

# St. Louis Regional Housing Conference

4.23.2010.

## Housing and Energy



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## **Outline and Objectives 4.23.2010.**

### **1. Major National Third Party Programs**

Energy Star (6)

Enterprise Communities (5)

LEED for Homes (8)

ICC-700 Green Building Standards (6)

**2. Patrician Place (7)**

**3. Top Construction Ideas/Costs (1)**

**4. General Green Program Costs (1)**

**5. Talking Points (1)**

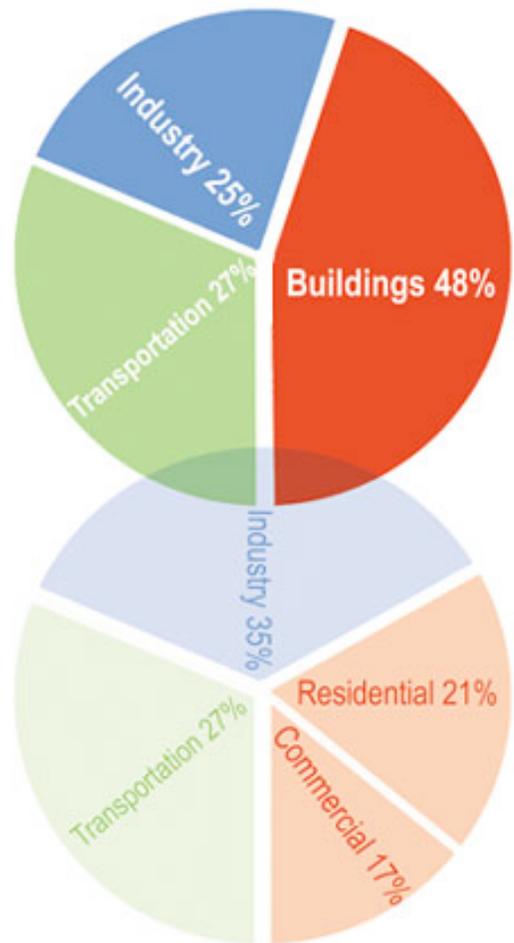
## WHAT IS ENERGY STAR?

ENERGY STAR is a joint program of the EPA, the DOE and private business partners, helping us all save money and protect the environment through energy efficient products and practices which deliver same or better performance.



# Energy Analysis

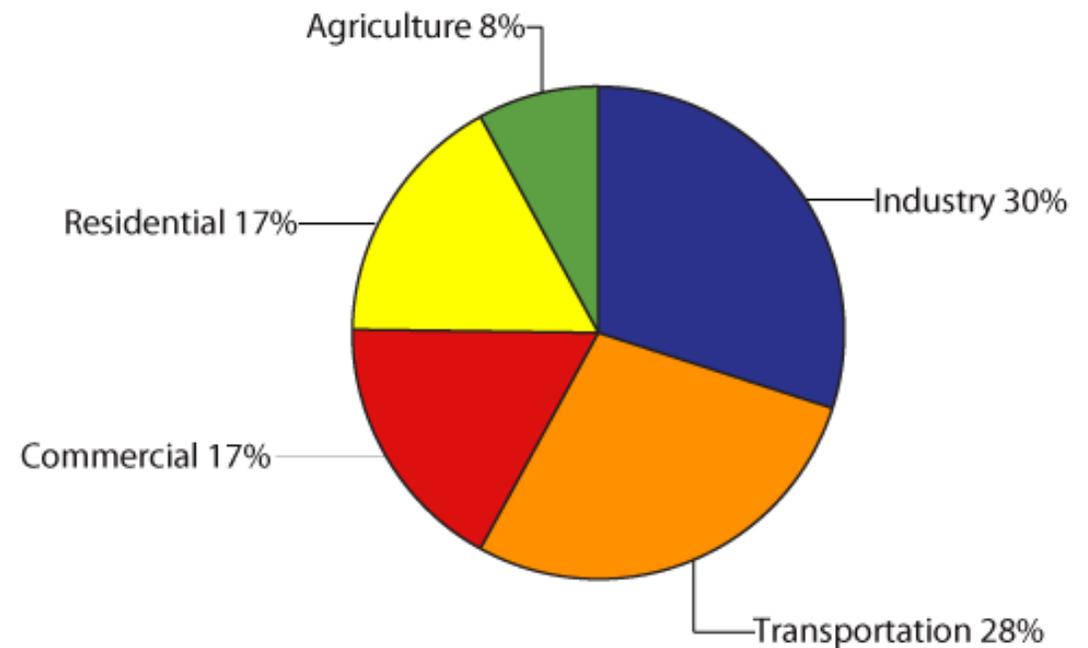
## US Energy Consumption by Sector



Source: US Energy Information Administration statistics

## Greenhouse Gas Emissions by Sector

United States, 2004



Source: US EPA Inventory of Greenhouse Gas Emissions and Sinks, 2006.

# ***BUILDING SCIENCE KEY COMPONENTS***



**Control**  
**Air Flow**

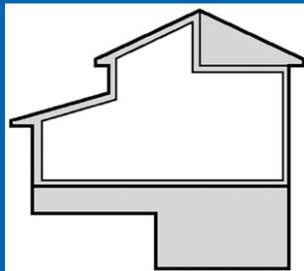
**Control**  
**Thermal Flow**

**Control**  
**Moisture Flow**  
(Vapor, Bulk)

# HOW TO APPLY BUILDING SCIENCE: ENERGY STAR QUALIFIED HOMES



*Proper  
Insulation*



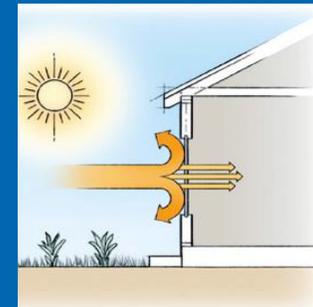
*Complete  
Air Barrier*



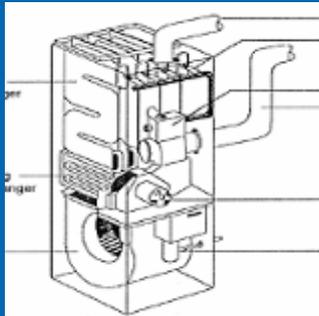
*Air  
Sealing*



*Tight  
Ducts*



*Advanced  
Windows*



*Efficient  
Equipment*



*Right  
Sizing*



*Field  
Verification*



# HIGH PERFORMANCE HOMES: PUTTING IT ALL TOGETHER

Why:



How:

Control Air Flow

Control Thermal Flow

Control Moisture Flow

Driving Forces

Stack Effect

Fans

Conduction

Convection

Radiation

Bulk

Vapor

Air Sealing

Air Sealing

Air Sealing

Proper Insulation

Proper Insulation

Low-E Windows

Water Man. Roofs

Air Sealing

Air Barriers

Air Barriers

Air Barriers

Low-E Windows

Low-E Windows

Radiant Barriers

Water Man. Walls

Air/Vapor Barriers

What:

Tight Ducts

Min. Thermal Bridging

Air Sealing

Water Man. Foundation

Tight Ducts

Pressure Balancing

Air Barriers

Right-Sizing

Tight Ducts

Ventilation

Dehumid.

