

Unwrapping the puzzle of home insulation

Is a more energy-efficient type of insulation really worth the higher price? It pays to figure out when your reduced energy bills would offset your upfront costs.

By Nancy Keates, *The Wall Street Journal*



Given what's happening with oil prices, anyone building a new home now would be crazy not to make it as energy-efficient as possible.



But what's most energy-efficient isn't always what's most cost-efficient: The tough part is figuring out the point at which the return of lower energy costs will offset the upfront expenditures on newer materials and techniques.

As we consider what kind of insulation to use in our home, we're struggling to figure this out.

Heating and cooling account for 50% to 70% of the energy used in a typical home, according to the Energy Department. And much energy and money is wasted when air

leaves or enters the house because of poor insulation.

Better for the environment

For the new house we are building, we picked out insulation six months ago based almost entirely on how much it would cost to buy and install. We chose the most common form: fiberglass batt sheeting along with another form of fiberglass that's blown in, called the "Blow-In-Blanket System."

But in recent weeks our architect has suggested an alternative type -- a spray foam product that is much more expensive upfront but is supposed to provide energy savings because it lets out less air. The architect also tells us it is better for the environment because it would allow our household to consume less fossil fuel.

The fiberglass batt plus blown-in fiberglass costs \$11,415. The foam would be \$8,000-\$10,000 extra, depending on what type we used. (Most people use an insulation contractor, as we will, though do-it-yourselfers can save about half the cost.)

Fiberglass batt has come under fire from critics who raise health concerns because fiberglass is a known carcinogen. Its energy efficiency has also been questioned because it has to be cut to fit around pipes and fixtures, thus leaving cracks. Blowing in the fiberglass reduces those spaces.

The foam that my architect recommends is made from cellular plastic and takes on the consistency of a pillow after it is sprayed, expanding as much as 120 times its volume within seconds. The benefit is that it can fill in nooks and crannies that fiberglass, even when blown-in, can't reach, he says, thus providing superior energy efficiency and improving indoor air quality by eliminating air movement through walls.

Since it reduces air movement, foam companies say it also makes less dust, which could help with my husband's allergies. And it is touted to help reduce mold, since it deprives mold of air and food sources – a huge selling point here in rainy Portland.

There are two main brands of foam: Icynene and Demilic. The one our architect wants us to use is Demilic's Sealection 500 – but maybe that's because he's been having long conversations with the company's salesman.

Calculating the R-value

The way you measure how effective insulation is in resisting heat flow is the R-value. The higher the R-value, the better the resistance. In that contest, spray-in foam ties with Blow-In-Blanket fiberglass, with an R-value of 4.0 per one inch of thickness; fiberglass batt has a 3.4 value.

Foam companies say the R-value doesn't take into account how well the product stops air flow -- a big issue if you think about what it feels like to wear a wool sweater instead of a ski jacket at the top of a mountain. When wind is taken into account, the foam performs twice as well as the fiberglass.

Our architect did an informal analysis to calculate the number of years it would take until we saved enough money from heating and cooling costs to make up for the extra upfront expenditure for the spray foam.

Using an estimated \$3,000 for annual energy costs, a 3% annual increase, an initial upgrade cost and estimated interest rate for the cost –

and assuming Demilic's assertion that there is a 40% energy savings over conventional batt insulation – he calculates there is a 15-year payback on the cost of the foam. If energy costs continue to dramatically rise, the payback period would be shorter.

One option is to use the foam in the most crucial parts of the house and choose the Blow-In-Blanket fiberglass for the rest. My architect says that if we don't want to spend all that money for the spray-in foam, we could use it just in the vaulted spaces in the attic and then use the Blow-In-Blanket fiberglass for the perimeter walls.

Making a decision

I called Andre Desjarlais, the group leader for building envelope research at the Energy Department's Oak Ridge National Laboratory in Oak Ridge, Tenn. That's where the R-values are determined. Desjarlais told me that new homes are almost always built using what's called an air-barrier system in which the home is "wrapped," underneath the exterior siding, by plastic or some other method. This provides a barrier to air leakage.

Using spray-in foam in a new house with an air barrier system is a total waste of money, he says. "You will pay a lot extra and get no extra benefit," he says.

I asked our contractor's head estimator whether our house will be "wrapped." She told me it will -- but with felt paper instead of plastic sheets. Though plastic sheets provide the most air-tight house, they don't allow moisture to escape, she says, and in their experience that has caused mold and mildew. The felt paper keeps out air, but it is also permeable.

Bottom line, it is my task to sort this out and make a decision. I am leaning towards using the Blow-In-Blanket fiberglass in the areas where there's most leakage and fiberglass batt everywhere else.