent formats (order of fields, dashes, etc.).
    - Inconsistent within SED vs. in Districts (e.g. AVI's Codes Reformatted).
- AVI data is not available electronically and a large amount of time was spent creating this database. Note: We had received 217 hard copies of AVI Reports for 101 schools in Columbia and Dutchess Counties for years 2001-02, 2002-03 & 2003-04.
- While doing the data entry process we discovered several limitations with the AVI data.
    - 18 of 217 reports had important information on the AVI Report missing or left blank.

- Control numbers were printed wrong for some schools, had different formats and different numbers of digits. This made it impossible to link the information with BCS. This necessitated creation of our own link table.

- SED has MMR data for districts, but not for individual schools.. There is insufficient MMR data to assess use of these funds in relation to needs identified in the BCS and AVI.
- AVI Reports look similar to BCS and are exactly the same in the information required of schools. In terms of data reported by schools, there is minimal variation (only 1.3% for unsatisfactory building components) between the BCS and the AVI.
- Inconsistent identification of school facilities across SED data sources[, many to many relationships]?
    - Several buildings for one program (e.g. mobile classrooms used).
    - Several programs for one building (e.g. Jr./Sr. High).

Part 1

Part 1. Research Question

The first level of analysis was to assess the adequacy of data tools used by the New York State Education Department and local school districts that are intended to document and measure the conditions of school facilities (the BCS, the AVI). The BCS and AVI are legally required facility inspection reports to be completed by schools in accordance with Part 155 of the New York State Commissioner of Education's Regulations, also known as RESCUE (Rebuild Schools to Uphold Education).

While required by law, it is unclear what function these inspection reports have for management of school facility health and safety. We are especially interested in the State's allotment of funds for renovation and replacement of school facilities in the aid category known as building aid. In previous discussions with SED officials, we learned that BCS and AVI school inspection data was not used by SED in their process of allotting school building aid for rebuilding and renovating schools. We are also similarly interested in the allotment of funds to school districts for minor maintenance and repair. Minor Maintenance and Repair (MMR) funds are provided to school districts for certain facility maintenance projects. We compared the minor maintenance and repair expenditures with the building aid expenditures.

Part 1. Methodology

For this first level of analysis, we limited our study to two contiguous NYS counties, primarily to limit the scope to produce meaningful findings with limited means. Columbia and Dutchess Counties were chosen because they represent a geographic region that is broadly representative of upstate NY, with a mix of small cities, suburbs and rural communities.

We asked the research question; "are school facility environmental health issues identified in the BCS and AVI related to MMR and building aid expenditures?" If building aid is expended for projects that bear a relationship to facility needs identified by schools in the BCS and AVI, then this would indicate that the inspection reports are capturing some data relevant to environmental health and safety. If there is a weak or no discernable relationship between BCS and AVI school

inspection data, then this would indicate that the inspection reports themselves are not capturing relevant data.

Our working assumption is that school district officials and SED should be spending public building aid funds for projects that address the greatest needs. If building aid is allotted for projects that don't represent a facility need as identified in the BCS and AVI, then this would indicate a weakness in the inspection reports, the building aid expenditure process, or both.

We compared BCS and AVI data with MMR and state building aid funds drawn down by schools to see any patterns and relationships between the school inspection data and actual funds used for renovation, repair and rebuilding of schools. To do this, we created a master table to link these different data sources, since BCS, AVI and building aid reports are all collected by SED using different formats (see attachment # 4). In fact, we found that SED has no electronic database of Annual Visual Inspections, necessitating hours of effort on our part to organize and enter data manually from AVI photocopies supplied to us by SED.

Once the master table was designed and populated, we were able to link and merge the BCS, AVI, MMR and building aid date. We measured the relationship between identified facility needs from the BCS and AVI in relation to school aid expenditures and further estimated the degree of the relationship between building condition and student performance. We compared them with each other for a two county sample of 95 schools, to relevant science evidence for maintaining a healthy school environment, and to a database of reported health and safety problems. Using the merged data, we estimated the relationship between building condition and school performance.

Part 1. Findings

- Building components rated "unsatisfactory" on the BCS typically had an approved building aid capital project apparently approved to address the need, but lack of detail precluded specific verification. There is insufficient detail to address targeting of maintenance and repair funds.

Part 2 . Problem Schools Research Question

For our second level of analysis, we asked whether schools with identified environmental health and safety problems were also showing potential health and safety issues as reflected in the BCS. If we identify a relationship between the HSN data of thirty select New York State schools that had individuals reporting health and safety problems with those schools' building condition surveys, then this would indicate that the BCS is capturing some information indicative of a serious school environmental health issue. If this comparison showed no relationship, it would indicate that the BCS is not capturing relevant data.

