HomeWorks Residential Energy Analysis Report

IR Camera Analysis

Location: Brookline, MA

Date: 10/20/09

For: Hilary K.

Background:

This is a three story double-brick apartment building which was converted to separate condos. The entire building was formerly heated by a single zoned steam boiler. The top and bottom floor units of this building were converted to forced hot air heating. However, your unit,#2, had a downsized boiler installed with the existing pipes retained for the front of the condo, while those feeding the back rooms were new but downsized. You reported experiencing very high gas heat consumption, considering the size of the unit and its placement, sandwiched in between two units. You reported consuming about 1500 Therms last season, with half or less that amount to be expected of a unit this size and placement. Plus I observed your uneven heating conditions between the front and back of this 2nd floor unit.

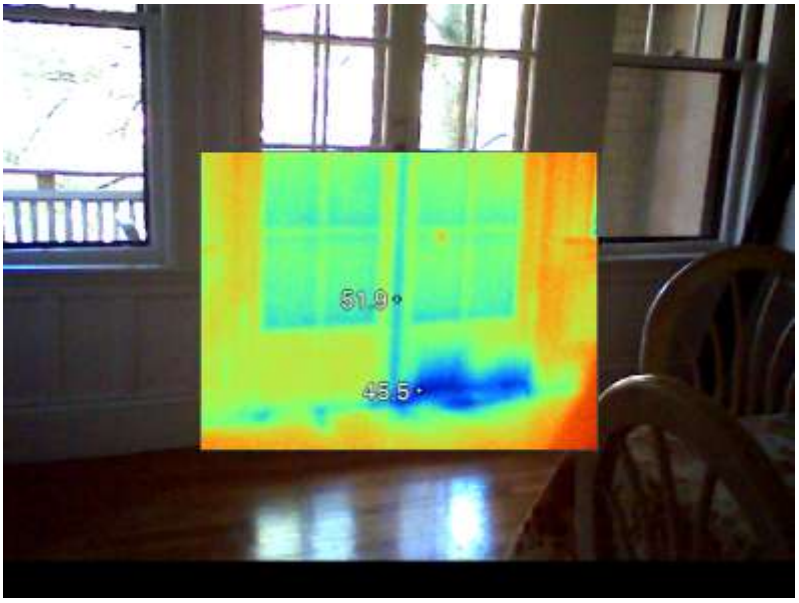
Findings:

My IR cam survey (see images below) revealed that there is no insulation in the exterior walls. You have approximately 800 square feet of exterior walls, which would account for about 200 Therms of heat loss per heating season. In addition, the back stairwell connecting to the basement is uninsulated and quite leaky to outside air, especially the hatch at the top of the stairwell. As you know, the floor of the left rear bedroom is insulated, which deprives it of the usual heat it would receive from the lower unit.

Most significant for your exess energy loss would be the significant amount of heat being thrown off by the boiler and its associated piping in the basement. As you can see from the image below, the temperature of the pipes is in excess of 212 F. The background

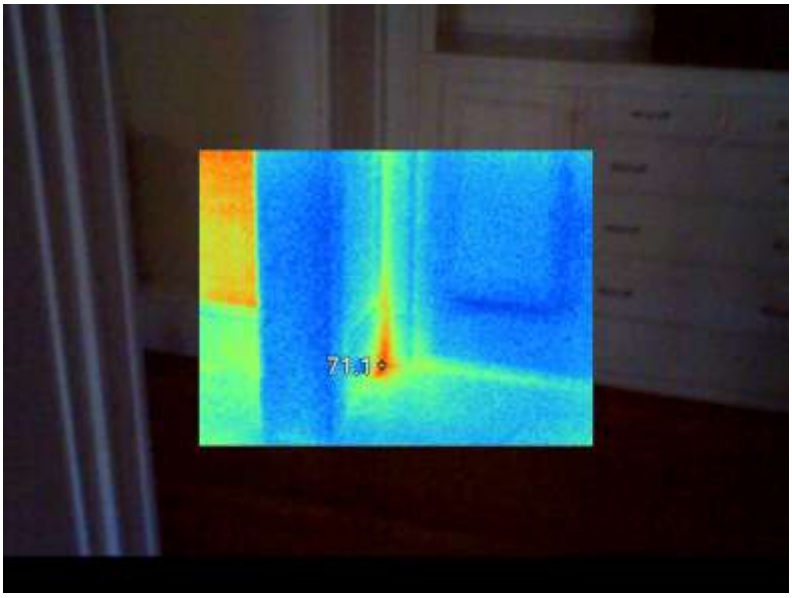
temperature of the basement is around 71 F. So, the uninsulated pipes are creating a nice cozy basement and clearly costing you a significant amount of money.
(Report continues after images)

Lack of insulation above French doors is typical of all exterior walls.

