

Daniel Bergey

**Low-Load, High Performance Homes:  
Two-Point Heating with Mini-splits**



**Transformations Developments**

- Devens  
8 houses
- Easthampton  
33 houses



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**Transformations Overview**

~2000 sf finished floor area  
8-18 kW<sub>p</sub> photovoltaic arrays

Easthampton      Devens



Image Courtesy of Transformations, Inc.

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**Transformations Overview**



12" double stud walls  
2x4s, 16" OC outer  
24" OC inner



0.5 pcf spray foam  
R-4/in  
about R-45 total

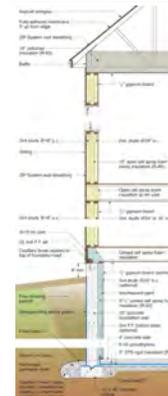
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### Transformations Overview



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### Transformations Overview



Ceiling: R-63 (18" cellulose)

Walls: R-46 (12" 0.5 pcf ccSPF)

Basement Walls: R-20 (3.5" 2.0 pcf ccSPF)

Basement Slab: R10 (2" XPS)

OR

Slab on Grade: R-30 (6" XPS)

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### Mini-Split Heat Pumps

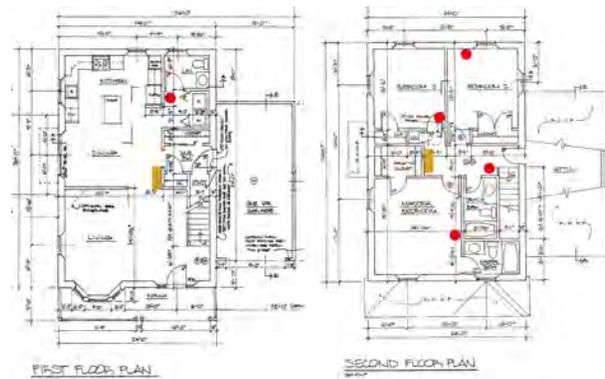


- 2x 1-ton heat pumps
  - First Floor in living / dining area
  - Second Floor at top of stairs
- 10 Wh Resolution

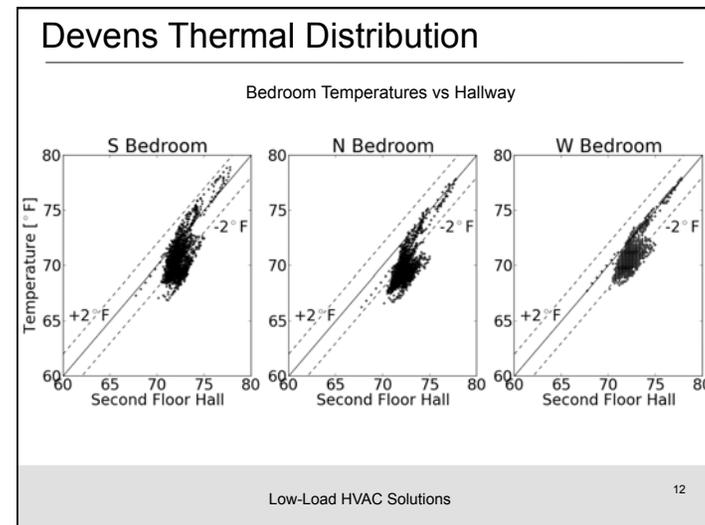
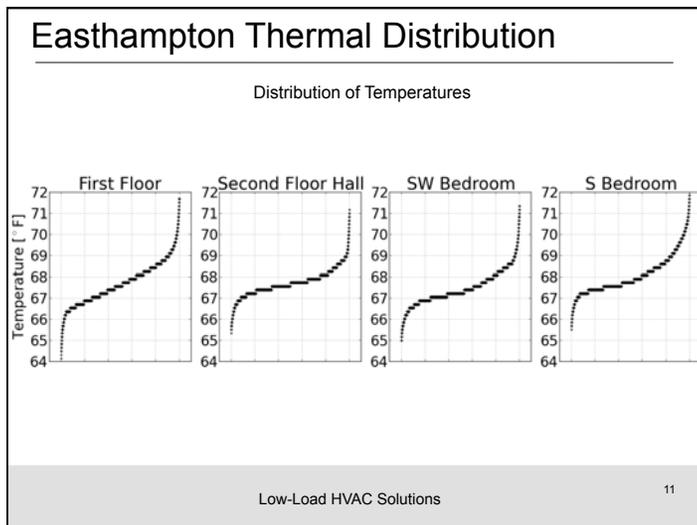
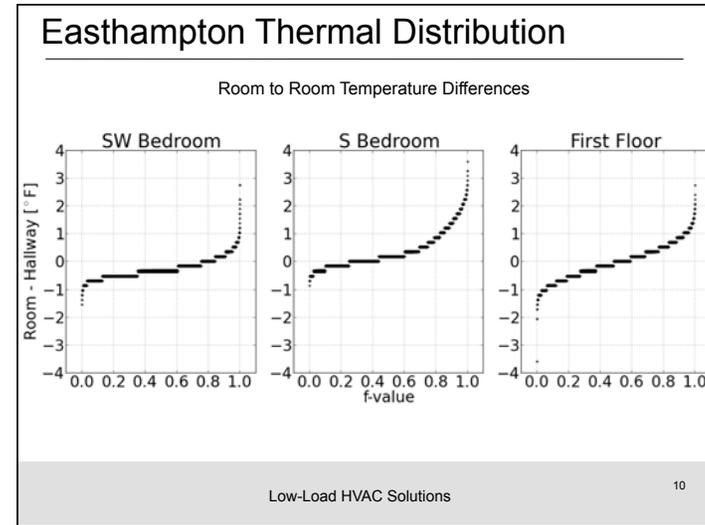
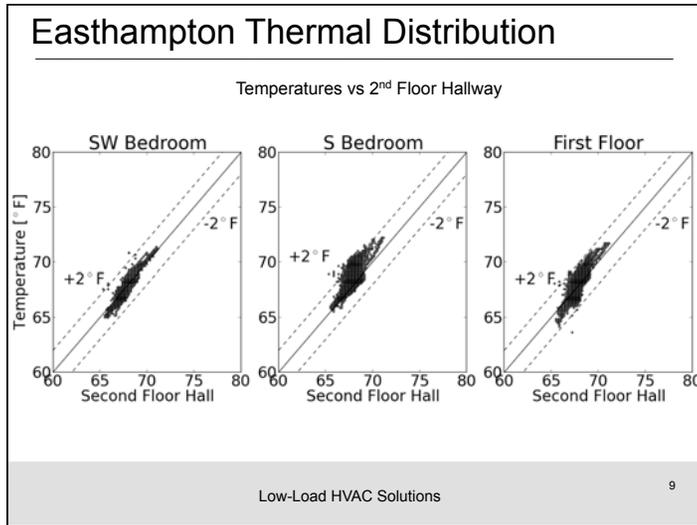