Part 2. Methodology

For this phase of the study, we selected 30 schools from the HSN New York State database that have reported facility related environmental health issues. We then compared this data to the State BCS database. From the information we have the facilities complaints can be one or more of the following:

1. Construction and renovation – inside or outside the building – dust , fumes (welding, paint), cement, chemicals, big equipment kept around study areas.
2. Molds
3. Roof leaks
4. Indoor air quality – ventilation, odors

5. Temperature control
6. Lighting
7. Use/presence of harmful chemicals (cleaning chemicals, presence of pesticides)
8. Asbestos
9. Sewage backup

Similarly the health complaints were one or more of the following:

1. Asthma
2. Sinus
3. Nose bleeds
4. Sore throats
5. Headaches/migraines
6. Stomach aches/cramps ,other stomach problems
7. Various allergies (most of them unspecified by person complaining)
8. Miscarriages

Part 2. Findings

- We have information for 30 schools. Out of that 12 complaints (40 %) were respiratory tract infections/problems.
- Asthma is the most common. Among the respiratory tract problems, nine of 12 were asthma.
- There were 4/30 complaints of headaches, 2/30 miscarriages, 2/30 allergies, 1/30 Nose bleed and 1/30 case of dizziness.
- Among the facilities, complaints due to construction and renovation going on in school were highest 13 /30 (43 %).
- Out of 13 facilities complaints, 8/13 schools (61%) also had one or more of the above health complaints associated with it.

- Molds were the next most frequent problem 8/30 (26%) followed by poor indoor air quality 7/30 (23 %) and roof leaks 5/30 (16%).
- We had BCS data for 21/30 schools. The rest of the schools were not on the electronic BCS database.

Linking the BCS, Key Systems (Systems linked to Asthma) and the 30 Problem Schools.

We found that 5 schools -- Wilbur H. Lynch Middle, Ryder Elementary, Woodstock Elementary, New Windsor School and Troy High School -- had one or more unsatisfactory key systems and complaints of respiratory tract infections. Wilbur H. Lynch Middle and Ryder Elementary had sinus and/or allergies complaints and the rest of the 3 had asthma and/or sinus, allergies, bronchitis. It is important to note that four of these schools Ryder ES, Woodstock ES, New Windsor School & Troy HS also had molds.

- Linking BCS reports to problem schools we found that 11/21 schools (50%) had one or more major/important facilities listed as unsatisfactory.

Though the results are not statistically significant due to small sample size, they clearly show some relation between health complaints and schools having poor facilities. We maintain a database of complaints and once we have enough data, leading towards a larger study, we might be able to see a clearer picture.

Part 3. Research Questions

Does the school inspection data suggest a correlation between school facility conditions and academic achievement? Do these findings suggest an opportunity for a larger study regarding school facility conditions and academic achievement?

Part 3. Methodology

For the third level of analysis, we compared the two county BCS data with the SED School Report Card database to assess patterns in conditions of school facilities and student academic achievement.

Part 3. Findings

- Academic achievement relationships to facility conditions were both measurable and consistent with scientific evidence.
- Schools with "unsatisfactory" reported in one or more of 53 measured building components had:
    - higher suspension rates (2-9%)
    - lower attendance rates in middle and high school (2-3%)
    - lower total (math and English language arts) test scores (-5%)
    - In the subset of schools where the "unsatisfactory" facility condition was in one or more of eight building components science evidence predicted the greatest relationship (**See other study**), differences were even greater: suspension rates 2-14% higher, attendance 2-4% lower and test scores 6% lower.
- Statewide, over one-third of schools generating a parent or staff health complaint in the HSN database had one or more major building systems rated "Unsatisfactory" in the BCS. This compares with only 4% average for schools outside of New York City and 5% for our 2 county sample.

- Performance relationships to facility condition were measurable and consistent with science evidence. Schools with "Unsatisfactory" in one or more of 53 building components had lower performance. Differences were even greater in the subset of schools where the Unsatisfactory was in the 8 building components where the science evidence predicts the greatest health relationship:

Performance Measure	1+ U in 53 Components	1+ U in 8 "Key" Components
Suspensions	2-9% higher	2-14% higher
Attendance	2-3% lower (Mid/High)	2-4% lower (Mid/High)
Test Scores (Math+ELA)	~5% lower	~6% lower

Analysis

New York has important building blocks in place for assuring that school facilities are healthy learning environments that facilitate rather then impede academic achievement. These building blocks include school inspections as required by the building condition survey, and by the annual visual inspection. The state also has a generous building aid program, worth well over $1 billion annually, and a modest minor maintenance and repair fund, worth $50 million annually. Yet, school inspection data is not coordinated with facility related expenditures.

Our Part One analysis shows that there is a significant correlation between funds spent for building aid, and identified school facility deficits as recorded on the school inspection reports. This is encouraging, as it shows that school inspection reports (BCS and AVI) can potentially be used by the state for prioritizing building aid. This prioritization should be geared towards remediation of school facility deficits, especially health and safety problems, as the first priority

for the apportionment of school building aid. Due to the very general nature of the data, no conclusions were reached regarding the MMR reports and their relationship to school facility inspection reports.

Our Part Two study shows that schools with identified health and safety problems show a tendency to have these problems reflected in the school inspection reports. While this is a small sample, it further indicates that tools may be available for SED to allocate facility funds based on identified health and safety problems.

Our Part Three study shows that we can indeed identify a significant correlation between school facility conditions and academic achievement. This could be the basis for a much larger study that would correlate facility inspection data and facility report card data for all schools in the state.

Recommendations

Based on this research, Healthy Schools Network recommends:

1) Replacing the current annual report with one using evidence-based assessments actionable in a short (one year) time frame, possibly linked to targeted funding under MMR.
2) The state Education Department should create uniform linking code(s) for each school and use internet-based data collection for better accuracy and accessibility,
3) SED should make this data, including historical data, routinely available to the general public to facilitate improvement efforts.