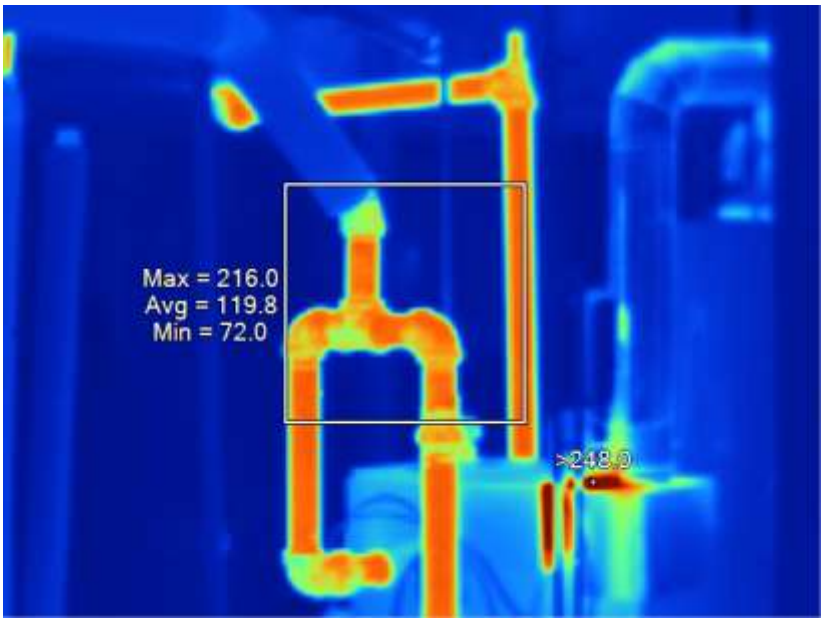


French doors are also a significant source of air infiltration.

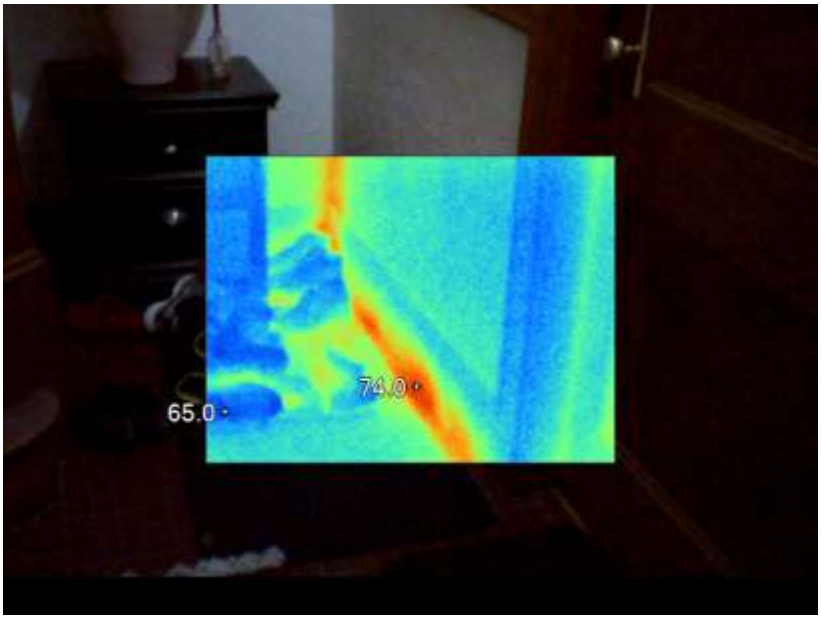
Air Infiltration above kitchen window.



Heat source inside interior wall…..is this upstairs neighbors' heat bleeding to your unit, or is this your heat on way upstairs?



Basement housing the boiler is quite warm owing to uninsulated pipes.



Uninsulated steam pipes throwing heat into hallway.

In addition, the uninsulated steam pipes are throwing heat into the hallway and possibly the first floor apartment on their way to your apartment.

I also visually observed that the air release valves on the radiators in the rear of your apartment were bubbling water, in addition to releasing air. These valves appeared to me to be either too small for the application and possibly malfunctioning. This, in addition to

the smaller diameter piping serving these radiators, could account for their very late warm up relative to the radiators in the much warmer front of the unit.

Recommendations:

1. Insulate all exterior walls, including the entire back stairwell, and air seal the unit. Note that dust from drilling into drywall and blowing cellulose insulation can be mitigated by proper installation and clean up technique. Your husband would experience little if no symptoms. However, it might be advisable to vacate unit for a couple days to let any residual dust settle. $2600 – gas rebate = $600 net cost to you
2. Insulate basement steam pipes, and trace out all steam pipes in walls and insulate by blowing cellulose into those wall cavities. $600-1000 , no additional rebate available
3. Replace steam valves in rear of unit with high capacity valves. $100
4. Move thermostat to hallway. Set it and leave it on a fixed setting. Steam systems, especially yours with its very large pipes, are **very** inefficient if they are allowed to cool off overnight only to have to heat up all that water and associated piping from room temperature to 212 F every morning. $250

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