# Home Energy Rating System (HERS)

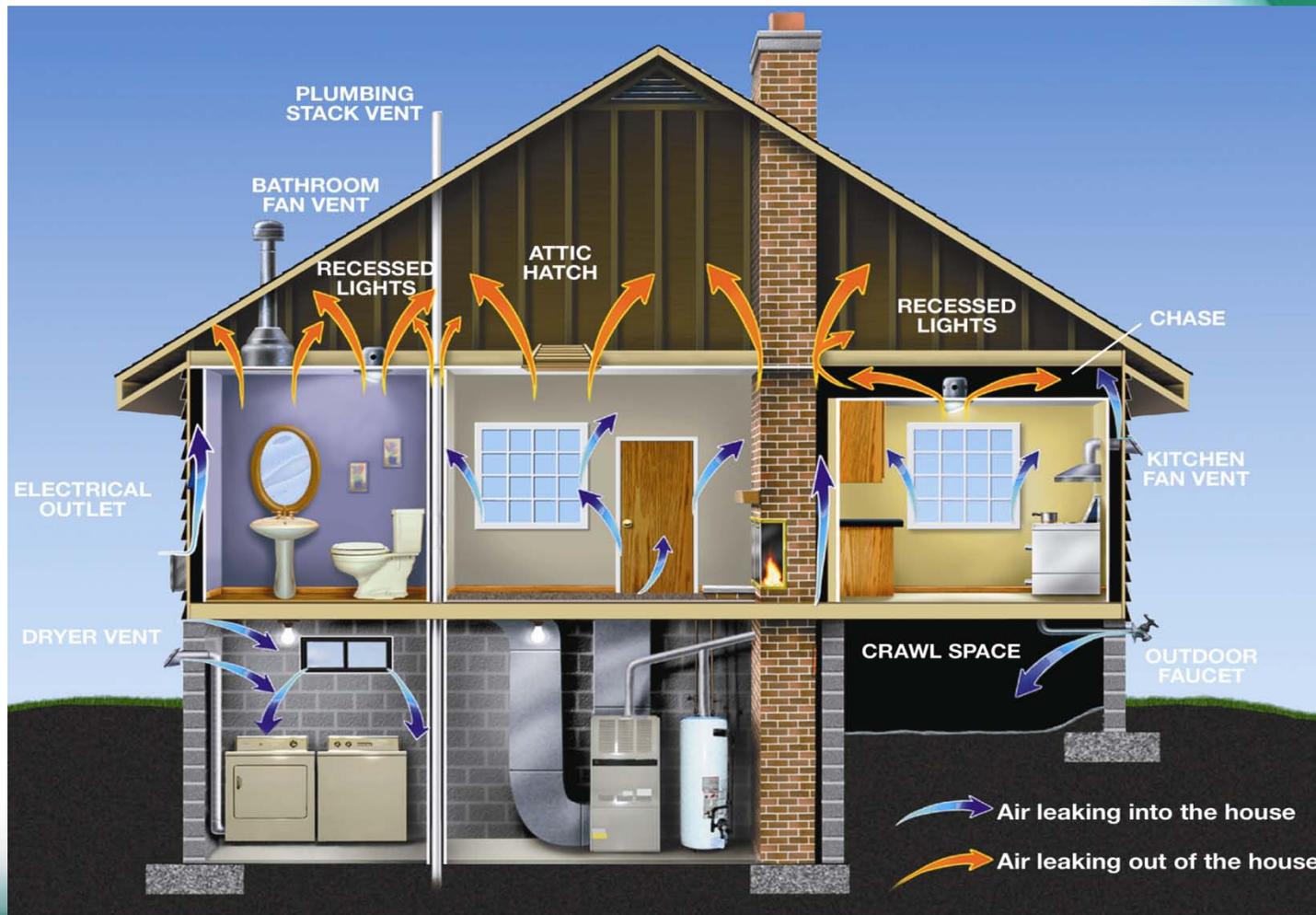
## Performance Testing:

- Heating and cooling
- Water heating
- Lighting
- Appliances
- Building envelope



# Home performance Program. Existing. Building envelope / air sealing

Air exits at the top of our home and enters through the bottom, commonly called the “stack effect”.



