Newburyport Old Home Case Study

Barriers to heat electrification in an older home
Circa 1760 Home

- Georgian Gambrel
- 3-unit condo
  - Side-by-side & in back
- 3 stories plus basement
  - Approx 2200 sq.ft
  - 1st fl, kitchen, dining, living & bath
  - 2nd fl, 3 BRs, full bath
  - 3rd fl, 3 BRs, full bath
- Natural Gas
  - 125,000 BTU furnace, 28yrs old
  - Forced hot air
  - Single zone / lousy distribution
    - 1st fl. Lots of vents
    - Upper floor, 1 vent/room
- Window AC in 2 rooms
- Solar on roof covers entire electric bill
Updates Done

- Single pane windows to appropriate double panes
- Leveraged Mass Save programs
  - Lots of crack sealing
  - Blew in insulation into walls
  - Insulated tops of walls in attic
  - Sealed utility chases
  - Foam insulated attic at roof
  - Added insulation to floor of attic
  - Insulated air ducts where exposed
    - Basement
    - Attic
Dream

- Move to heat pumps for all heating
- Get AC in all rooms
- Add zones for efficiency and comfort
- Foreseeable issues:
  - I don’t like heating hoses strung along outside of historic home
    - Reuse some of existing ductwork for coolant hoses inside home
  - I don’t like the look of the wall mount vent units in an historic home
    - Smaller flush ceiling mount units look suitable
Dream Meets Reality

- Heat pump rep could do anything I want
  - He wouldn’t recommend it
  - It will become very expensive

- General issues
  - Largest compressor is 50,000 BTU
    - Probably need 2
  - Wall mount vents are $5000 apiece
    - Might need 7-8 for $35,000-$45,000
  - Ceiling flush mounts (my preference) add another $4000 each
    - Might need 7-8 for $63,000-$72,000
    - Some risk as need a certain amount of space between ceiling rafters, won’t know until open up

- Could bury hoses under siding, but requires a lot of surgery

- I would be spending more on electricity than I am now on gas
  - I don’t have much excess solar power

- He did not recommend my dream
  - He gave 2 “sensible” options
Simple Recommendation

- Replace furnace with another more efficient gas furnace, probably 80,000 BTU
- Continue to use window air conditioners
- Wait for technology to improve
  - Next time HVAC needs upgrade
  - Next owner’s decision
- Cost $9,000
  - $1,000 Mass Save rebate
  - 7 yr 0% interest Mass Save heat loan
Larger Recommendation

- Replace furnace with another more efficient gas furnace, probably 80,000 BTU
- Add outdoor heat pump for AC
  - Heat exchange coil at furnace
- Use existing ductwork for all
- Cost $15,000
  - $1,000 Mass Save rebate
  - 7 yr 0% interest Mass Save heat loan