



PROFILE OF SUCCESS

ENERGY STAR[®] Labeled Roof Products Case Study



Jefferson Houston Elementary School
 Alexandria, Virginia
 White EP Single-ply Insulated Roofing System
 Stevens Roofing Systems

Project Manager: Mark Krause
 Facility Type: Elementary School
 Total Roof Area: 83,000 ft²

An old, failing roof was replaced with a highly reflective, insulated, single-ply membrane roofing system. The new roof resulted in increased comfort and substantial savings with no additional cost for the higher performance.

<i>Project Costs</i>	Total Expenditures	\$330,000
	Dollars Per Square Foot	\$3.87
	Extra Cost for High-Efficiency	\$0
<i>Cost Savings</i>	Annual Dollar Savings	\$31,000
	Dollar Savings Per Square Foot	\$0.37
	Simple Payback Period for Increased Efficiency	Immediate
<i>Energy Savings</i>	Annual Energy Savings	514,000 kWh
<i>Pollution Prevention</i>	Annual CO ₂ Emissions	1,217,000 lbs.
	Car Pollution Equivalent	122 cars

Jefferson Houston Elementary School, built in 1970, is a single-story, 83,000 ft² building in Alexandria, Virginia. Local temperatures often rise to a humid 100°F during the summer and drop to 10°F in the winter. Until 1994, these heating and cooling demands were managed by electric air-conditioning and electric-resistance heating systems.

Larry Gilbertson, Director of Facilities, had analyzed the school's historical energy expenses and determined that the school should have an overall energy efficiency upgrade as soon as it could be

funded. By 1994, the existing EPDM (ethylene propylene diene monomer) roof had reached the end of its useful life. Mr. Gilbertson knew that the roof needed to be replaced at a low first cost, but he also recognized the opportunity to lower the school's energy bills by specifying energy-efficient roofing materials. Working with Project Manager Mark Krause, Gilbertson compared several options—built-up, modified bitumen, EP (ethylene propylene), and metal—for replacing or repairing the roof, considering both first costs and annual maintenance costs. Based on Krause's recommendation, Gilbertson specified a white, insulated, reflective, 60-mil EP roof manufactured by Stevens Roofing Systems. The reflectivity of the new roof, compared with the old roof, increased from less than 20 percent to 78 percent, and the insulation value increased from R-10 to R-20. Because the existing roof had significant water ponding, Gilbertson also elected to have roof drains installed. These drains not only prolong the life of the roof, but also help maintain its reflectivity by enabling dirt to be flushed from the roof when it rains.

The cost of installing the EP material was no higher than the cost of the alternate materials considered. Furthermore, because the material is heat-welded, it could be applied without substantial odors—an important factor in protecting air quality in the classrooms.

As a result of installing this energy-efficient, insulated roofing system, Jefferson Houston's energy costs fell to a post-upgrade average of \$90,000 per year from a pre-upgrade average of \$121,000—a reduction of \$31,000 in annual energy costs. These savings are due to both greatly reduced electric power demand and lower electric energy consumption. The school realized these savings despite a conversion of the interior courtyard space in 1994 into additional classrooms, which significantly increased the building's heating and cooling demands. The white EP membrane accounted for approximately 30 percent of the realized savings. Based on their energy-saving potential and ease of installation, white, reflective, single-ply membrane materials have become the roofing product of choice for Alexandria City Public Schools.

"We've been using this particular reflective product in a number of other schools. It goes on without odors, so we can install it while the kids are still in class. It is also easy to install, so it has become the material of choice for us."

*¾ Mark Krause,
Supervisor, Design
and Construction*

Following the new roof's installation, Krause upgraded the lighting, replaced the air-conditioning and heating units, and installed an energy management system. The building's total energy bills decreased by 50 percent from \$121,000 to \$60,000 between 1994 and 1997, because of these comprehensive upgrades.

On Alexandria City Public Schools' partnership with ENERGY STAR Labeled BuildingsSM, Gilbertson remarked: "I appreciate EPA's efforts to continue providing unbiased technical information to us. We have a good source to go to for information not only about selecting roofing products, but also about financing projects, communicating our success to the community, and selecting other types of energy-efficient building options."

To learn more about ENERGY STAR Labeled Roofing products, go to <http://www.energystar.gov>, or call the toll-free ENERGY STAR Hotline at 1-888-STAR-YES (1-888-782-7937).