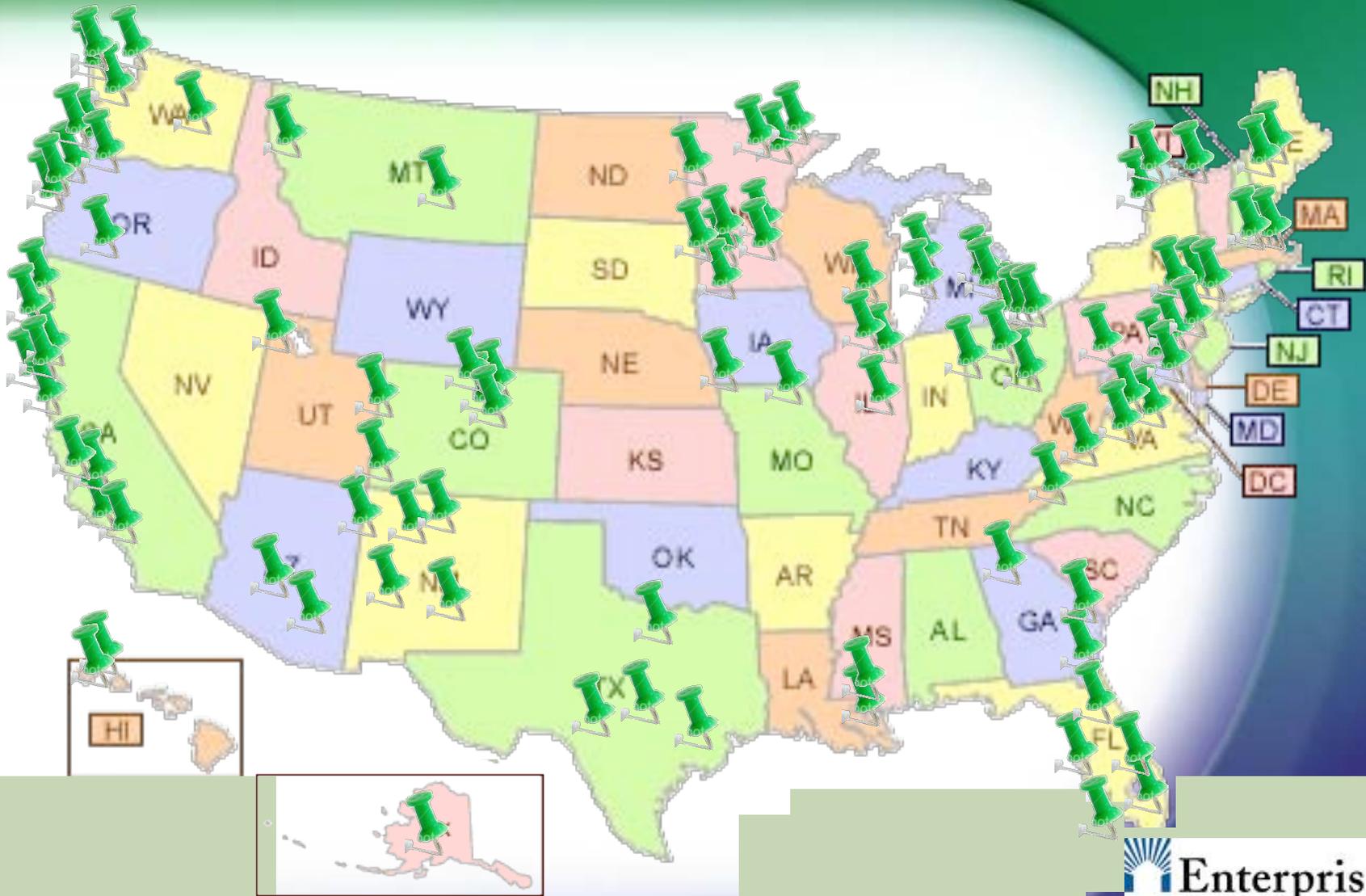
# Enterprise Green Communities



November 2009



# Results at Work



# San Francisco



# Enterprise Green Communities Criteria



Materials



Integrated Design



Location



Energy

Water

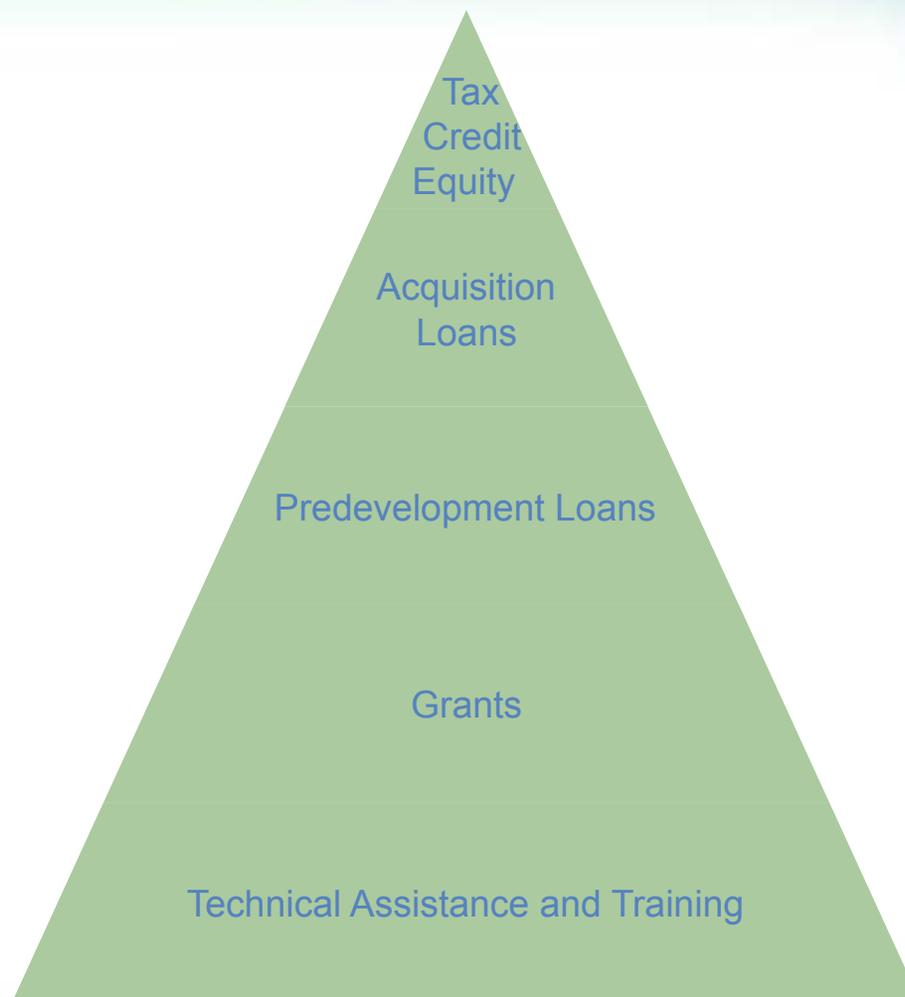


Health



Operations and Maintenance

# Financing Your Enterprise Green Community





# LEED FOR HOMES

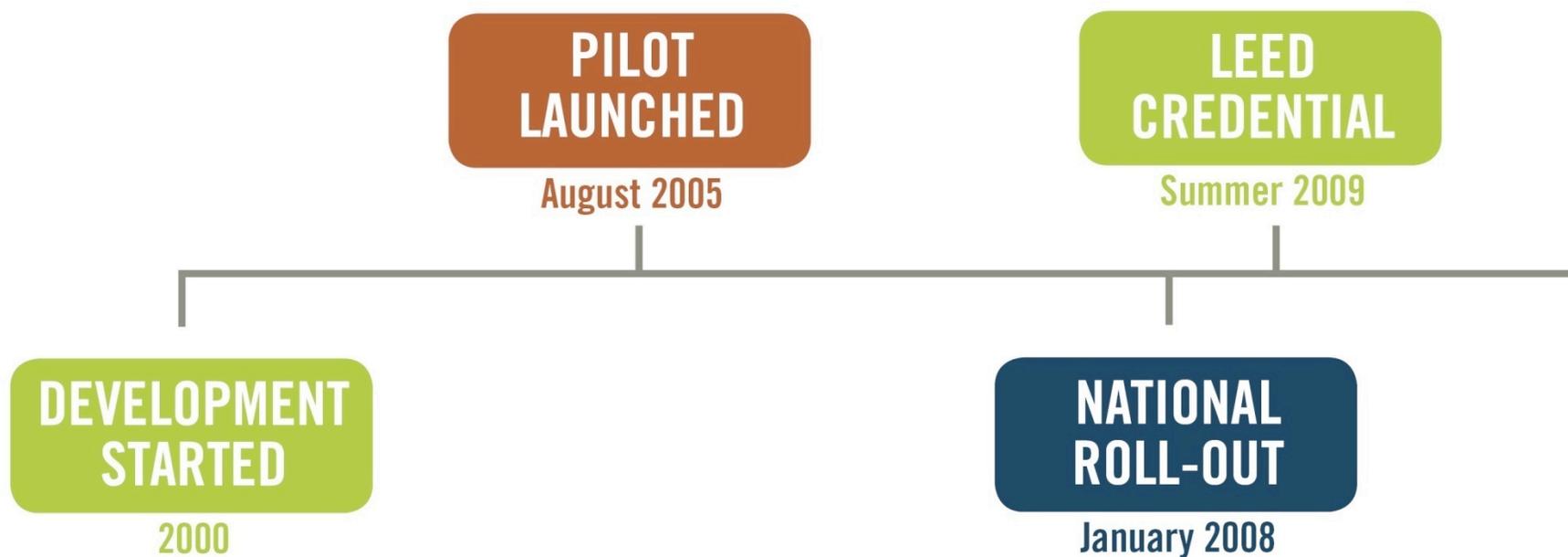
Southern Living Idea Home  
Photo by Rob Moody

