STATE CLEAN ENERGY – ENVIRONMENT TECHNICAL FORUM
December 8, 2005
High Performance Green Energy Buildings: Opportunities for Cost-Effective Energy & Environmental Savings

Participants: 50 participants from 20 states and national organizations (see the attached participants list).
Background Document: High Performance Green Buildings: Public Sector Opportunities for Cost-Effective Energy and Environmental Benefits (download at: http://www.keystone.org/html/documents.html#buildings)

Key Issues Discussed

- Integrated and Climate Responsible Designs
- Linking LEED with EPA ENERGY STAR to achieve greater energy savings
- Life cycle cost analysis of building performance to evaluate cost effectiveness
- ENERGY STAR benchmarking and portfolio manager tools
- Owner education and builder performance incentives

Summary of Presentations

A. *Objectives of the Clean Energy-Environment Technical Forum – Julie Rosenberg, Director, State and Local Branch, Office of Air and Radiation*

Julie welcomed participants to the Technical Forum. The topic for this call highlights a cost-effective way states can lead by example by reducing energy consumption in state buildings through energy efficient design. A number of states have voluntarily implemented programs to improve the efficiency of new buildings using EPA guidelines and tools provided through the ENERGY STAR Building Challenge. Julie alerted participants of upcoming topics including: 1) Tracking and measuring energy efficiency progress toward state lead by example goals; 2) IGCC technology, emissions, cost and permitting; and 3) Biofuels, related emissions, financial incentives and challenges in meeting demand. Dates for each of these will be announced.

B. *Overview – Jean Lupinacci, Chief, Energy Star Commercial & Industrial Branch*

- Over one-half of all states have joined the ENERGY STAR Challenge, to help support a call to action for building owners to reduce energy use by 10% or more in buildings.
- Buildings that meet the challenge typically exceed the existing building code standards and deliver good energy performance.
- EPA's goal is to see that energy efficiency becomes a required element of a green building, and that aggressive energy use targets be added to the requirements. But until green building rating programs more effectively integrate energy efficiency, many states and public organizations have been supplementing green building ratings goals with specific required energy elements, including asking that buildings be green and ENERGY STAR.

C. ***Pennsylvania – Paul Zeigler, Director, PA Governor's Green Government Council*** (See "Green for Le$$ Principles and Technologies" PowerPoint presentation @ http://www.keystone.org/html/documents.html#buildings)

- 1st State Green Building was good by environmental criteria but was not energy efficient; demonstrated the need to go beyond LEED to include ENERGY STAR recommendations
- 2nd building, Southwestern Region Mining Office, Cambria, PA, put both environmental and energy performance criteria together and PA has repeated the success in five other state buildings
- Proved that it can be completed within a conventional building budget ($98/sq. ft.)
- Keys to success:
    - Focused on engineering and physics fundamentals of good design
    - Set hard targets: e.g. new building target at 40,000 BTU/sq.ft./yr to achieve score of 85 with EPA Target Finder.
    - Life cycle cost-effectiveness important; apply principles that result in "first cost savings" and life-time operational savings, e.g.
        - Windows: Compared double pane, Low E /triple pane, low E and double pane heat mirror windows. Cost/benefit analysis found that the more expensive windows reduced cost of mechanical equipment and other first costs which offset the cost of the windows.
    - Incorporate green and integrated design principles early and in every part of design, e.g. Work with builders and designers to achieve:
        - Appropriate building orientation for passive solar heating and shading
        - Natural lighting
- Rely on EPA Target Finder Tool which is based on building type; Use EPA Labs 21 program for assessment of lab's energy use. Some buildings are not covered by these resources and need to be expanded.
- Dept. of Environmental Protection and Dept. of General Services work together with EPA to analyze non-typical buildings.
- PA is working on local government building initiative; release expected in 2 months
- PA Green Lease Specifications are used to develop contract between the state and building contractors (see http://www.keystone.org/html/documents.html#buildings)

