PIER Research for the 2008 Residential Building Standards

Revision to the Residential ACM Calculation for Furnace Fan Modeling

March 28, 2006

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Agenda

- Background
- Field Survey Data
- Proposed Heating Fan Model
- Impact with Defaults
- Performance Option

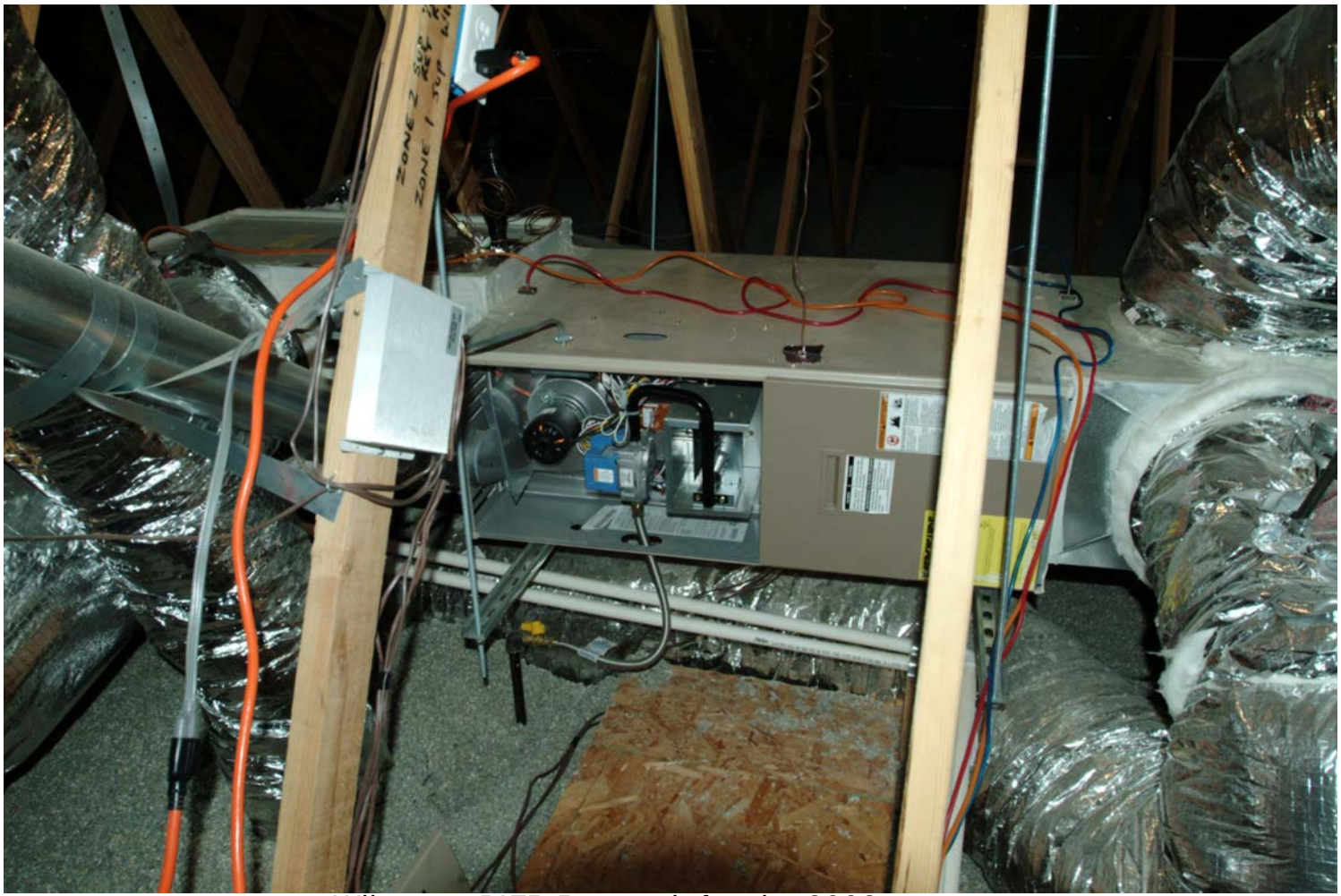
Background

- The Residential ACM specifies the rules and algorithms to be used in compliance Calculations
- 2005 ACM says fan energy is fixed at .005 x heating output
- No credit for efficient fan/duct system