# U.S. Green Building Council

- **Founded in 1993**
- **Non-profit: 501(c) 3**
- **Mission-based organization**
- **Committed to expanding sustainable building practices**
- **Headquarters in Washington D.C.  
(Residential: San Diego, CA)**



# History & Future of LEED for Homes



# 4 Levels of LEED Certification

Varying Performance Levels



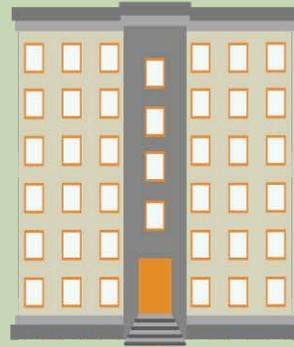
# Program Scope and Applicable Building Types



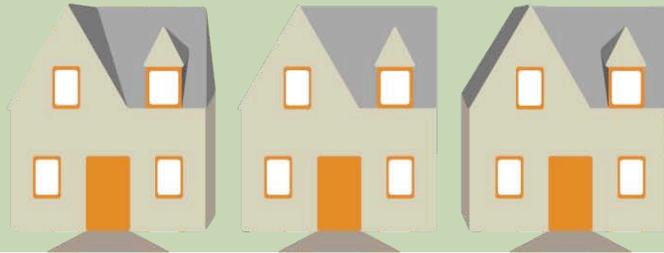
Single-Family Homes



