What is an Energy Retrofit

Energy retrofit is a term that defines a *complete* airsealing and insulation project on an existing building. It addresses all the areas that would have been sealed during construction if energy would have been as expensive then as it is now. It also addresses areas that builders do not typically pay enough attention to and areas that insulation contractors should address but due to low bidder qualifications, can't offer.

Every location that allows heat and/or air to enter or escape is located and sealed with an appropriate material. There are several materials to choose from and every one has a specific application. Some are fire-rated for use near a chimney, others expand to penetrate a gap and seal it from the inside, and still others are flexible and can be pushed into a gap or crack and will stay pliable forever to allow expansion and contraction of building materials from season to season without allowing air to move through.

Fibrous insulation won't stop air movement, and air exchange accounts for half or more of the energy lost from your home. So going up into the attic and rolling out more insulation probably won't produce the results you expect. It can even create problems you didn't have before. Moisture is contained in the air that leaks out of your home every day. If that air is cooled to the dew point, moisture comes out of the air and clings to any surface at or below the dew point. When you add insulation to the attic, the temperature in the attic will likely be much lower in the winter than it was before. When that happens, improperly vented bath fans and air leaks from the house supply enough moisture to the attic to accumulate condensation on the underside of the roof deck and framing members. This will result in mold, rot, and curling shingles. It may take a few years to see the damage but it is best not to let it begin.

The way an energy retrofit begins is with a thorough visual inspection and/or an infiltrometer (blower door) test of the house. Then a plan is formulated to make the building envelope as complete and air tight as possible. It is not a pleasant task. It requires moving all the insulation already installed in an attic and sealing all gaps and penetrations beneath. Wiring holes, plumbing holes, framing anomalies, chases, soffit ceilings in bathrooms and kitchens, etc., etc., must be sealed airtight from the attic. Recessed light fixtures that are not air tight are sealed and prepared so that insulation can be placed around them. All bath fans and range hoods must be vented properly. Not into the attic or into the soffit, but all the way out of the building. Vent panels must be installed to insure adequate ventilation from the soffit to the attic. Next a walkway should be constructed so that the next person who needs to get up in the attic for an inspection doesn't have to trample the insulation to get from one end to the other. Since most framing is only 6 or 8 inches high and insulation today in our area should be at least 12 inches, there is no way to see where to step without a walkway. That creates a dangerous situation and will lead to degraded R value and possibly someone stepping through the ceiling accidentally. Lastly, if the access to the attic is from the living space, it needs to be insulated and sealed. Not permanently, but when it is closed, it should close tightly and provide a substantial R value between the inside and outside. Hatches in bedroom

closets and pull down stairs are common energy loss areas that go unchecked. Finally, an infiltrometer test is performed after the work to determine the effectiveness of the repairs.

If there are heating or air conditioning ducts in the attic, they present another dimension to the repair. Any duct leakage in the attic is detrimental to the efficiency of the system and the energy efficiency of the structure. All duct leakage needs to be repaired and adequate insulation needs to be placed on the exposed ducts. All duct connections to the rooms below need to be sealed airtight too.

The saying goes “The devil is in the details” and that is never more true than in an energy retrofit. There are many details that can be easily overlooked and will result in poor home performance or worse, moisture build up in an attic.

Without proper training in the area of building science and a wide variety of materials and tools, a complete energy retrofit is impossible. Your home is probably the largest investment you will ever make, treat it as such and hire professionals to address sensitive areas that can save hundreds and possibly thousands of dollars in wasted energy annually.

This article was written by Ken Field. Ken is the owner of Field’s Service, Inc. and Slate Belt Energy Services. He has been involved with the heating and air conditioning trade since 1980 and holds several industry certifications. He is a RESNET certified energy auditor in the state of PA and operates a successful energy retrofit business in addition to installing cellulose insulation in new and existing homes. He can be contacted at 610-759-6306 or Ken@FieldsService.com