D. ***Colorado: Thomas Fernandez, Energy Manager, Colorado Springs Public Schools*** (See "High Performance K-12 Building Design" PowerPoint presentation downloadable at: http://www.keystone.org/html/documents.html#buildings)

- Learned from past experience that relying exclusively on LEED green building standards will not necessarily result in best energy performance. LEED buildings perform only slightly better than average.
- Using EPA's Utility Benchmarking tools, compared energy consumption in four new schools (ranging from 58,000 to 101,000 Btu/sq. ft./yr) and found that they were above target performance standards.
- Brought in high performance building expert to analyze what went wrong. Found that they could have saved $15 million in energy costs had they met the design target.
- Lessons learned:
    - Didn't set clear energy goals; at the time, didn't know what the standard should be. For. K-12, should be 25,000 Btu/sq. ft./yr.

    - Didn't understand the challenges of building green high performance buildings. Need better building owner education about high performance criteria and process.
    - Traditional architect down process (owner hires architect, architect hires builder who hires subcontractors) is not the right approach. Need to put together an integrated design/construction team who all share in the performance fee.
    - Make best use of orientation, then move on to form or function.
    - Need to pay higher than average design fee, but will be paid back many times over by energy savings.
    - Difficult to find the most qualified design team. Ask team to submit their KBtu/sq. ft ratings of prior construction
- Also plan to set water use (2.4 gal/sq.ft./yr for domestic uses), power factor (.95) and cost goals ($110/sq. ft) for future school buildings

Discussion & Questions

Do you need to provide incentives to overcome higher design effort required?

PA doesn't currently but would like to because it does cost more to design a green, high performance building, even though it can cost the same to build.

Would be helpful to have an analytical tool that helps develop bonuses related directly to the building's performance.

How do you overcome the "cash & carry" attitude?

Speakers suggested that life cycle analysis must be the core of the program but recognized that when agencies' construction budgets are separate from operating budgets, it is difficult to overcome built-in practices for keeping first costs as low as possible.

Also need to educate building owners that is doesn't necessarily cost more.

Have states set targets for indoor air quality or acoustic quality of buildings?

Neither PA or CO have adopted acoustic standards, but CO is looking into it. PA has CO2 monitoring equipment in one school.

What resources did you use to educate staff?

In Colorado Public School District 11, the analysis of the recently completed building energy use compared to Energy Star Building standards was very informative.

EPA Energy Star Benchmarking tools have been very useful.

Have you begun to evaluate the environmental impacts of green high performance buildings?

Several years ago, PA tried to document the energy savings and emissions benefits of every energy program. Hasn't been reevaluated recently, but as part of new government mandate, must justify all funding requests in terms of a set of performance criteria such as emissions reductions.

What other states have begun to consider green high performance building programs?

Massachusetts starting to draft policies to help overcome barriers such as considering first costs rather than operating costs and improving education and training.

MA conducted a number of studies (downloadable at http://www.keystone.org/html/documents.html#buildings) :

1. "Sustainable Design in Massachusetts, Obstacles and Opportunities"
2. "Analysis of State Green Building Programs"
3. "The Massachusetts Story: The current state of sustainable design at Massachusetts state agencies"

MA also used a stakeholder process including executive agencies, the MA Sustainable Design Roundtable to develop proposed policies. Not a legislative process. (See: http://www.mass.gov/envir/Sustainable/initiatives/initiatives_roundtablewgresearch.htm) to.

Georgia commissioned a report to assess the potential impact of green building programs and lessons learned: "Green Georgia Facilities: An Analysis of LEED Requirement Impacts."

GA looked at current state of construction practices in the state and analyzed how LEED certification would change what the state is currently doing. (downloadable at http://www.keystone.org/html/documents.html#buildings)

NEXT CALL: Thurs., January 17th, 2 – 3:30 pm ET
TOPIC: Tracking Energy Savings in Meeting State Lead-by-Example Efficiency Goals