Low-Rise Multifamily



Mid-Rise Pilot



Single-Family Production

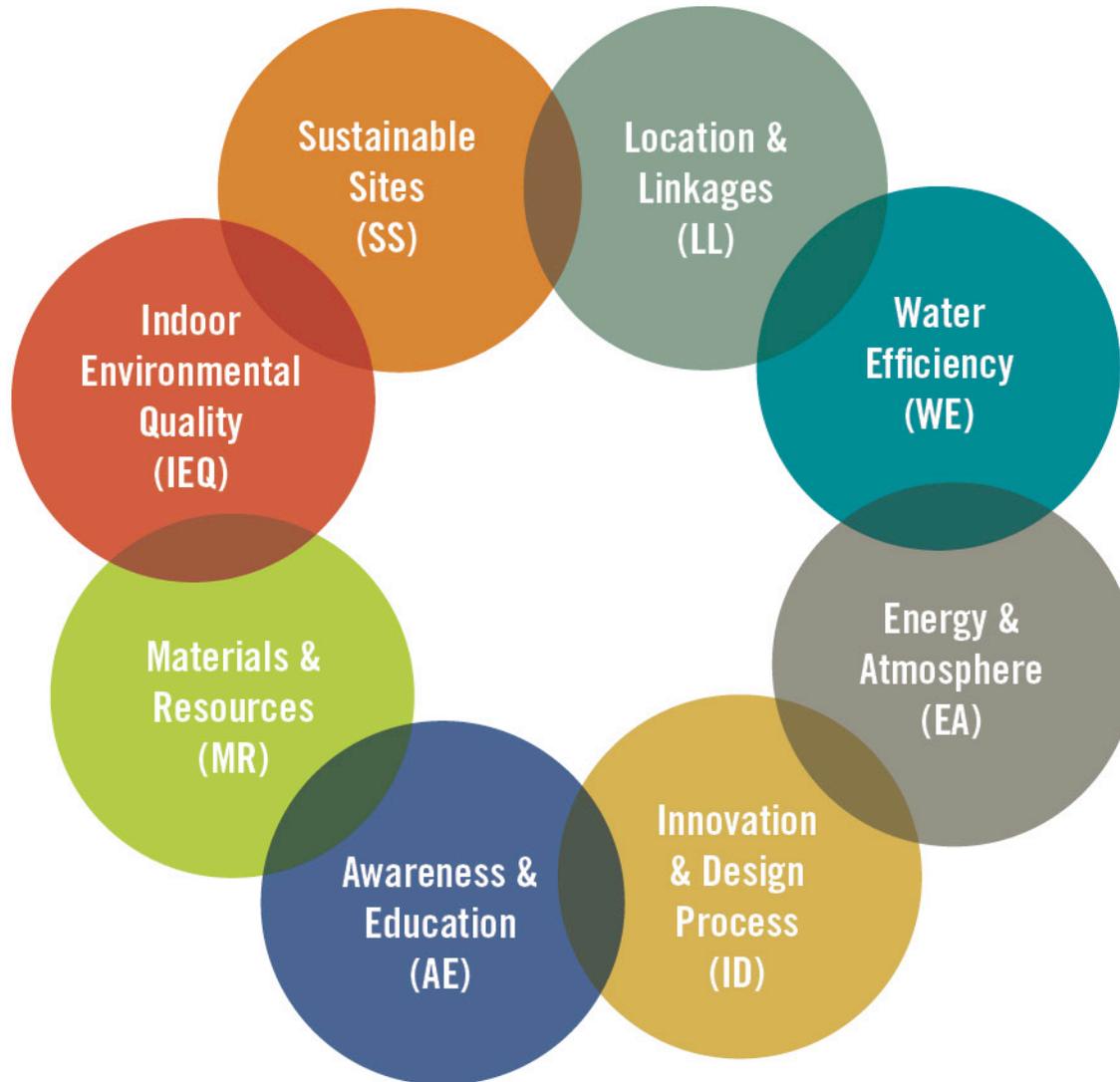


Gut Rehab

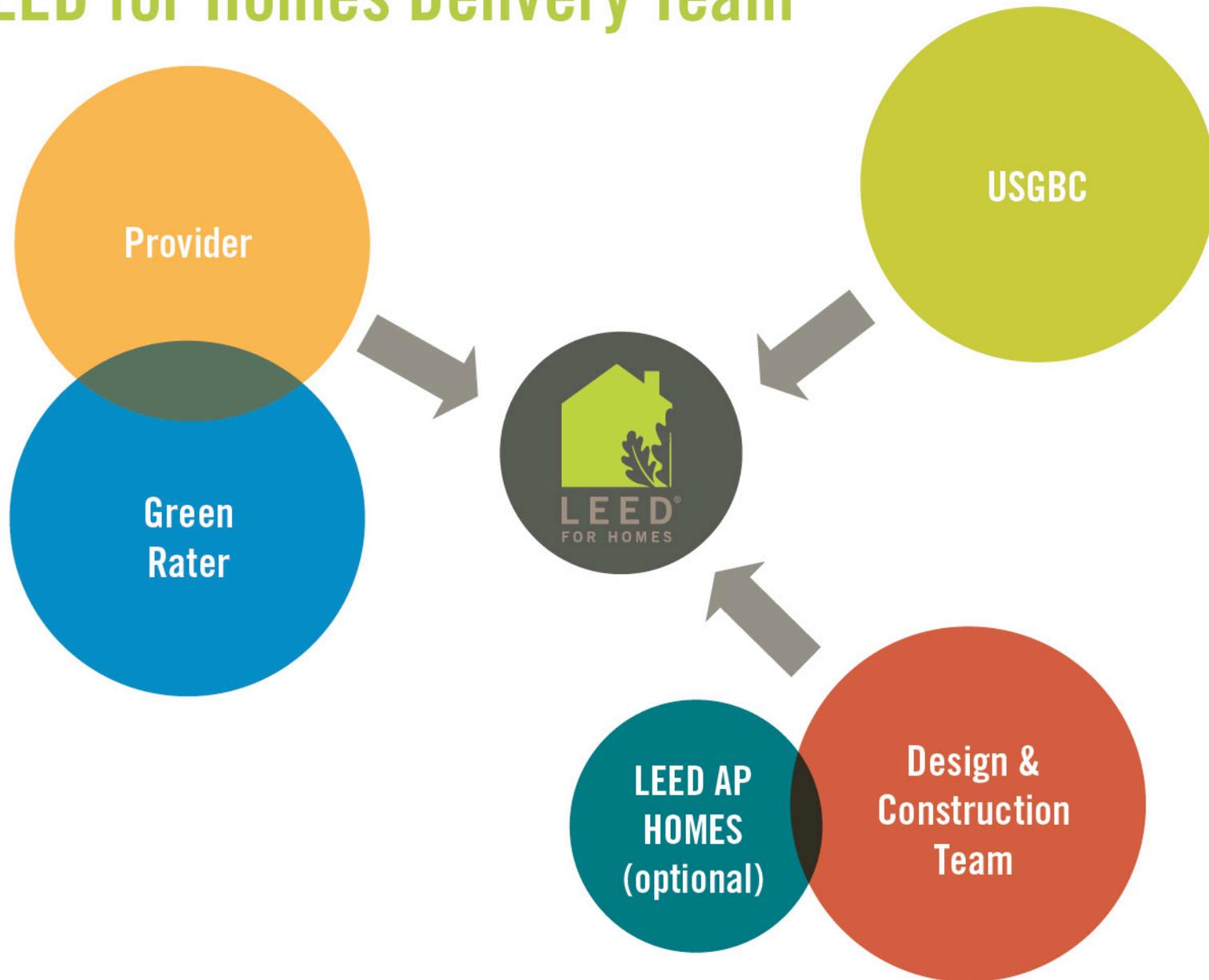
# How Does LEED Define a Green Home?

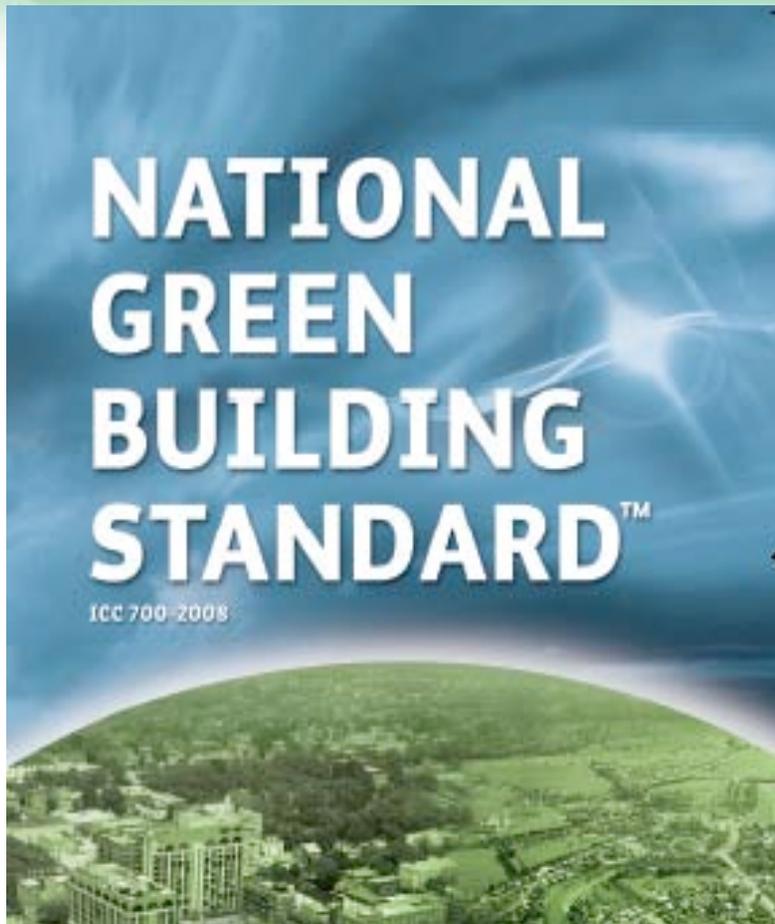


# Credit Categories



# LEED for Homes Delivery Team





- ▶ **ICC-700**
- ▶ **International Code Council**
- ▶ **ANSI Approved Standard**
- ▶ **Published in 2009**
- ▶ **Six Green Categories**
- ▶ **Flexible but with many mandatory items**

