

Case Study Results:

This case study outlines home energy efficiency upgrades performed on a home in the spring of 2009, and the energy savings resulting from those upgrades.

Case Study: Reynolds			
Location: Crieve Hall, TN 37220			
House Style / Size: Ranch / 1,400 SF			
Description of Work:		Energy Use - MMBtu/yr	
Air Sealing		Before	106.7 MMBtu/yr
Duct Sealing		After	75.3 MMBtu/yr
Sealed Crawl Space		% Reduction	29%
Radiant Barrier + Insulation			
Energy Use - kWh/yr		Lbs. Coal Used/yr	
Before	31,263 kWh/yr	Before	25,417 lbs
After	22,063 kWh/yr	After	17,937 lbs
% Reduction	29%	Lb. Reduction	7,480 lbs
Air Infiltration		CO2 Emissions	
Before	3,456 CFM50	Before	72,692 lbs.
After	2,142 CFM50	After	51,300 lbs.
% Reduction	38%	% Reduction	29%
Duct Leakage		# Of Cars/Year Off the Road:	2.18
Before	350 CFM		
After	133 CFM		
Reduction	62%		

Energy Efficiency Upgrades:

This list includes everything E3 did to ‘tighten up’ and dramatically reduce air-leaks in the home and insulate the building envelope.

- Attic – E3 installed a radiant barrier in the attic. This radiant barrier reflects heat from the dark roof while still allowing warm air in the attic to escape at the roof ridges. E3 caulked light and fan penetrations into the attic to further prevent attic air leakage into the conditioned space. E3 unclogged the soffits and installed baffles to ensure adequate ventilation and then added 4-5 inches of *GreenFiber* blown cellulose insulating to the attic, ensuring even coverage throughout. The attic insulation level now complies with the recommended R-38 for our climate zone (4).
- Crawl Space – E3 installed a 3 ply 12-mil *Griffolyn* brand vapor barrier in the crawl spaces to control moisture levels and suppress harmful gases like Radon from entering the living space. E3 laid plastic piping underneath the vapor barrier in case radon venting is needed in the future.
- Rim & Band / Crawl Space Walls – The rim band (area between basement and first floor) is one of the most problematic areas for air leakage and heat/cold intrusion. E3 used *BioBased* 0.5 lb open cell polyurethane spray foam to seal and insulate the rim band around the perimeter of the house as well as the exterior crawl space walls, creating a sealed crawl space system.
- Air Infiltration – E3 caulked or foamed all penetrations into the subfloor, including plumbing and electrical lines, penetrations into the ceiling including recessed lights and fans, and around window and door frames, all common areas of air leakage. E3 added foam insulating pads to all outlets and light sockets, helping seal this common area of air leakage to the attic and basement.
- Duct Leakage – E3 reattached 2 ducts that were partially disconnected and used mastic tape and mastic glue to seal the ducts at all bends and joints.

Photos:

Crawl Space

Before:



After:



Attic

After:



After:

