



**Affordable Housing  
Toward Zero Energy  
Case Studies in Cold Climates**

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[www.buildingscience.com](http://www.buildingscience.com)

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**Affordable Housing Design Context**

**Small and Compact like a Traditional Cape House or  
2 Story Gable End House**

- 1.5 to 2 Stories 1200 to 1900 sq. ft.
- 3 to 4 BR / 1.5 to 2 bath

**Adaptable and/or Able to be Expanded**

- Upper level left to be finished
- 3 BR 2 bath when finished
- BR/bath on ground level with minor changes for wheelchair
- Variety of foundation designs

**Townhouse Type Construction**

- 2 to 3 Stories 1200 to 1600 sq. ft.
- 3 BR 2.5 bath
- Variety of foundation designs

**Affordability Guidelines**

- Habitat, CDC's, State and Federal

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**bsc** **House System Integration-By Design**  
Specific by Climate Zone

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Advanced **Framing/Structural** Systems  
2 x 6 24" o.c., Advanced Framing with insulating sheathing  
Or SIPS/ICF's

**Air Flow Retarder** Systems  
Interior/Exterior/Both

**Moisture Control** Systems  
Liquid Water (drainage plane) / Vapor Diffusions Control  
Roof/Walls/Foundations

**Thermal Envelope** System  
Exceed Model Energy Code requirements

**Air Distribution** System  
Innovative ductwork and ductwork location

**Mechanical** Systems  
Integration of ventilation and heating/cooling systems

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**bsc** **1995 Ostrander, OH Gates Residence**  
1900 sq.ft. Single Family Home

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**1999 Cleveland, OH Infill House**  
2,200 sq.ft. 4 BR 2.5 bath

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This slide shows the exterior of a two-story infill house. The house has a light-colored siding, a dark brown roof, and a front porch with white columns and a railing. A concrete sidewalk leads to the porch steps. The house is situated in a residential neighborhood with other houses visible in the background.

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This slide shows the construction site for the infill house. The image is split into two parts. The left part shows a close-up of the foundation wall, which is made of concrete blocks and has a white vapor barrier applied. The right part shows a wider view of the foundation and the first floor framing. Two workers are visible on the site, and a concrete mixer truck is parked nearby.

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EEBA Denver Conference Demonstration Project

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Detailed description: This photograph shows the exterior of a two-story residential building during its construction phase. The walls are covered in white, patterned sheathing paper. Several windows and a door opening are visible. The roofline is partially finished with wooden shingles. The sky is clear and blue.

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Detailed description: This is a close-up photograph of a construction site. A person's hand is visible in the foreground, pointing towards a vertical joint in a wall. The wall consists of a wooden stud, a layer of yellow insulation, and a white sheathing board. The scene is dimly lit, likely indoors or in a shaded area.

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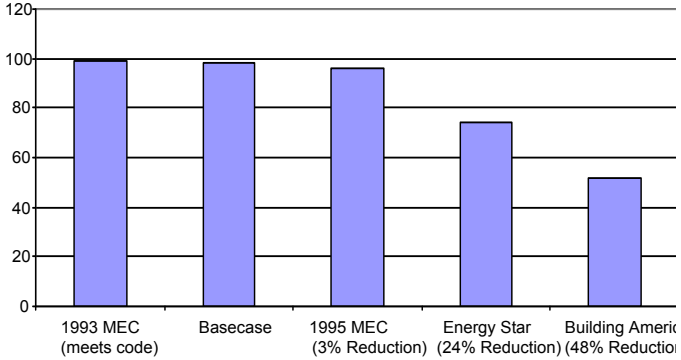
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**Energy Use Comparison**



Scenario	Reduction	Predicted Heating and Hot Water Energy Use (MMBtu/yr)
1993 MEC (meets code)	0%	100
Basecase	0%	100
1995 MEC	3% Reduction	97
Energy Star	24% Reduction	76
Building America	48% Reduction	52

**Predicted Heating and Hot Water Energy Use (MMBtu/yr)**

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