Exhibit designed and built by Modular Technology, Inc.

Modular Technology is a fully-integrated commercial design and construction firm that specializes in energy-efficient schools and other building sectors.
www.modtechinc.com

For more information about these technologies and many other energy-saving features for schools, visit www.energysmartschools.gov and click on the thumbnail image of the *National Best Practices Manual for Building High Performance Schools*. Check local and state energy codes for specifications for your area. The manual is available on a CD from the Rebuild America Clearinghouse. To order, email rebuildorders@rebuild.org.

To learn more visit www.eere.energy.gov

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A Strong Energy Portfolio for a Strong America
Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

Rebuild America is a U.S. Department of Energy program that focuses on improving communities through energy-saving solutions.

Printed on paper containing at least 50% wastepaper, including 20% postconsumer waste.

EnergySmart Schools
Rebuild America Schools
U.S. Department of Energy

Model Classroom Showcases National Best Practices in High Performance School Design

The model EnergySmart Classroom displays a selection of the technologies that are explored in the *National Best Practices Manual for Building High Performance Schools*, a design guide produced by the U.S. Department of Energy. This exhibit guide describes the displayed technologies. These technologies are examples of the innovative solutions available to communities for saving money, saving energy and improving learning.

High Sidelighting – Clerestory with Light Shelf or Louvers

Use light shelves or louvers with high clerestory glazing to improve sunlight distribution. A horizontal light shelf or smaller horizontal louvers can bounce sunlight deeper into a room while reducing the glare near a window. The shelf or louvers will shade part of the lower window while scattering sunlight up off the ceiling. High clerestory windows with light shelves or louvers can be used in many school spaces to provide deep penetration of daylight.

National Best Practices Manual for Building High Performance Schools, Guideline DL3
Product and Manufacturers: Windows by TRACO, www.traco.com; Light Shelf by Modular Technology, www.modtechinc.com

Central Toplighting

Electric lighting often needs to be integrated with central daylighting schemes to properly illuminate interior walls. Central toplighting, which features electric lighting wall wash fixtures, provides a high level of benefits. This approach:

- With good diffusion, creates even, balanced daylight across the classroom;
- Has been correlated with higher standardized test scores among students;
- Saves electric lighting energy if the electric lights are switched off or dimmed in response to the daylight;
- Can save 40 percent to 80 percent in energy use during daylight hours.

National Best Practices Manual, Guideline DL5
Product and Manufacturer: Component daylighting fixtures with integrated fluorescent light by Universal Natural Lighting

Wall Insulation

Vary insulation with the type of wall material as well as the climate:

- For wood-framed walls, in all climates install a minimum of R-13 cavity insulation; also install R-7.5 insulating sheathing in Cool and Humid, Cold and Humid, and Cool and Dry climates.
- For metal-framed walls in all climates, install a minimum of R-13 cavity insulation; also install R-3.8 continuous insulating sheathing in Hot and Humid and Hot and Dry climates; in other climates, install R-7.5 continuous insulating sheathing.
- For mass walls, install R-7.6 continuous insulation in Hot and Dry and Hot and Humid climates; install R-9.5 in Temperate and Humid climates; install R-13.3 in Cool and Humid and Cool and Dry climates; install R-15.2 in Cold and Humid climates.

National Best Practices Manual, Guideline EB1
Product and Manufacturer: Insulation by Johns Manville, www.jm.com

Roof Insulation

- For insulation above the structural deck, install R-20 insulation, its thickness varying according to type.
- For attic and other spaces, install R-38 insulation in all climates except Cold and Humid climates, where R-60 should be used.

National Best Practices Manual, Guideline EB2
Product and Manufacturer: Insulation by Johns Manville, www.jm.com

Cool Roofs

In air-conditioned buildings, use a roof surface that is light in color (high reflectance) with a non-metallic finish (high emissivity).

- Asphalt roofs with a cap sheet and modified bitumen roofs should be coated with a liquid-applied material such as white elastomers, white polyurethanes or white acrylics;
- Metal or concrete roofs should be coated with white paint;
- Single-ply roofing products include white CPE (chlorinated polyethylene), white CPSE (chlorosulfonated polyethylene) and white TPO (thermoplastic polyolefin)

National Best Practices Manual, Guideline EB3
Product and Manufacturer: Cool Roof by Sarnafil, www.sarnafilus.com

Troffer Lighting

Spaces with no ceiling or a low ceiling (less than 9 ft. 6 in.) can use fluorescent troffer lighting. Fluorescent troffers are designed to replace an acoustical tile in a grid ceiling system. There are three common troffer types:

- Lens troffer, covered on the down-facing side with a plastic lens;
- Parabolic troffer, enclosed on the down-facing side by a metal louver having aluminum blades;
- Basket troffer, partially covered on the down-facing side by a perforated basket.

Parabolic and basket troffers can be used, but lens troffers generally are preferred because of their light distribution and economy. Systems operating at 1 watt per square foot will generate between 50 and 60 footcandles with the desired uniformity.

National Best Practices Manual, Guideline EL2
Product and Manufacturer: Light troffer featuring T-8 bulbs by Modular Technology, www.modtechinc.com

Lighting Controls for Classrooms

Lighting systems in daylit spaces should have controls that respond to the amount of daylight available with automatic sensing. They should allow for automatic dimming, manual dimming and manual override. Dimming ballasts allow for both automatic and manual dimming. Classroom lighting also should employ motion sensors for shutting off lights in unoccupied rooms. Most motion sensors are passive infrared devices and respond to body heat. A photo cell sensor and occupancy sensor are built into the ceiling of this exhibit to efficiently manage the lighting needs of the classroom.

National Best Practices Manual, Guideline EL4
Product and Manufacturer: Lighting switch, occupancy sensor and photocell sensor by Lithonia Lighting, www.lithonia.com

Resilient Flooring

Linoleum flooring, preferred by environmentally conscious designers, is durable and produced from minimally processed renewable materials. It is an alternative to vinyl composition tile (VCT) flooring which is made of nonrenewable resources. Concerns have been raised about environmental degradation associated with the production of VCT. True linoleum is made with biodegradable materials such as linseed oil, cork and wood dust and does not contain the petrochemicals and chlorine found in vinyl and VCT flooring, nor the plasticizers found in vinyl sheet flooring. Low-toxic adhesives and coating minimize indoor air pollution and related health risks. The flooring used in this exhibit is Marmoleum, a natural organic linoleum product made primarily from raw materials.

National Best Practices Manual, Guideline BP2
Product and Manufacturer: Linoleum flooring by FORBO, www.forbo.com