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**NCAR Engineer Wins Award in 1992 Efficient Building Competition**

Wayne Morrow, electrical engineer for NCAR's Facilities Planning and Design office, recently won a national award for redesigning the lighting and cooling systems at the Foothills Laboratory. *Energy User News*, a national magazine for engineers and business managers, awarded Morrow a Certificate of Merit in the Indoor Environment category of the 1992 Efficient Building Awards Competition. NCAR is sponsored by NSF.

Morrow worked with ETTA Industries of Boulder to design a new, local lighting controller that interfaces with the local temperature controllers. The highly integrated system involves a network of 900 motion sensors in 720 power zones. The sensors share data to control the lights and temperature level. The data can also be displayed graphically to improve security and safety systems.

Since most of the work done at the Foothills Lab involves computers, there needed to be a special kind of lighting: low glare, good color, full spectrum, and no flicker. The final design involved dimable lighting with a highly integrated control system.

There are multiple advantages to the new lighting. Its full spectrum gives excellent color rendition and vibrancy. Operating at 27,000 Hertz (instead of the standard 60 Hertz) reduces eye strain by helping the eye to focus, decreases glare, and eliminates flicker.

The system is energy efficient as well. If a room is unoccupied for a certain period of time, the lights automatically dim or turn off, reducing energy use by 70 to 100%. The system also uses "daylight harvesting." As a result, the sensors dim the lights to take advantage of natural light during peak hours when most of the energy is used. The lights are also manually adjustable within each office.

The Public Service Company of Colorado awarded NCAR \$72,000 in recognition of the decreased energy use at the Foothills Lab both in lighting and in cooling. NCAR's design improvements eliminated the need for a 200-ton, \$50,000 'chiller' that uses chlorofluorocarbons for cooling the building.

The lighting and temperature systems save enough energy to offset their costs. Lighting improvements cost \$133,000 more than refurbishing with conventional equipment. However, the more efficient design saves about \$20,000 in energy costs each year. That means the lighting improvements will pay for themselves in just under seven years.

Besides being cost-efficient and conducive to worker comfort and productivity, the new lighting also produces less pollution than conventional systems. Energy savings translate into 593,415 pounds (269,122 kilograms) of carbon dioxide and 2,295 (1,041 kilograms) of sulfur dioxide each year that won't be released into the atmosphere.

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