single family



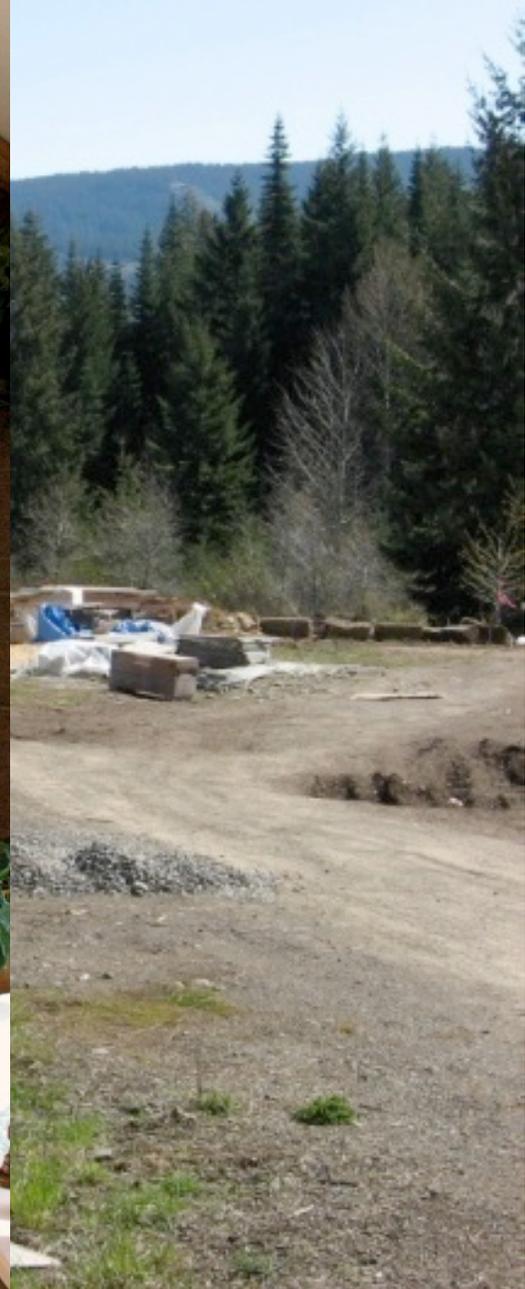
multi-family

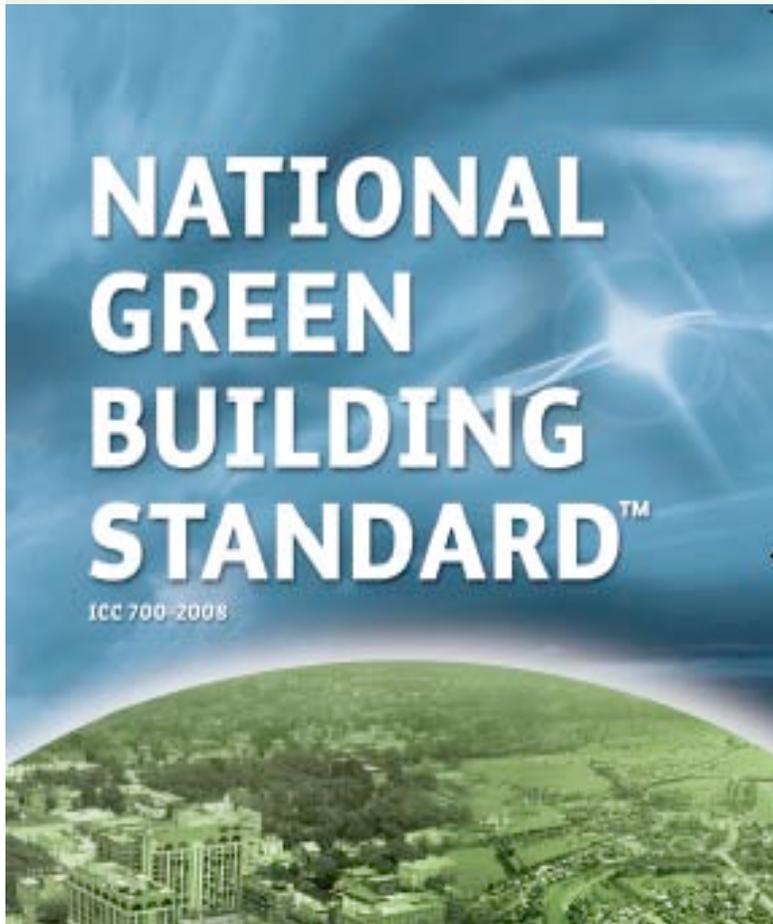


renovations

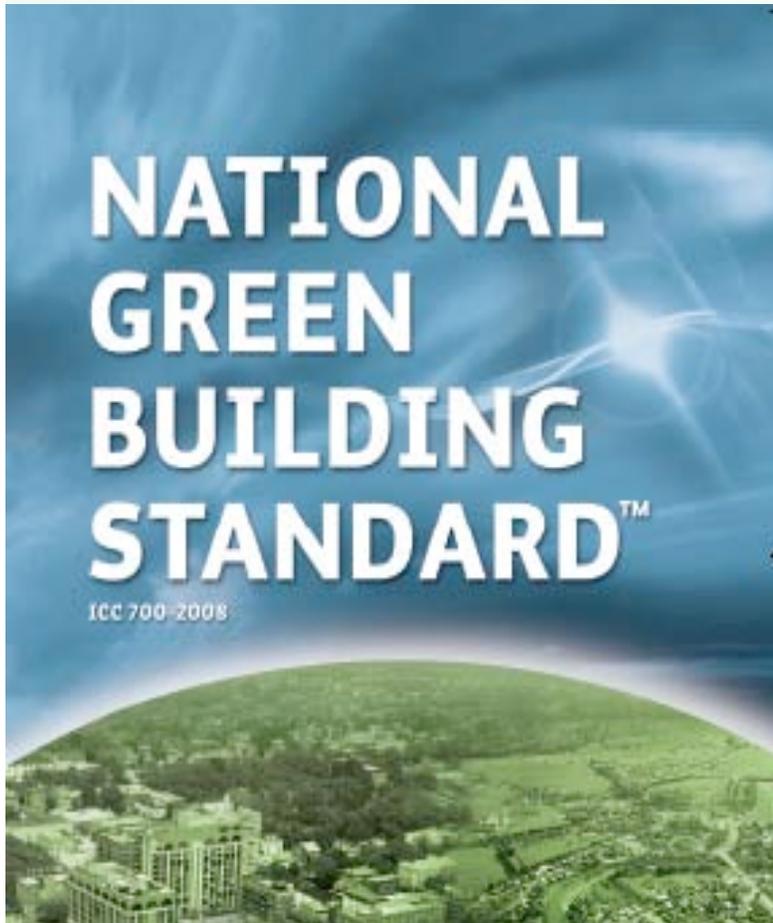


subdivisions





- 42 Industry Professionals  
Code Officials, Builders  
Govt Agencies: DOE, EPA,  
U.S. Navy  
SBIC, USGBC, GBI  
Local Green Building  
Programs
- 2 rounds of public comment
- Over 2000 comments  
addressed



## **Applications of the ICC 700 National Green Building Standard**

- An optional basis for homes/projects seeking National Certification
- An alternative for policy makers seeking to encourage the greening of their communities

# NATIONAL GREEN BUILDING STANDARD™

ICC 700-2008



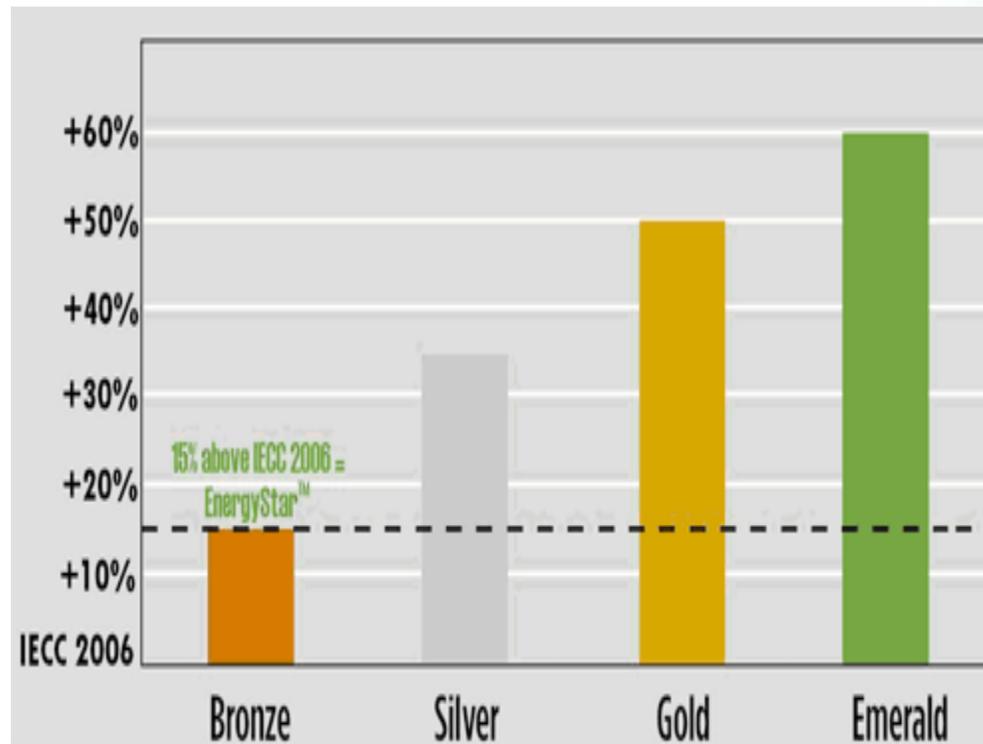
## Threshold Point Ratings for Green Buildings