4) Linked building and performance data should be compared beyond the 2 sample counties for more precision of analysis and targeting of priorities.

Building Condition Survey

New York State Education Department
Office of Facilities Planning
BUILDING CONDITION SURVEY REPORT and BUILDING SAFETY RATING

Name of School District School District Final Inspection Date: Final Inspection Date

Building Name Building Name SED Control Number: SED Control Number

Building Address Building Address

Grades Housed K – 12 Student Enrollment _____ Certificate of Occupancy Status & Expiration Date _____

A/E Firm Name _____ Firm Address: _____

Firm Phone Number: _____ _____

Firm E-Mail: _____ _____

Name of Professional Performing Inspection: _____ License No.: _____

Was Waiver Granted? ☐ Yes ☐ No If Yes, Date: _____
Overall Building Rating [redacted]
Was overall building rating established after consultation with Health and Safety Committee? ☐ Yes ☐ No

Program Spaces Provided. Check all that apply.

☐ N/A	☐ Gymnasium	☐ Cafeteria	☐ Kitchen	☐ Library	☐ Lrg. Group Instruction
☐ Auditorium	☐ Art	☐ Audio Visual	☐ Computer Room	☐ Home & Careers	☐ Guidance
☐ Music	☐ Science Labs	☐ Technology/Shop	☐ Special Ed.	☐ Pre-K	☐ Other (Please describe)
☐ Health Suite	☐ Resource Rooms	☐ Remedial Rooms	☐ Teacher Resources	☐ Swimming Pool	_____

Accessibility Provided for Physically Impaired. Check all that apply.
☐ Parking- Exterior Route ☐ Building Entrances ☐ Interior Route ☐ Toilet Rooms

Is a comprehensive maintenance plan in effect? ☐ Yes ☐ No

Was overall building rating established after consultation with Health and Safety Committee? ☐ Yes ☐ No

Building System Ratings: **E, S, U, F, or I** System Types: **C, A, H, or S**

E Excellent: No remediation required.
S Satisfactory: System functioning reliably, but routine maintenance and repair is required.
U Unsatisfactory: System is functioning unreliably or has exceeded its useful life. A corrective action plan is in place and repairs or replacement have been scheduled.
F Failure: System is non-functioning, unreliable or not functioning as designed. System endangers occupant health and/or safety, and/or has deficiencies that have resulted in serious accident or injury.
I Indeterminate: Requires additional probing or testing and a summary report will be issued.

C Comfort
A Aesthetic
H Health & Safety
S Structural

Overall Building Rating: **E, G, S, or U**
E Excellent Systems rated in overall excellent condition. Preventive maintenance plan in place.
G Good Systems rated in overall good or better condition.
S Satisfactory Any system categorized as comfort or aesthetic rated as unsatisfactory. All systems categorized as health and safety or structural rated good or better.
U Unsatisfactory Any system categorized as health and safety or structural rated **F** - Building Certificate of Occupancy may be rescinded.

System	Sys Type	Sys Rating	Remaining Useful Life (Years)	Cost to Reconstruct/Replace	Last Major Reconstruction/Replacement (year)	Remarks
1.1 Site Electrical						
1.2 Site Gas	H					
1.3 Site Water	H					
1.4 Site Fuel Tanks	H					
1.5 Site Storm Water						
1.6 Site Sanitary	H					
1.7 Paving	H					
1.8 Playgrounds						
1.9 Play Fields						
1.10 Security						
Barriers/Fencing						
2.1 Roofing						
3.1 Exterior Walls						
Chimneys						
Parapets						
3.2 Exterior Doors						
3.3 Windows						
3.4 Fire Escapes	H					
4.1 Structural Conc. Slabs	S					
4.2 Masonry Bearing Wall	S					
4.3 Structural Steel	S					
4.4 Wood Beams	S					
5.1 Floor Finishes						
5.2 Wall Finishes						
5.3 Ceilings						
5.4 Lockers						
5.5 Interior Doors						
5.6 Hardware						
6.1 Electrical Service/Dist.	H					
6.2 Lighting						
6.3 Communications Systems	H					
6.4 Technology Infrastructure						
7.1 Water Dist. System	H					
7.2 Plumbing/ Drainage Sys.	H					
7.3 Plumbing Fixtures						
7.4 Water Heaters						

System	System Type	System Rating	Remaining Useful Life (Years)	Cost to Reconstruct/Replace	Last Major Reconstruction/Replacement (year)	Remarks
8.1 Boiler / Furnace	H					
8.2 Heating System Piping						
8.3 Ventilation Sys.	H					
8.4 Ductwork						
8.5 Unit Ventilators	H					
8.6 Air Handling Sys.	H					
8.7 Terminal Units	H					
8.8 Exhaust Sys.	H					
8.9 Control Sys.	H					
8.10 Heating Fuel Sys.	H					
8.11 Air Conditioning Sys.						
9.1 Stairs	S					
9.2 Elevators						
9.3 Swimming Pool Sys.						
10.1 Fire Alarm Sys.	H					
10.2 Smoke Detection Sys.	H					
10.3 Sprinkler Sys.	H					
10.4 Emergency Lighting	H					

System	Estimated Cost for necessary improvements	Remarks
11.0 Environmental Conditions		
11.1 General Appearance		
11.2 Cleanliness		
11.3 Acoustics		
11.4 Lighting Quality		
11.5 Thermal Comfort		
11.6 Humidity		
11.7 Ventilation		
11.8 Space Adequacy		
11.9 Evidence of Vermin		

Annual Visual Inspection Report

New York State Education Department
Office of Facilities Planning
ANNUAL VISUAL INSPECTION REPORT
Directions
for completion of the Annual Visual Inspection Report

There are three parts to this inspection report. Across the bottom left of the computer screen you will see Directions, Working Copy and Submission Copy. To switch between parts, place the mouse pointer over the applicable tab and click the left button.

