



## HUD Energy Action Plan

Building Sustainable, Cost-Effective,  
and Affordable Housing:  
Strategies; Approaches; and Results.

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Steven Winter Associates, Inc.



### This Presentation Will:

- **Define** what we mean by “sustainable” construction;
- **Discuss** specific strategies and approaches which can be used to achieve sustainable and affordable results; and
- **Demonstrate** actual results through built case studies.

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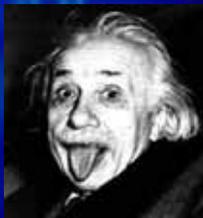


## Sustainable Building is:

- Durable
- Healthy
- Energy Efficient
- Resource Efficient
- Low-Impact



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## Basic Approach:

“Everything should be made as simple as possible, but not simpler.”

Albert Einstein



## Performance Optimization Through Whole-Building Design

**BUILDING PLANNING**: Simplified envelope configuration planned on a 2' module

**DESIGN SYSTEMS TOGETHER**: Building systems are designed in concert with each other to optimize performance

**VALUE ENGINEER** each independent system. Optimize material and labor, reduce waste



## Building Planning:

- Simplify Building Form
- Don't cut corners, eliminate them

- Simplify roof configuration
- Use full-length standard height materials
- Eliminate corners and jogs



- Avoid "Gable-itis"



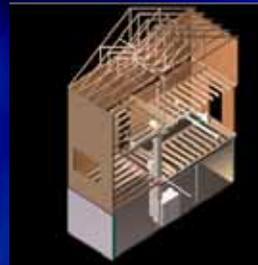
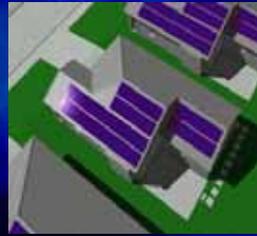
## Design Systems Together:

### Systems Integration

- “Rationalized” Structure
- Alternate Systems
- Integrated Mechanicals

### Specification Optimization

- Insulation levels
- HVAC Sizing and Efficiency
- Windows
- Hot Water
- Lighting and Appliances



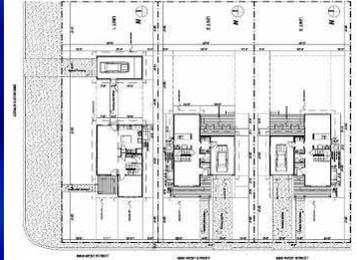
## Value Engineering

### Cost/Performance Optimization of Materials And Systems

- Advanced Framing
- Compact HVAC Distribution
- Alternate Materials
- Waste Reduction
- Speed of Assembly

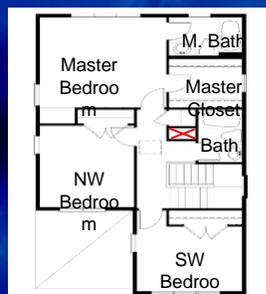


## CDC of Utah, Salt Lake City



- Advanced Framing
- Blown-in insulation (R-22)
- Polyiso. Basement Insulation
- R-40 Attic Insulation
- Vinyl, Double Pane, Low e windows
- Air Sealing to Reduce Infiltration
- ECM Motor on Furnace
- 100 % Fluorescent Lighting
- Energy Star Appliances
- All Ducts in Conditioned Space & Sealed
- Direct-Vented Equipment

## Building Planning



- Open plan on 2' module
- Standard height materials
- Integrated HVAC

## Architectural/Structural/Mechanical Integration



Project execution benefits from advanced planning



**Results:  
50% better  
Than IECC**

## Claretian Associates, Chicago, IL



**2005 Award of  
Excellence for  
Affordable Housing Built  
Responsibly**  
Greenbuild International Conference

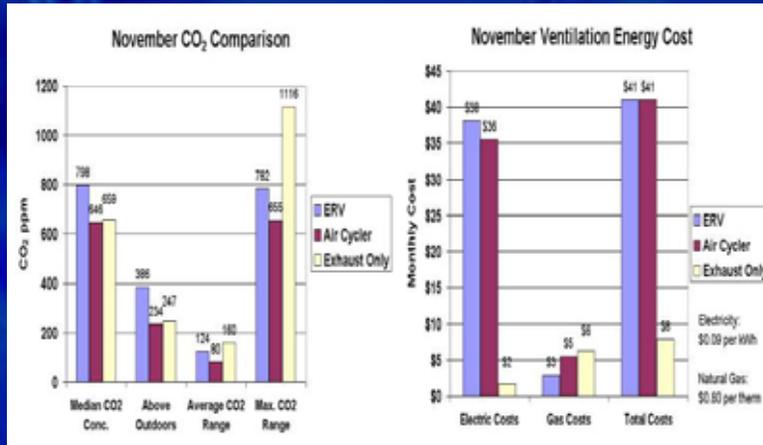
- 25 Home In-fill  
Development
- SIP Construction
  - R-24  
Walls
  - R-40 Roofs
- 92 AFUE Furnaces
- 1.2-kW PV Systems
- Low-e Windows
- EnergyStar Appliances
- Efficient Lighting
- Controlled Ventilation