Green Building Categories			Performance Level Points <sup>(1)</sup> <sup>(2)</sup>			
			BRONZE	SILVER	GOLD	EMERALD
1.	Chapter 5	Lot Design, Preparation, and Development	39	66	93	119
2.	Chapter 6	Resource Efficiency	45	79	113	146
3.	Chapter 7	Energy Efficiency	30	60	100	120
4.	Chapter 8	Water Efficiency	14	26	41	60
5.	Chapter 9	Indoor Environmental Quality	36	65	100	140
6.	Chapter 10	Operation, Maintenance, and Building Owner Education	8	10	11	12
7.		Additional Points from any category	50	100	100	100
<b>Total Points:</b>			<b>222</b>	<b>406</b>	<b>558</b>	<b>697</b>

- (1) In addition to the threshold number of points in each category, all mandatory provisions of each category shall be implemented.
- (2) For dwelling units greater than 4,000 square feet (372 m<sup>2</sup>), the number of points in Category 7 (Additional Points from any category) shall be increased in accordance with Section 601.1. The "Total Points" shall be increased by the same number of points.

# ANSI ICC-700 New Threshold for Energy

## Updates to IECC 2006

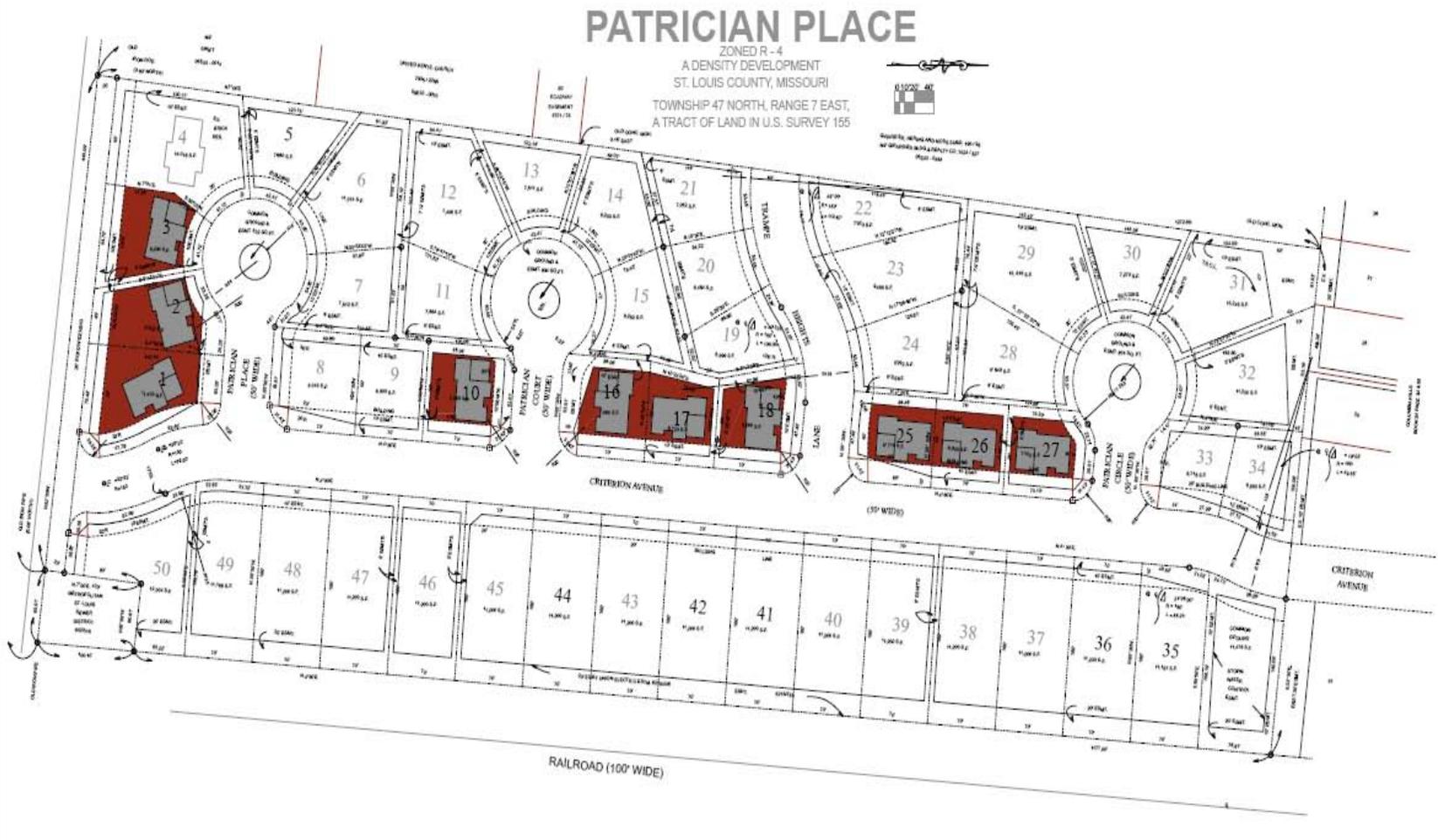


# New Construction: Green By Design

## Patrician Place



**LEED: LL. Location and Linkages**  
**NAHB: Section 1: Lot Design Site selection**  
Preferred Location Community resources - Infrastructure