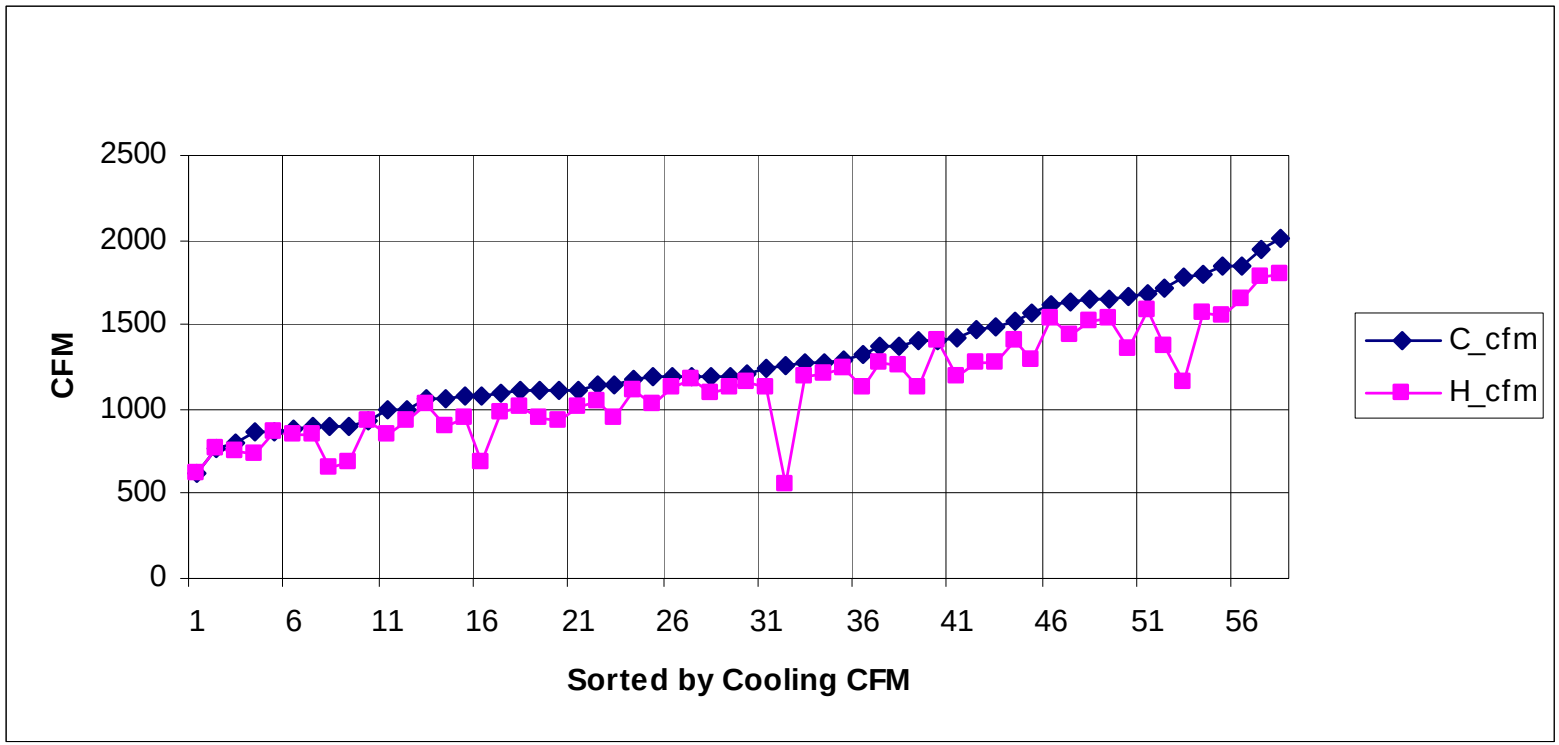
Field Survey

- 60 furnace systems in new homes
- 55 in production homes, 5 custom
- All measured with dry coil
- Measured air flow and fan watts by mode
- Measured pressure by mode and component

