

# POULOS HOUSE CASE STUDY



**HOME PROFILE**

**Age:** 92 years old (build in 1918)  
**Use:** Single-Family  
**Residence Type:** Two-Story  
**Land Square Footage:** 9,250  
**Building Square Footage:** 1,794  
**Interior/Exterior Construction:**  
 Stucco  
 Concrete Foundation  
 Original windows & un-insulated plaster walls  
 Remodeled several times  
 16 YR old boiler (~1994)  
 19 YR old central air-conditioning systems (~1991)

**1. Did you follow any of the suggestions on your Energy Audit results given by EZING? If so, which ones and why?**  
 We have not yet, but we will work on following them soon. We had the audit done in January.

**2. Do you feel like the money you spent on the Energy Audit was worth it?**  
 YES. I would definitely recommend families to have energy audits done since knowledge of how their house (energy-consumption-wise) is important for minimizing costs. It is great to have the information accessible.

**3. Why did you decide to get an energy audit? Were there any negatives?**  
 Mostly economical reasons. Everyone likes saving money whenever possible. This was a good way to solve short-term and long-term issues with the home. The only bad thing that has come of the audit is that it has made me sad to know how poor in condition my home is.

**4. How long did your Energy Audit take? (hours/days?)**  
 It was very short, only four hours!

**5. Has the experience of the Energy Audit changed the way you think and act? Your family?**  
 Yes, absolutely! We are a lot more aware of the energy we use and the way that our home functions throughout the day.

## AIR LEAKAGE CHECKLIST AND RECOMMENDED CORRECTIONS

Leak Severity is ranked High (1), Medium (2), Low (3), or None (N). Priority Action Levels A, B, or C  
 Client: K C Poulos

AIR LEAKAGE TYPES	Severity	Location(s)	Correction	Priority
Attic/Roof				
Drop-down stair	1	SW Bedroom	Pre-fab insul'd cover @ Insulated-covers.com, or fabricate foam box	A
Eave Vents	1	Main Attic: IF CHOOSE roof insul'n strategy	Add blocking to prevent "wind washing" at exposed insul'n.	A
Roof Fan		Attic	DISABLE IT!	A
Framing and Chases-- Open to Attic, Basements, or other areas				
Vent or Chimney Chase	1	Attic Floor	Seal at attic floor w/ fire rated materials, eg. metal & foam.	A
Chases (plumbing, electric, HVAC)	1	Attic Floor	Cut/fit foam board & seal edges or spray foam. Many acceptable seal methods & materials.	A
Floor Cavity @ Exterior -- Rim Joist or other type	1	Basement, Crawls -- include with wall insul'n at exterior; seal edges with spray foam	Cut and fit rigid insulation to fill cavity at exterior; seal edges with spray foam	A
Cabinets & Counters	2	NW corner of kitchen	Seal gaps w/ caulk -- see blue tape	A
Pocket Doors	1	2nd Fl Bathroom	Difficult to correct. Try attic floor.	A
Enfilades				
Floor-Wall Junction	1	Throughout 1st and 2nd floors.	Dense packing walls may solve this! Or Caulk with clear silicone, or remove quarter-round, seal behind, & replace.	A
Wood Trim	2	Various windows--Lv Rm	Caulk -- see Blue tape	A
Recessed Fixtures	1	Kitchen	Seal behind cover at drywall cut AND add air tight baffle inserts.	A
Recessed Fixtures -- "eyeball" type	1	Dn Rm, Lv Rm	We know of no correction for eyeball or 4 inch types, except replacing with track lighting! Hopefully dense pack cellulose in the walls will eliminate this leak.	A
Fixture Base; Electrical Box	1	Powder Rm wall light	Caulk, or polyiso foam behind & into box. Check w/ electrician	A
HVAC Distribution				
Accessible Ducts	3	1st Fl Living & Dining Rooms	Remove vinyl "duct" tape. Run furnace fan & mark leaks. Seal w/ mastic or UL listed alum tape.	C
Insulated ducts	1	2nd Fl Supply and Returns at ceiling	Run fan & mark leaks. Seal w/ mastic or UL Listed alum tape.	A