The Annual Visual Inspection Report form must be completed by November 15th and submitted to SED by January 15. The first page has information similar to the original Building Condition Survey and the remaining pages are identical to the original survey. Print as many copies of the Working Copy as you have buildings to survey. Record all your information by hand prior to filling in the submission sheet.

All the information from the Working Copies must be typed into the Submission Copy before it is sent to SED. To do this place the mouse pointer over the box you wish to fill in, click the left mouse button and type in the information. Remarks should be brief and should not exceed the size of the box.

In order to reduce the size of the report, upon completion delete all the rows that have no information in them. To do this place the mouse pointer over the gray number on the left of the page and highlight the row so the row becomes black. Press the right mouse button and select delete. The row will disappear. To delete multiple rows, place you mouse pointer over the first gray row number, press the left mouse button, and drag the mouse pointer down the column of numbers until all the rows to be deleted are selected. Then release the left mouse button, press the right mouse button and select delete. Repeat these steps until all the rows containing no information in are deleted.

As you complete the Submission Copy of each building, print it. To speed up the process for multiple buildings, SAVE your original submission copy after you fill in page one and prior to filling the survey information. As each building is completed, return to your saved copy, change the building name and complete the survey information for that building.

Keep a copy of the completed report for your records and send the original report to:

Office of Facilities Planning
New York State Education Department
Room 1060 EBA
Albany, N.Y. 12234
Attention: Mr. Dave Clapp

New York State Education Department
Office of Facilities Planning
ANNUAL VISUAL INSPECTION REPORT

Name of School District **School District**

Building Name **Building Name**

Building Address **Building Address**

Grades Housed **K-12** Enrollment: _____

Status and Expiration Date _____

District Director of Facilities _____
Telephone Number _____

Health & Safety Comm. Mbr. _____
Telephone Number

Code Enforcement Official _____
Telephone Number _____

Inspection Date **Inspection Date**
SED Control Number

Certificate of Occupancy **SED Number**
Status & Expiration Date _____

Signature _____
E-Mail Address _____

Signature _____
E-Mail Address _____

Certification No. _____
Signature _____
E-Mail Address _____

Is a comprehensive maintenance plan in effect? ☐ Yes ☐ No

Was overall building rating established after consultation with Health and Safety Committee? ☐ Yes ☐ No

Building System Ratings: **E, S, U, F, or I** System Types: **C, A, H, or S**

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I Indeterminate: Requires additional probing or testing and a summary report will be issued.

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A Aesthetic
H Health & Safety
S Structural

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G Good Systems rated in overall good or better condition.
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System	Sys Type	Sys Rating	Remaining Useful Life (Years)	Cost to Reconstruct/Replace	Last Major Reconstruction/Replacement (year)	Remarks
1.1 Site Electrical						
1.2 Site Gas	H					
1.3 Site Water	H					
1.4 Site Fuel Tanks	H					
1.5 Site Storm Water						
1.6 Site Sanitary	H					
1.7 Paving	H					
1.8 Playgrounds						
1.9 Play Fields						
1.10 Security						
Barriers/Fencing						
2.1 Roofing						
3.1 Exterior Walls						
Chimneys						
Parapets						
3.2 Exterior Doors						
3.3 Windows						
3.4 Fire Escapes	H					
4.1 Structural Conc. Slabs	S					
4.2 Masonry Bearing Wall	S					
4.3 Structural Steel	S					
4.4 Wood Beams	S					
5.1 Floor Finishes						
5.2 Wall Finishes						
5.3 Ceilings						
5.4 Lockers						
5.5 Interior Doors						
5.6 Hardware						
6.1 Electrical Service/Dist.	H					
6.2 Lighting						

6.3 Communications Systems	H					
6.4 Technology Infrastructure						
7.1 Water Dist. System	H					
7.2 Plumbing/ Drainage Sys.	H					
7.3 Plumbing Fixtures						
7.4 Water Heaters						

System	System Type	System Rating	Remaining Useful Life (Years)	Cost to Reconstruct/Replace	Last Major Reconstruction/Replacement (year)	Remarks
8.1 Boiler / Furnace	H					
8.2 Heating System Piping						
8.3 Ventilation Sys.	H					
8.4 Ductwork						
8.5 Unit Ventilators	H					
8.6 Air Handling Sys.	H					
8.7 Terminal Units	H					
8.8 Exhaust Sys.	H					
8.9 Control Sys.	H					
8.10 Heating Fuel Sys.	H					
8.11 Air Conditioning Sys.						
9.1 Stairs	S					
9.2 Elevators						
9.3 Swimming Pool Sys.						
10.1 Fire Alarm Sys.	H					
10.2 Smoke Detection Sys.	H					
10.3 Sprinkler Sys.	H					
10.4 Emergency Light'g	H					