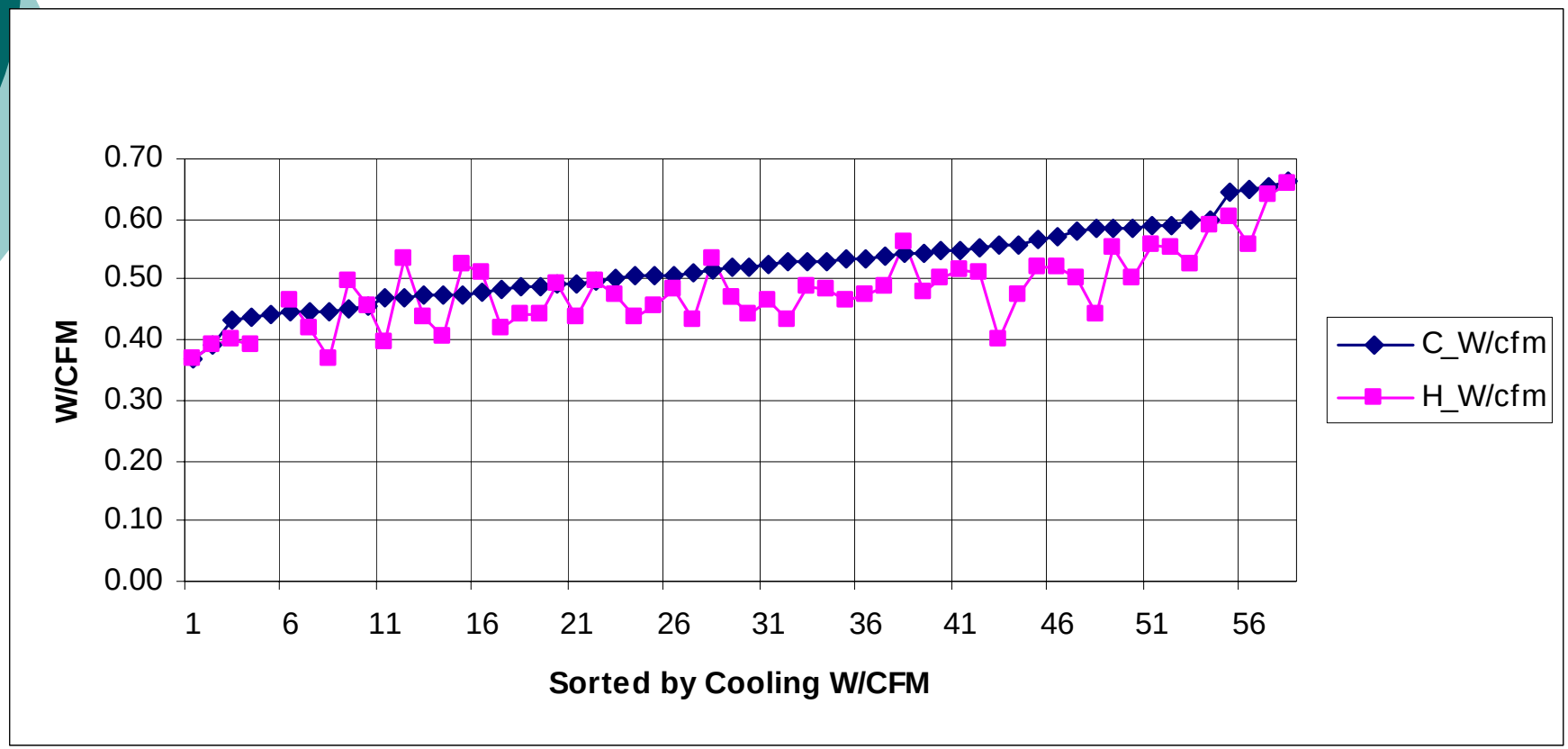
Furnace in attic with flex ducts



Heating CFM
Function of Cooling CFM (default PSZ Motor)