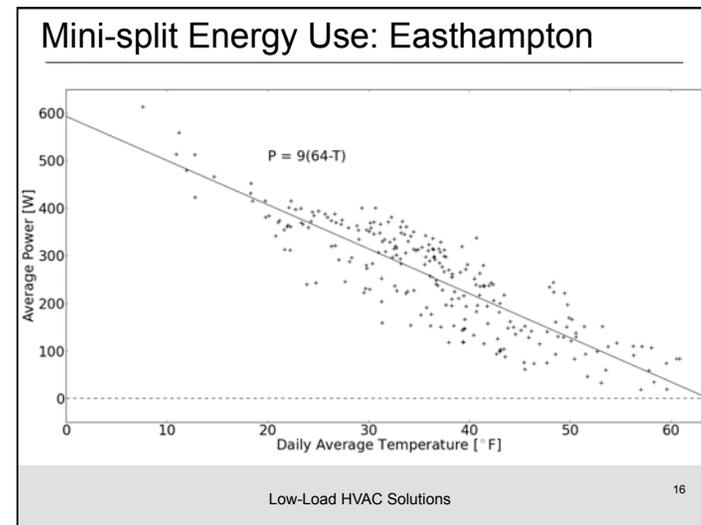
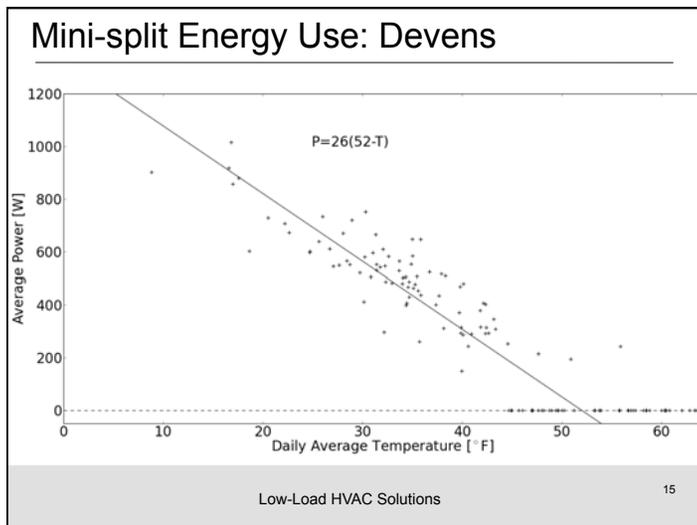
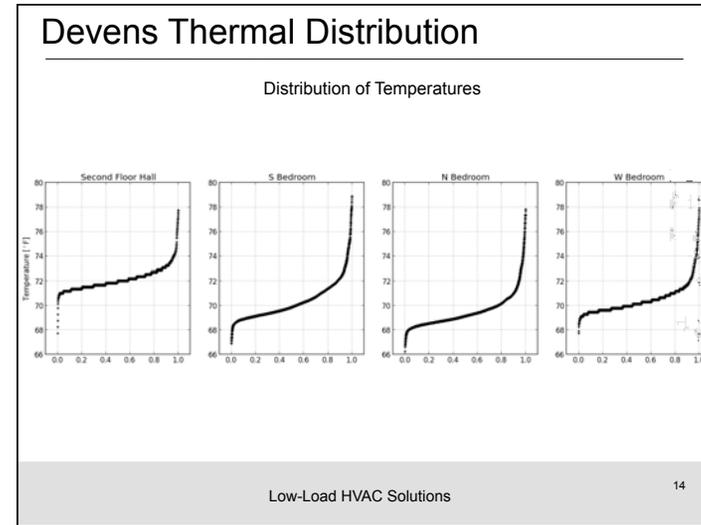
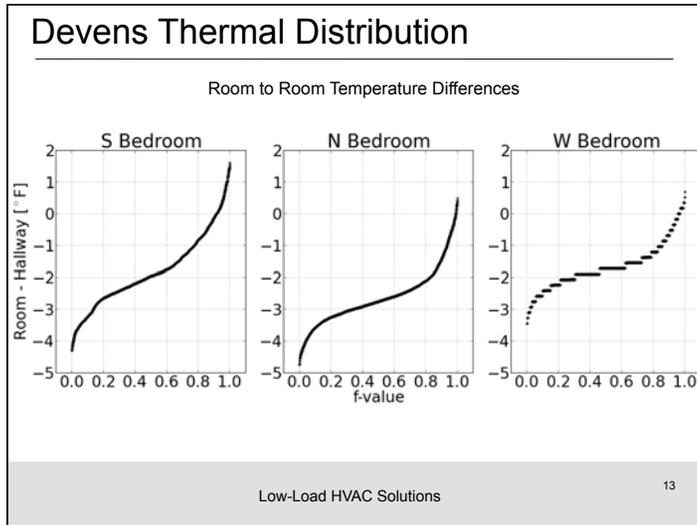
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