System	Estimated Cost for necessary improvements	Remarks
.0 Environmental Conditions		
.1 General Appearance		
.2 Cleanliness		
.3 Acoustics		
.4 Lighting Quality		
.5 Thermal Comfort		
.6 Humidity		
.7 Ventilation		
.8 Space Adequacy		
.9 Evidence of Vermin		

Minor Maintenance and Repair Form

2004 – 2005 Extraordinary School Capital Needs Program Aid Worksheet

THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ELEMENTARY, MIDDLE AND SECONDARY SCHOOLS
FACILITIES PLANNING – ROOM 1060 EBA
ALBANY, NY 12234
(518) 474-3906

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

SED USE ONLY

2004-2005 EXTRAORDINARY SCHOOL CAPITAL NEEDS PROGRAM AID WORKSHEET

(Section 155.15 of the Regulations of the Commissioner of Education)

School District Name: _____ County _____

Person Completing This Form: _____ Title _____

Telephone: ( ) _____

Complete this worksheet and return one (1) copy on or before March 1, 2005 for expenses incurred through February 1, 2005. **A final claim must be filed (if necessary) on or before August 1, 2005**. The district may elect to submit one claim for the whole year.

Enter the 2004-2005 extraordinary school capital program expenditures as recorded in the Special Aid Fund: Account Code F1621

A. Summary of Expenses to Date:

Report expenditures by object:

Object Code		
.16	Support Staff Salaries	_____
.40	Contractual	_____
.45	Supplies & Materials	_____
.80	Employee Benefits	_____

TOTAL: _____
Claimed through: ___/___/____

*Expenditures through 2/1/05 for first claim

B. Detailed report of expenditures:

1. Site: Utilities, Paving	_____
2. Roofing	_____
3. Exterior: exterior walls, doors, windows	_____
4. Structure	_____
5. Interior: Interior Finishes, Doors, Hardware	_____
6. HVAC: Boilers, Refrigerator, Controls	_____
7. Plumbing: Water, Drainage, Fixtures	_____
8. Electrical: Service/Distribution, Lighting, Communications	_____
9. Special Construction:	_____
10. Life Safety Alarm/Detection, Fire Protection	_____
11. Energy Conservation	_____
12. Health and Safety	_____

	TOTAL:	_____

C. Superintendent's Certification: I hereby certify that the expenditures claimed on this form have been made and include expenditures as provided by Section 3602, Subdivision 6-d of the Education law and Section 18 of Chapter 53 of the Laws of 2002. The information contained in this report is true and correct to the best of my knowledge.

_____ _____

Signature of Superintendent of Schools Date

"Unsatisfactory" Ratings in "Key" Systems

2000 Building Condition Survey – Columbia and Dutchess Counties

"Unsatisfactory" Ratings in "Key" Systems - 2000 Building Condition Survey - Columbia and Dutchess Counties

(<-Hidden Columns-Do NOT Sort) (8 Key Systems Statistically Associated with School Asthma)

DistrictName	BuildingName	System Name	Remarks-BCS	Cost- Repair Replace	Prob. Life	Last. Major	Rating	AVI2001	AVI2002	MMR-Category	Minor Maintenance and Repair Projects	CSI_Code-BA	Building Aid Projects
BEACON CITY SD	GLENHAM UNION SCHOOL	5.3 Ceilings		$0.00			U	Same As BCS=U	Same As BCS=U	Interior	Small District Investment of $4,500, no cost listed or remarks in BCS.	9	No cost or details in BCS. Major Project initated 3/2004, not yet approved
HYDE PARK CSD	ELEMENTARY-HYDE PARK	2.1 Roofing	Slate/EPDM - Repl Metal Skirt/Cafeteria Roof	$150,000.00	5	1997	U	Same As BCS=U	Same As BCS=U	Roofing		7	No Roofing project until 2005
HYDE PARK CSD	ELEMENTARY-HYDE PARK	3.3 Windows	LBP / Repl All Units	$300,000.00	5	1990	U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 2/2001 (SED approv. 7/02); 8/2002 (SED approv. 3/03); and 1/2005 (not yet approv.)
HYDE PARK CSD	ELEMENTARY-HYDE PARK	7.3 Plumbing Fixtures	Repl 1939 Fixtures	$50,000.00	5	1990	U	Same As BCS=U	Same As BCS=U	Plumbing	Minor District investment in Plumbing ($6,775.58), 6 school needs total $682,500. May address small need at Violet Ave. of $7,500.	15	Plumbing projects initiated 2/2001 (SED approv. 7/02), 8/2002 (SED approv. 3/03), and 1/2005 not yet approved.
HYDE PARK CSD	HAVILAND JUNIOR HIGH	3.3 Windows	Planned Replacement 2001	$350,000.00	5	1965	U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 2/2001 (SED approv. 7/02) and 1/2005 (not yet approv.)
HYDE PARK CSD	HAVILAND JUNIOR HIGH	5.1 Floor Finishes	VAT Replacement Req'd at 1965	$150,000.00	5	1991	U	Same As BCS=U	Same As BCS=U	Interior	District Spent $ 21,935 in MMR-interior. Need listed on BCS's totaled $650,000 for floors in 3 schools, $500,000 for ceilings in 2 schools.	9	Finishes projects initiated 9/2002 (SED approv. 1/03) and 1/2005 not yet approv.
HYDE PARK CSD	HAVILAND JUNIOR HIGH	5.3 Ceilings	1940 ACBM Plaster V 1957-65 ACT Poor	$250,000.00	5	1998	U	Same As BCS=U	Same As BCS=U	Interior	District Spent $ 21,935 in MMR-interior. Need listed on BCS's	9	Finishes projects initiated 9/2002 (SED approv. 1/03) and 1/2005 not yet approv.

											totaled $650,000 for floors in 3 schools, $500,000 for ceilings in 2 schools.		
HYDE PARK CSD	HAVILAND JUNIOR HIGH	7.3 Plumbing Fixtures	Orig Fixtures at 1940-57	$250,000.00	5	1989	U	Same As BCS=U	Same As BCS=U	Plumbing	Minor District investment in Plumbing ($6,775.58), 6 school needs total $682,500. May address small need at Violet Ave. of $7,500.	15	Plumbing projects initiated 9/2002 (SED approv. 1/03) and 1/2005 not yet approved.
HYDE PARK CSD	HAVILAND JUNIOR HIGH	8.3 Ventilation Systems	Toilet Rm Ventilation Req'd	$150,000.00	5	1965	U	Same As BCS=U	Same As BCS=U	HVAC	Small HVAC project ($12,036) and Energy Conversation project ($42,675) in district.	155	HVAC projects initiated 11/1999 (SED approv. 3/03); 10/2000 (SED approv. 5/03); 2/2001 (SED approv. 7/02); and 9/2002 (SED approv. 1/03)
HYDE PARK CSD	NETHERWOOD ELEM SCHOOL	3.3 Windows	Planned Replacement 2001	$350,000.00	5	1960	U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 2/2001 (SED approv. 7/02) and 1/2005 (not yet approv.)
HYDE PARK CSD	NETHERWOOD ELEM SCHOOL	5.1 Floor Finishes	Repl VAT at N. Corridor, Gym Poor - ACBM	$300,000.00	5	1960	U	Same As BCS=U	Same As BCS=U	Interior	District Spent $ 21,935 in MMR-interior. Need listed on BCS's totaled $650,000 for floors in 3 schools, $500,000 for ceilings in 2 schools.	9	Finishes project initiated 1/2005 not yet approv.
HYDE PARK CSD	NETHERWOOD ELEM SCHOOL	7.3 Plumbing Fixtures	Repl Fixtures	$125,000.00	5	1960	U	Same As BCS=U	Same As BCS=U	Plumbing	Minor District investment in Plumbing ($6,775.58), 6 school needs total $682,500. May address small need at Violet Ave. of $7,500.	15	Plumbing project initiated 1/2005 not yet approved.
HYDE PARK CSD	NORTH PARK ELEM SCHOOL	7.3 Plumbing Fixtures		$150,000.00	5	1966	U	Same As BCS=U	Same As BCS=U	Plumbing	Minor District investment in Plumbing ($6,775.58), 6 school needs total $682,500. May address small need at Violet Ave. of $7,500.	15	Plumbing projects initiated 2/2001 (SED approv. 7/02) and 1/2005 not yet approved.
HYDE PARK CSD	NORTH PARK ELEM SCHOOL	8.1 Boiler / Furnace	Planned Replacement 2001	$250,000.00	5	1966	U	Same As BCS=U	Same As BCS=U	HVAC	Small HVAC project ($12,036) and Energy Conversation project ($42,675) in district.	155	HVAC projects initiated 10/2000 (SED approv. 5/01); 10/2000 (SED approv. 3/03); 2/2001 (SED approv. 7/02); and 9/02 and 1/05 not yet approved.