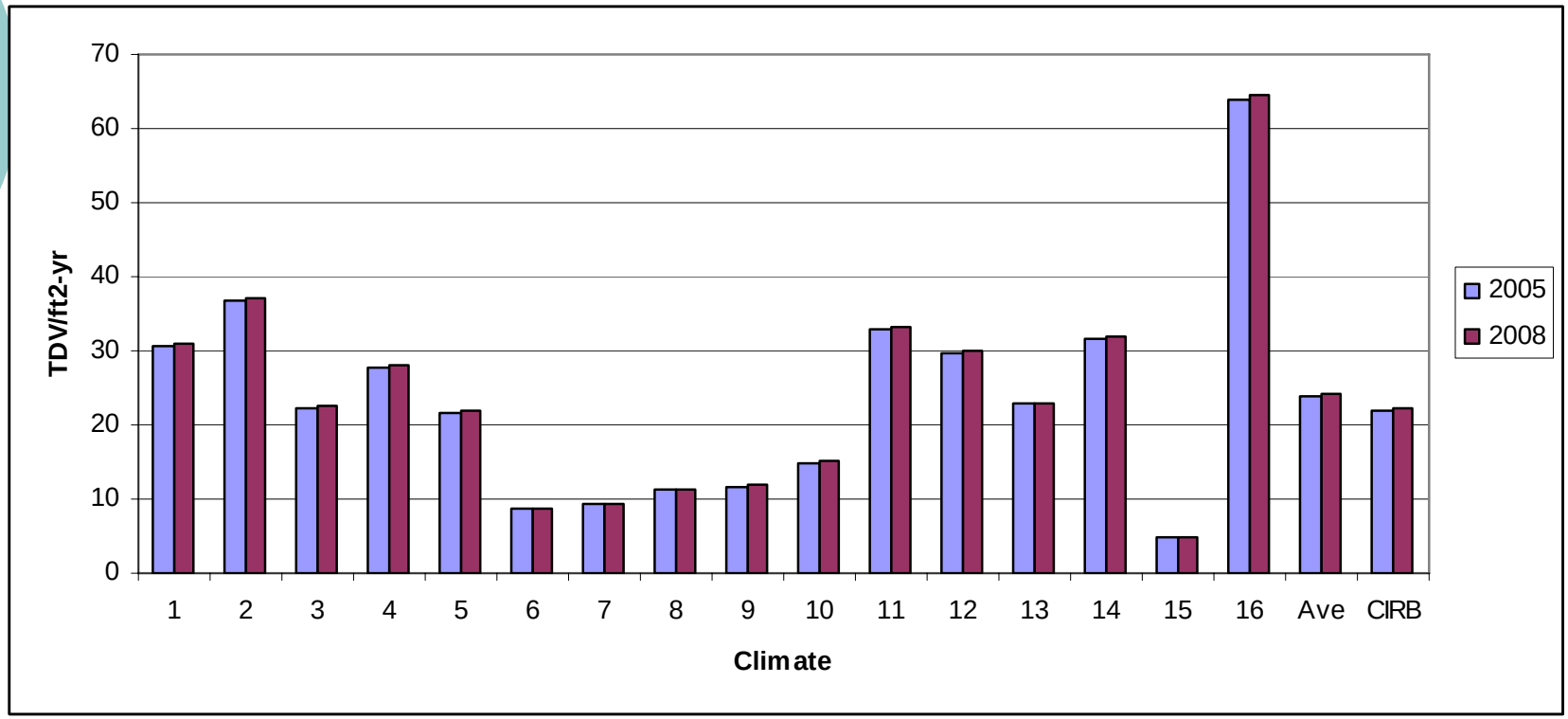
Heating W/CFM
Function of Cooling W/CFM (default PSZ Motor)



Proposed Heating Fan Model

- CFM Heat = 0.93 * CFM Cool
- W/CFM Heat = 0.88 * W/CFM Cool
- Cap Heat = 1.08 * CFM Heat * 40
- W/BtuHeat =
- (CFM Heat * W/CFM Heat) / Cap Heat

Default Increases Annual Heating TDV 1%



Performance Option

- Builder specifies heating (and cooling) CFM and W/CFM
- Performance TDV credit for compliance
- Post construction test by builder
- 3rd party verification required