



RADIANT BARRIER RETROFITS

to Improve Energy Efficiency
of Older Homes in Hot-Humid
Climate Zones

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The energy efficiency and cost-effectiveness of radiant barrier retrofits is a question frequently asked by homeowners. A grant from the National Center for Preservation Technology and Training, National Park Service, U.S. Department of the Interior, allowed UTSA researchers to measure the actual energy-use impact of this one change—installation of the radiant barrier—in six case-study homes. Each home was:

- One-story high
- Wood frame
- Located in a San Antonio historic district
- Small, averaging 1,381 square feet

HOW MUCH ENERGY WAS SAVED, OVERALL?

- The six homes in the San Antonio study used, on average, **7.2 percent** less energy after installation of the radiant barrier than they did before.

WAS THIS THE RESULT EXPECTED?

- The 7.2 percent reduction in energy use falls within researchers' expectation of a 5 to 10 percent decrease in energy use, which was based on manufacturers' claims and results of a previous study done in Florida.
- The range across the six case-study homes in San Antonio was rather wide—one home used 23.5 percent less energy, while another used 4.2 percent more.

FINDINGS AT A GLANCE

WHAT IS A RADIANT BARRIER?

- A radiant barrier is a highly reflective film fitted into a home's attic.
- Its purpose is to reduce the amount of radiant heat transmitted from objects warmed by the sun, reflecting the heat back toward its source.
- Because the radiant barrier fits within the attic, **it cannot be seen from the exterior of the house.**



Findings of the study indicate the radiant barrier has great potential, but results at the six case-study homes varied widely. More research is needed.



Median cost for a professional to install a radiant barrier:

\$1,362.50



Median annual reduction in energy bills at six case-study homes:

\$146.64



Based on the numbers above, a radiant barrier will pay for itself in:

9.3 years

IS IT A GOOD INVESTMENT?

FACTORS TO CONSIDER

Much of the radiant barrier's \$1,362.50 installation cost comes from labor. Materials alone cost between \$204 and \$319. Should labor costs become lower, or if installation were a do-it-yourself project, the payback period for a radiant barrier retrofit would be significantly shorter.

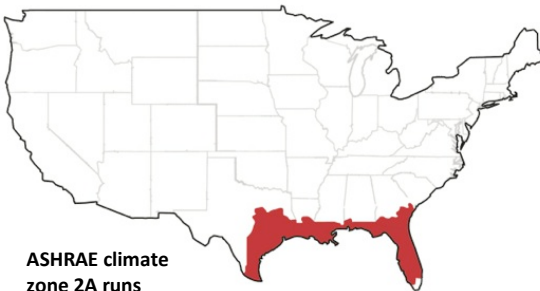
DIY?

1) FINANCIAL IMPACT

This study is among the first attempts to determine whether radiant barriers can significantly lower homeowners' energy bills.

2) LOCATION

This study is among the first to examine radiant barriers' impacts in **southern climate zones**, as opposed to northern climate zones. Homes included in the study were all located in ASHRAE climate zone 2A. However, this evaluation of the radiant barrier has relevance to climate zones 2B, 3B, and 3A, as well.



ASHRAE climate zone 2A runs from central Texas to Florida

WHAT MAKES THIS STUDY UNIQUE?

two factors

WHO PAID FOR THE RADIANT BARRIER?

- All installations (labor and material) were paid by study participants and completed by professional installers.
- There was no incentive or subsidy.
- **Homeowners paid the full cost** of the radiant barrier installation.
- There was no industry involvement or financial support.



1. Homeowners submitted their electricity bills— between one and two years' worth prior to installation, and one year's worth after.
2. Researchers installed SiteSage, an energy use monitoring system, into each home after installation of the radiant barrier.

HOW WAS DATA OBTAINED?

two methods

WEATHER IN FLUX

- Outdoor temperatures remained fairly consistent between the summer prior to radiant barrier installation and the summer after.
- Outdoor winter temperatures, however, were lower than usual prior to installation and higher than usual after installation.



STUDY LIMITATIONS

WIDE RANGE IN RESULTS

- One homeowner saved \$290, weather normalized, on energy bills in the year post-installation. Another wound up spending more on energy bills post-installation.

SMALL SAMPLE SIZE

- Of the 21 homes identified to fit participation criteria, the owners of all but six declined to participate or ceased communication with the research team.

LARGER SCOPE



- Participation in a controlled, 2-year study by hundreds of homeowners would need to be subsidized or underwritten.
- Homeowners will sign up enthusiastically to receive a free retrofit, or one with a very minimal cost.
- This study shows the radiant barrier retrofit is very promising, and thus a larger study is warranted.

FOR
FURTHER
STUDY

COST OF LABOR

- More data is needed on the installation costs of the radiant barrier.

HEATING COSTS

- The cooling load is supposed to be the greater concern in climate zone 2A, yet researchers discovered natural gas for heating used 35 percent more energy per sq. ft. per year than did electricity for cooling.



The Center for Cultural Sustainability explores the continuity of the cultural systems of human existence. Cultural sustainability includes consideration, understanding and respect for heritage—identities and values that bind people to places.

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