HYDE PARK CSD	RALPH R SMITH ELEMENTARY	7.3 Plumbing Fixtures		$100,000.00	5	1963	U	Same As BCS=U	Same As BCS=U	Plumbing	Minor District investment in Plumbing ($6,775.58), 6 school needs total $682,500. May address small need at Violet Ave. of $7,500.	15	Plumbing project initiated 1/2005 not yet approved.
HYDE PARK CSD	VIOLET AVE ELEM SCHOOL	2.1 Roofing	Slate/EPDM - Repl Metal Roof at Library Bay	$50,000.00	5	1993	U	Same As BCS=U	Same As BCS=U	Roofing		7	No Roofing project until 2002, not yet approved by SED as of January, 2005
HYDE PARK CSD	VIOLET AVE ELEM SCHOOL	3.1 Exterior Walls	Planned Upgrade 2001 - LBP	$150,000.00	5	1989	U	Same As BCS=U	Same As BCS=U	Exterior		4	Special Project SED approv. 5/2000
HYDE PARK CSD	VIOLET AVE ELEM SCHOOL	3.3 Windows	Planned Upgrade 2001	$350,000.00	5	1939	U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 2/2001 (SED approv. 7/02); 8/2002 (SED approv. 3/03); and 1/2005 (not yet approv.)
HYDE PARK CSD	VIOLET AVE ELEM SCHOOL	5.1 Floor Finishes	Refin 1939 Classrm Flrs/Repl Toilet Rm Flrs	$200,000.00	5	1998	U	Same As BCS=U	Same As BCS=U	Interior	District Spent $ 21,935 in MMR-interior. Need listed on BCS's totaled $650,000 for floors in 3 schools, $500,000 for ceilings in 2 schools.	9	Finishes projects initiated 9/2002 and 1/2005 - both not yet approv.
HYDE PARK CSD	VIOLET AVE ELEM SCHOOL	5.3 Ceilings	Repl Corridor/Cafeteria Clgs	$250,000.00	5	1998	U	Same As BCS=U	Same As BCS=U	Interior	District Spent $ 21,935 in MMR-interior. Need listed on BCS's totaled $650,000 for floors in 3 schools, $500,000 for ceilings in 2 schools.	9	Finishes projects initiated 9/2002 and 1/2005 - both not yet approv.
HYDE PARK CSD	VIOLET AVE ELEM SCHOOL	7.3 Plumbing Fixtures		$7,500.00	5	1939	U	Same As BCS=U	Same As BCS=U	Plumbing	Minor District investment in Plumbing ($6,775.58), 6 school needs total $682,500. May address small need at Violet Ave. of $7,500.	15	Plumbing projects initiated 2/2001 (SED approv. 7/02), 8/2002 (SED approv. 3/03) and 9/2002 and 1/2005 not yet approved.
MILLBROOK CSD	ALDEN PLACE ELEM SCHOOL	3.3 Windows	REPLACE ORIGINAL SINGLE PANE W/ INSULATED PANE	$450,000.00	4	1964	U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows project part of New/Addition initiated 1/2002 and not yet approved by SED.
MILLBROOK CSD	HIGH SCHOOL	3.3 Windows	SINGLE PANE - REPLACE W/ INSULATED GLASS	$800,000.00	4	1960	U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows project initiated 8/2000 (SED approv. 8/01)
MILLBROOK CSD	HIGH SCHOOL	5.1 Floor Finishes	TOILET & LOCKER ROOMS FLOORS DAMAGED	$30,000.00	3	1960	U	Same As BCS=U	Same As BCS=U	Interior		9	Finishes projects initiated 8/2000 (SED approv. 8/01) and 8/2001 (SED

													approv. 7/04)
NEW LEBANON CSD	WALTER HOWARD ELEM SCHOOL	3.3 Windows	need to be replaced	$250,000.00	3	1969	U	Same As BCS=U		Exterior		8	Windows project part of New/Addition initiated 12/1998 (SED approv. 2/2000)
NORTHEAST CSD	AMENIA ELEM SCHOOL	5.1 Floor Finishes		$25,000.00	5	1926	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $ 385,000 on BCS's.	9	Finishes projects initiated 4/1999 (SED approv. 8/01) and 11/2003 (SED approv. 7/04)
NORTHEAST CSD	AMENIA ELEM SCHOOL	5.3 Ceilings		$45,000.00	5	1926	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $ 385,000 on BCS's.	9	Finishes projects initiated 4/1999 (SED approv. 8/01) and 11/2003 (SED approv. 7/04)
NORTHEAST CSD	AMENIA ELEM SCHOOL	8.1 Boiler / Furnace		$70,000.00	5	1926	U	Same As BCS=U		HVAC		155	HVAC projects initiated 4/1999 (SED approv. 8/01) and 11/2003 (SED approv. 7/04)
NORTHEAST CSD	MILLERTON ELEM SCHOOL	3.3 Windows		$290,000.00	5	1927	U	Same As BCS=U		Exterior		8	Windows project initiated 4/1999 (SED approv. 8/01)
NORTHEAST CSD	MILLERTON ELEM SCHOOL	5.3 Ceilings		$45,500.00	5	1927	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $ 385,000 on BCS's.	9	Finishes project initiated 4/1999 (SED approv. 8/01)
NORTHEAST CSD	MILLERTON ELEM SCHOOL	8.1 Boiler / Furnace	Two boilers, abatement required	$130,000.00	5	1927	U	Same As BCS=U		HVAC		155	HVAC project initiated 4/1999 (SED approv. 8/01)
NORTHEAST CSD	WEBUTCK JR-SR HIGH	3.3 Windows		$540,000.00	5	1970	U	Same As BCS=U		Exterior		8	New/Addition project initiated 8/1998 (SED approv. 8/01)
NORTHEAST CSD	WEBUTCK JR-SR HIGH	5.1 Floor Finishes	Vinyl tile flooring	$70,000.00	5	1956	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $	9	New/Addition project initiated 8/1998 (SED approv. 8/01)

											385,000 on BCS's.		
NORTHEAST CSD	WEBUTCK JR-SR HIGH	5.3 Ceilings	Acoustical Lay-in	$170,000.00	5	1956	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $ 385,000 on BCS's.	9	New/Addition project initiated 8/1998 (SED approv. 8/01)
NORTHEAST CSD	WEBUTUCK ANNEX JR-SR	3.3 Windows		$540,000.00	5	1970	U	Same As BCS=U		Exterior		8	New/Addition project initiated 8/1998 (SED approv. 8/01)
NORTHEAST CSD	WEBUTUCK ANNEX JR-SR	5.1 Floor Finishes	Vinyl tile flooring	$70,000.00	5	1958	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $ 385,000 on BCS's.	9	New/Addition project initiated 8/1998 (SED approv. 8/01)
NORTHEAST CSD	WEBUTUCK ANNEX JR-SR	5.3 Ceilings	Acoustical Lay-in	$125,000.00	5	1958	U	Same As BCS=U		Interior	District spent $9,001 total. 3 School buildings listed floor needs totaling $165,000 and 4 buildings with ceiling needs of $ 385,000 on BCS's.	9	New/Addition project initiated 8/1998 (SED approv. 8/01)
PINE PLAINS CSD	SEYMOUR SMITH SCHOOL	5.1 Floor Finishes	gym and class rooms need new floors	$350,000.00	0	1997	U		Same As BCS=U	Interior		9	
POUGHKEEPSIE CITY SD	C B WARRING SCHOOL NO. 10	3.3 Windows	replace non thermal windows	$660,000.00	5		U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01), 5/2001(SED approv. 6/03) and 5/2003 (SED approv. 3/04)
POUGHKEEPSIE CITY SD	C B WARRING SCHOOL NO. 10	7.3 Plumbing Fixtures	replace outdated fixtures	$54,000.00			U	Same As BCS=U	Same As BCS=U	Plumbing		15	Plumbing projects initiated 10/2000 (SED approv. 6/01) and 5/2003 (SED approv. 3/04)
POUGHKEEPSIE CITY SD	GOV CLINTON SCHOOL NO. 8	3.3 Windows	change to energy efficient units	$400,000.00	5		U	Same As BCS=U		Exterior		8	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01), 5/2001(SED approv. 6/03) and 5/2003 (SED approv. 3/04)
POUGHKEEPSIE CITY SD	JUNIOR-SENIOR HIGH	5.1 Floor Finishes	new vct at corridors	$563,000.00	5	1991	U	Same As BCS=U	Same As BCS=U	Interior		9	Windows projects initiated 12/1999

	SCHOOL												(SED approv. 5/00) and 5/2001 (SED approv. 3/04)
POUGHKEEPSIE CITY SD	KRIEGER SCHOOL NO. 11	3.3 Windows	replace nonthermal windows	$500,000.00	5		U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01) and 5/2001 (SED approv. 6/03)
POUGHKEEPSIE CITY SD	KRIEGER SCHOOL NO. 11	7.3 Plumbing Fixtures	replace old fixtures and drinking fountains	$45,000.00	5		U	Same As BCS=U	Same As BCS=U	Plumbing		15	Plumbing projects initiated 10/2000 (SED approv. 6/01)
POUGHKEEPSIE CITY SD	MIDDLE SCHOOL	3.3 Windows	replace non thermal windows and curtain wall	$870,000.00	5		U	Same As BCS=U		Exterior		8	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01), 5/2001(SED approv. 6/03) and 5/2003 (SED approv. 3/04)
POUGHKEEPSIE CITY SD	MIDDLE SCHOOL	5.1 Floor Finishes	carpet	$260,000.00	5	1986	U	Same As BCS=U		Interior		9	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01), 5/2001(SED approv. 6/03) and 5/2003 (SED approv. 3/04)
POUGHKEEPSIE CITY SD	SFB MORSE SCHOOL NO. 5	3.3 Windows	Replace non thermal windows	$380,000.00	5		U		Same As BCS=U	Exterior		8	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01) and 5/2001(SED approv. 6/03)
POUGHKEEPSIE CITY SD	SFB MORSE SCHOOL NO. 5	7.3 Plumbing Fixtures	replace service sinks, drinking fountains, orig. fixtures	$82,000.00	10		U		Same As BCS=U	Plumbing		15	Plumbing projects initiated 10/2000 (SED approv. 6/01)
POUGHKEEPSIE CITY SD	W W SMITH	3.3 Windows	replace non thermal windows	$450,000.00	2		U	Same As BCS=U	Same As BCS=U	Exterior		8	Windows projects initiated 12/1999 (SED approv. 5/00), 10/2000 (SED approv. 6/01), 5/2001(SED approv. 6/03) and 5/2003 (SED approv. 3/04)
RHINEBECK CSD	CENTRAL H.S./M.S ADDITION	3.3 Windows	REPLACE EXTERIOR WINDOWS ADD LABELS	$722,000.00	5	1950	U	Same As BCS=U	Same As BCS=U	Exterior		8	
RHINEBECK CSD	CENTRAL H.S./M.S ADDITION	8.3 Ventilation Systems	REPLACE UNIT VENTILATORS	$687,000.00	5		U	Same As BCS=U	Same As BCS=U	HVAC		155	
RHINEBECK CSD	LIVINGSTON ELEM SCHOOL	3.3 Windows	REPLACE EXTERIOR WINDOWS AND INTERIOR SIDELIGHTS	$307,000.00	5	1964	U	Same As BCS=U	Same As BCS=U	Exterior		8	Major project initated 3/2000 (SED approv. 2/01)
RHINEBECK CSD	LIVINGSTON ELEM SCHOOL	7.3 Plumbing Fixtures	INSTALL WATER SAVING AND HANDICAPPED ACCESSIBLE FIXTURES	$586,000.00	5	1964	U	Same As BCS=U	Same As BCS=U	Plumbing		15	Plumbing project initated 9/1999 (SED approv. 5/00)
RHINEBECK CSD	LIVINGSTON ELEM SCHOOL	8.3 Ventilation Systems	PROVIDE MECHANICAL VENTILATION TO ALL STUDENT SPACES	$260,000.00	5	1964	U	Same As BCS=U	Same As BCS=U	HVAC		155	HVAC project initated 9/1999 (SED approv. 5/00)