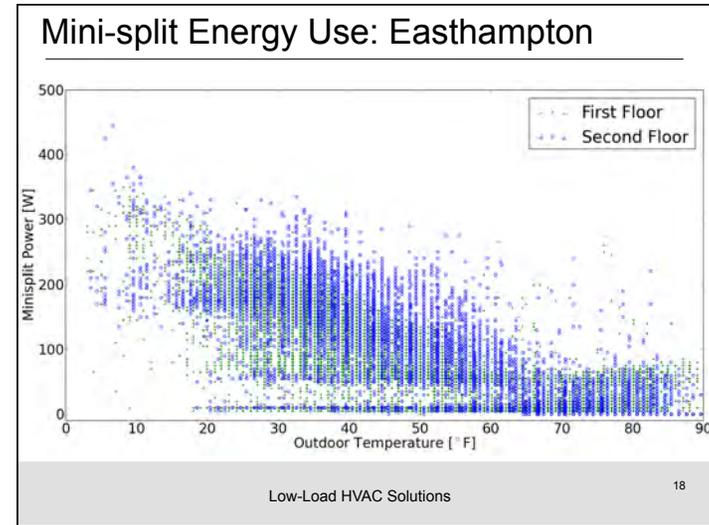
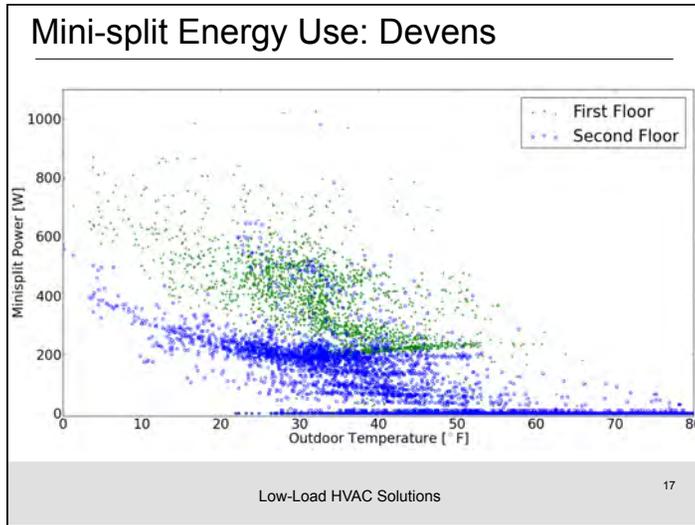
### Devens Floor Plan



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# Questions?

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