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Insulated ducts	1	2nd Fl Supply and Returns at ceiling	Run fan & mark leaks. Seal w/ mastic or UL Listed alum tape.	A
Duct Boots and Registers	1	2nd Fl. Ceiling	Caulk or foam seal betw/ boot & floor/ceiling/wall. Access by removing grill or from attic floor.	A
Vent Connection at Chimney/Chase	N	Good seal in brmt.	Air seal w/ fire rated sealant, eg. refractory cement or caulk	A
Fireplace				
Fireplace Damper	1	Living Room	Damper is not well seated. Fabricate temporary blocking w/ foam board or repair damper.	A
Windows/Doors/Skylights				
Window	1	SW Bedroom - casements w/ inter wood storms that leak!	Repair wood storms so they fit tightly in opening. Plane down wood; add plastic V-strip	A
Parting Rail (Lock Stile)	1	Powder Rm, Dining, Living, W. kitchen, others that are loose	V-strip betw/ parting (locking) rails; also repair all latches that do not work or do not tighten sashes.	A
Pulley Seal	1	Throughout 1st and 2nd floors.	"Pulley seal" fits over pulley opening; allows proper function.	A
"Chain Run"--lower sash	1	Throughout 1st and 2nd floors.	Add backer rod to gap in winter and where never open window	A
Sliding Glass Doors	1,2	S. Porch (1) at vertical parting rail; (2) at bottom track & floor junction	Caulk junction at floor and bottom track. Be creative at parting rails.	A
Door(s)	1	Entry at threshold; French Doors at S porch & at entry	V-strip at top and sides and add door sweep (& missing handle)	A
Direct Penetrations to Outdoors				
Kitchen Fan			Need to add fan here.	
Mail Slot	1	Entry Door	Explore magnetic closures or replace with new, insulated door.	B
Air-Conditioning Entrance	1	Basement at plywood window	Spray foam sealant at interior. Caulk at exterior to weatherproof.	A

Verify Air Tightness of air seal work before adding insulation with all above corrections.  
 See www.efi.org for specialty air seal and ventilation products.

## AIR LEAKAGE MEASUREMENT

Client: K C Poulos

Date:	12/11/2009	15 degrees F	Cu. Ft.
Outside Temp.	65 degrees F	0.5	0.4
Indoor Temp.	0-5	0	0.4
Wind Speed	0-5	0	0.4
House P	Ring O	Flow	
Fan P	(Pa)	or ABC	(CFM)
@20	23.8	0	2607
2nd	893	0	8.5
3rd		0	2290
Other			
Note			
Total Volume:			19,258

House Volume Calculations:  
 ACH50 or Air Changes per hour at 50 Pascals fan pressure  
 ACH50: 13.70  
 ACH50 Rating: Ratings reflect the condition of your house compared to what is typically seen.  
 Excellent 0-2 Good 2-4 Avg 4-8 Poor >8  
 Your ACH50 rating: Poor

## Air Tightness

Severity of Air Leakage Through the Thermal Boundary  
 ACH Naturs (ACH<sub>nat</sub>) or natural air changes per hour is the average house air leakage rate, useful for estimating heating cost due to leakage. ACH<sub>nat</sub> is calculated as an adjustment to the ACH50 rate, taking account for local climate, height of the house, and wind shielding provided by the surroundings.  
 ACH natural: 0.93  
 Effective Leakage Area (eq. in.): 575 or 24" x 24"

Energy audits are an important way for home and small business owners to know exactly how much they are consuming and spending. An audit can isolate key problem areas in a home or business and offer a comprehensive plan of action in a step-by-step format for how to reduce energy use and remedy key energy-wasting aspects of a building. The charts to the left prioritize the different areas to improve.