

RESEARCH SUMMARY

Insulation and Energy Savings in Minnesota

Published DOE and ENERGY STAR figures on air leakage and energy savings, and why Minnesota's cold climate makes the attic the highest-return upgrade.

Where a heating bill actually goes

Homeowners usually ask about insulation first, because R-value is the number printed on the package. Air leakage is harder to picture, which is probably why it is so often overlooked, even though the U.S. Environmental Protection Agency and the U.S. Department of Energy have published the same finding for years: a large share of a typical home's heating and cooling energy is lost to moving air, not conducted heat. The Department of Energy has found that air leakage alone can account for 30 to 40 percent of a home's total heat loss. That is a meaningful share, and it is exactly why air sealing, not insulation thickness by itself, is often the difference between a project that performs and one that underdelivers.

What EPA and ENERGY STAR have published

According to ENERGY STAR, a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy, homeowners who air seal and add insulation in attics, floors over crawl spaces, and basements save an average of 15 percent on heating and cooling costs, or about 11 percent on total energy costs. That figure is ENERGY STAR's current modeled average, based on a typical 1970 to 1989 home. An earlier EPA estimate from 2009 put the ceiling at up to 20 percent on heating and cooling costs, or up to 10 percent on total annual energy bills, from sealing air leaks and adding insulation together. Both figures describe air sealing and insulation done together, since ENERGY STAR's own methodology assumes a 25 percent reduction in air infiltration as part of the modeled improvement.

These are national averages across many types and ages of homes, offered as a general expectation, not a specific promise for any one project. The only way to get a project-specific number is an on-site estimate.

Why the attic pays back first in a cold climate

Minnesota spans International Energy Conservation Code Climate Zones 6 and 7. Savage, in Scott County, falls in Zone 6, a cold, heating-dominated zone. ENERGY STAR's published recommended insulation levels place attics in zones 6 and 7 in the R-49 to R-60 range, among the highest recommendations in the country, reflecting how much heat a Minnesota attic is exposed to over a typical winter. For comparison, homes in the Southeast or Southwest are often built to attic recommendations in the R-30 to R-38 range, a full tier lower, because those climates put a smaller, shorter temperature difference across the building envelope.

What the published research supports is the direction and the ranking: ENERGY STAR's modeling assumes a 25 percent reduction in air infiltration alongside insulation upgraded to current code levels, and attics in a cold, heating-dominated climate zone see a larger share of that benefit than almost any other part of the house, because they sit under the biggest indoor-outdoor temperature gap for the most months of the year. The bigger the existing R-value gap and the colder the climate, the faster a properly sized attic upgrade tends to pay for itself, though the specific dollar figure and payback period for a given house depend on that house's construction, current insulation, and energy costs, which is why we provide a clear written estimate after seeing

a property, at no cost.

Why spray foam is built to capture more of the combined savings

Batt insulation alone usually only delivers the insulating half of the ENERGY STAR and EPA equation above, since it does not address the air leakage those figures are counting. A material that air-seals and insulates in one step, like spray foam, is built to capture more of that combined savings figure in a single job, because it is addressing both root causes of heat loss at once rather than treating them as two separate projects where one gets skipped.

How to judge the result honestly

- Comfort changes, like disappearing drafts and warmer floors, usually show up within the first few days of full occupancy after the re-entry window.
- Bill changes take longer to judge fairly. Compare at least one full billing cycle, and ideally a full heating season, against the same period a year earlier rather than against last month.
- A single month's bill can be skewed by an unusually mild or unusually brutal stretch of weather, so a full season gives the most honest picture.
- General published averages describe many homes; the number for a specific house depends on its construction, current insulation levels, and energy costs, which is exactly what an on-site estimate is for.

Sources cited in this document: ENERGY STAR, Methodology for Estimated Energy Savings; ENERGY STAR, Recommended Home Insulation R-Values; U.S. Department of Energy, Guide to Home Insulation (DOE/EE-0340); U.S. Environmental Protection Agency, Seal and Insulate with ENERGY STAR (EPA 430-F-09-052, 2009).