## Claretian Associates



- First SIP Project in Chicago
- \$155,000 cost for 1700 SF Home
- 5% Increase in Cost of Standard Construction
- 50% Increase in Energy Efficiency

## Ventilation Study Results



## Eaton Row Hope VI, New Haven CT



30 Ownership Homes, all EnergyStar



**Price range: 130k to 195k**  
**Very affordable for area, 40% better than MEC**

- **Modular-hybrid construction**
- **R-19 walls, R-38 ceilings**
- **Low-e windows**
- **Compact HVAC design**
- **92% AFUE furnaces**
- **Tankless water-heaters**
- **Controlled ventilation**
- **PEX supply piping**
- **Fiber-Cement Siding**

## Melrose Commons, Bronx, NY



**Energy Value in Housing Award Winner 2004**

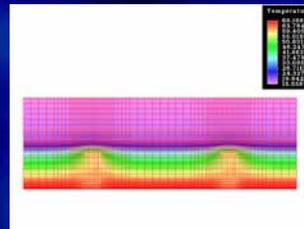
- **40 3-Family townhouses**
- **Precast concrete panel construction**
- **Low-e vinyl windows**
- **Air-sealed envelope**
- **Sealed combustion boiler w/ indirect hot-water tank**
- **Controlled ventilation**
- **Efficient lighting**
- **First 3-family EnergyStar homes in NYC**



**Innovative precast system  
reduces waste, and  
speeds construction**



**Thermal analysis led to  
Insulation solution**



## **“Rules” For Renewables**

- Energy-Efficient Building
- Net-Metering
- Electric Rates
- Time-of-Use Rates
- Subsidies



[www.dsireusa.org](http://www.dsireusa.org)

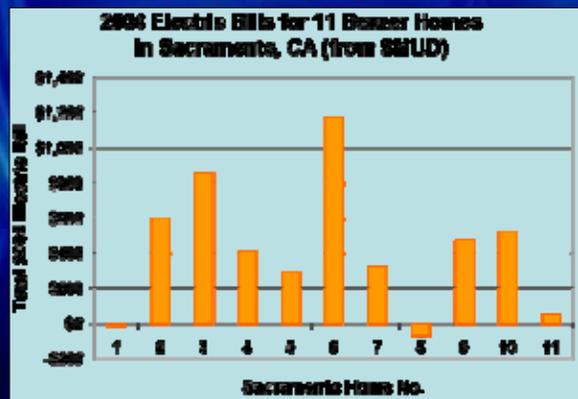
**DSIRE**  
Database of State Incentives for Renewables & Efficiency

## Beazer Homes, Sacramento, CA

- Eleven Similar Homes in same community
- SMUD Advantage Program
- 3.3 kW PV systems
- How did they perform?



## Occupant Behavior

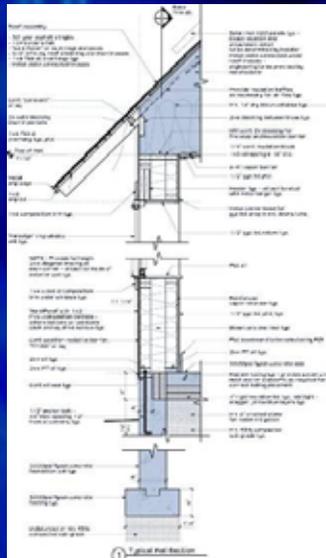


# Rural Development, Inc

Affordable Housing in Western MA  
3.2-kW PV system  
Active solar thermal for DHW and Space Heat

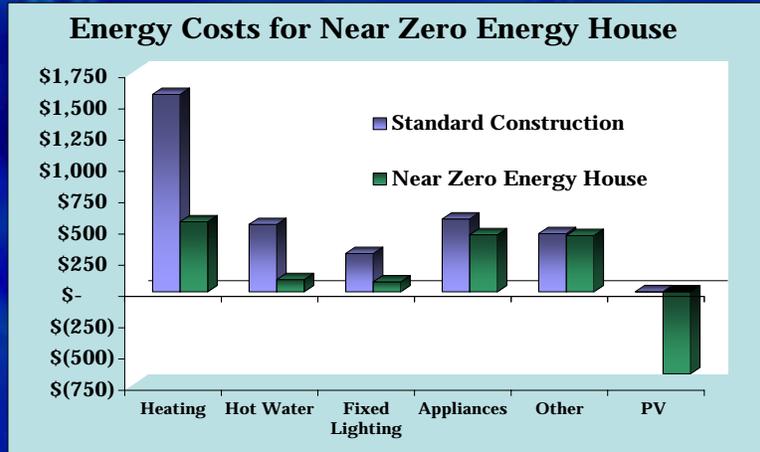


## Envelope Specifications



- Double walls, R-43 dense cellulose
- Heat mirror windows, U:0.20 Btu/ft<sup>2</sup>h°F
- R-20 XPS Slab Insul.
- R-50 cellulose ceiling insulation

## Near Zero-Energy House



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**Thank you!**

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