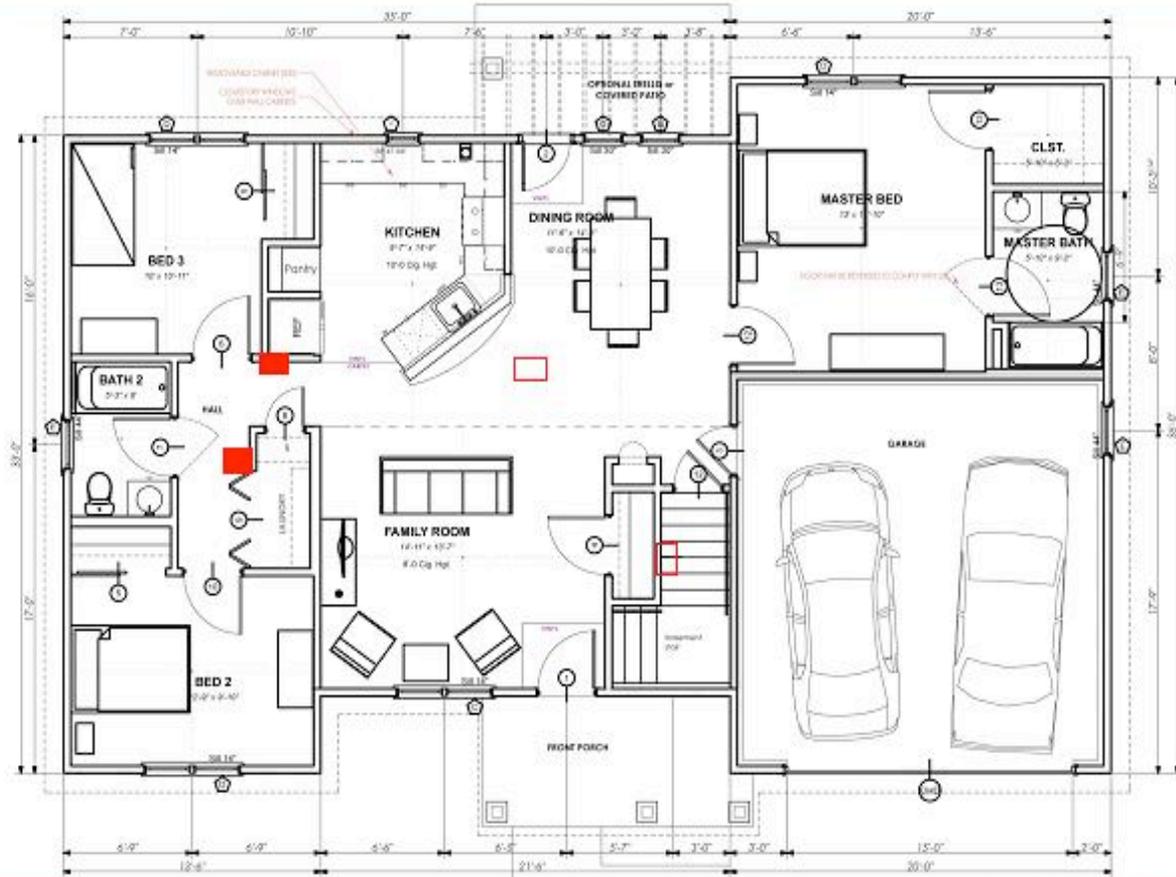


**LEED:** Floor area efficiencies. Points.

**NAHB:** Section 2.1.1 Create an efficient home floor plan that maintains home's functionality.

- Consistent design for efficient layout and construction
- Energy consumption monitoring program

are approximate.



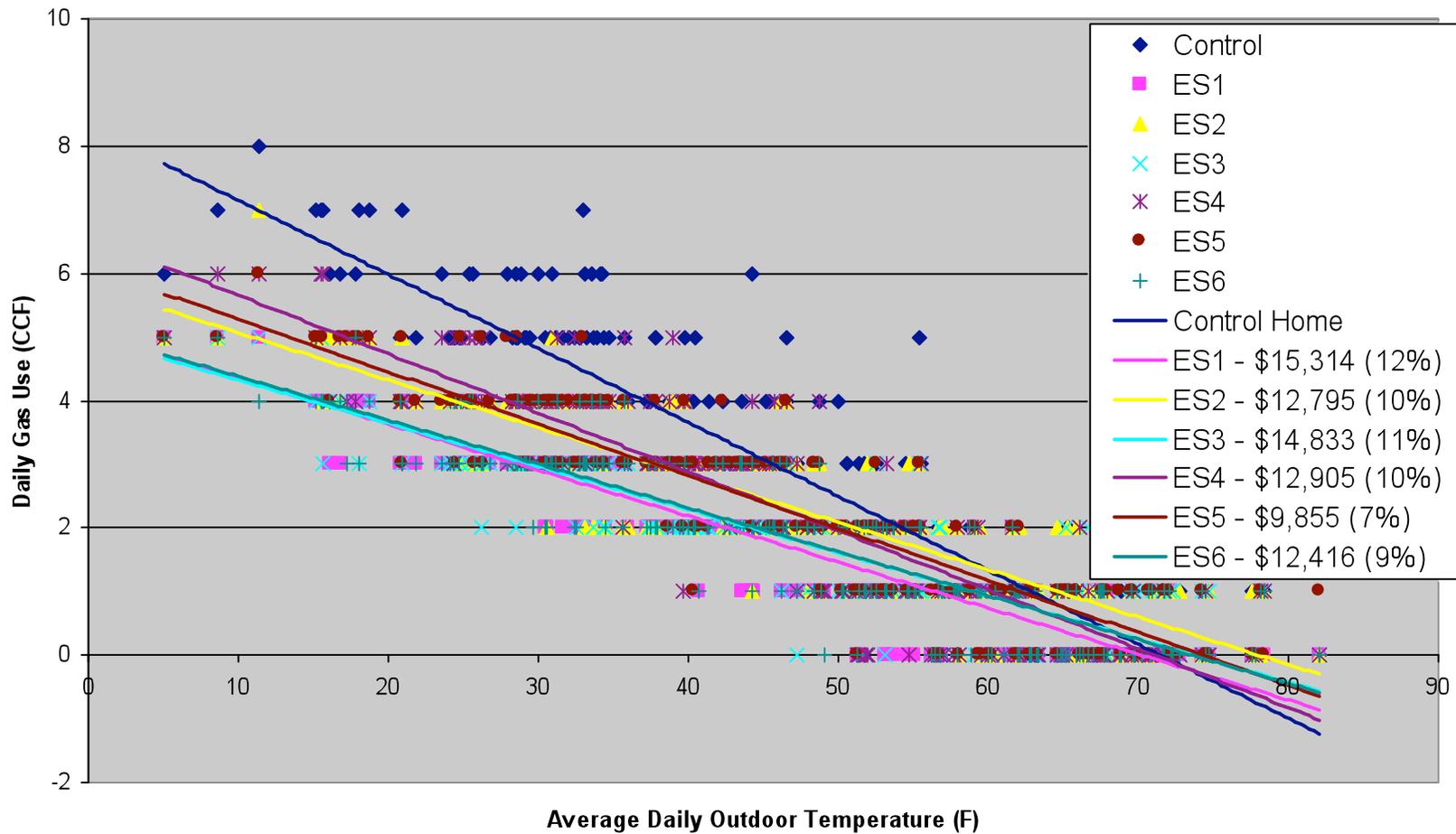
**PATRICIAN PLACE HOMES**  
preliminary design  
COPYRIGHT 2007 : architect: goren miller . all rights reserved



architect: goren miller, inc.  
215 south charles place  
charles, ms. 38919  
phone: 314.443.1777  
mobile: 314.269.5006  
fax: 314.272.7902

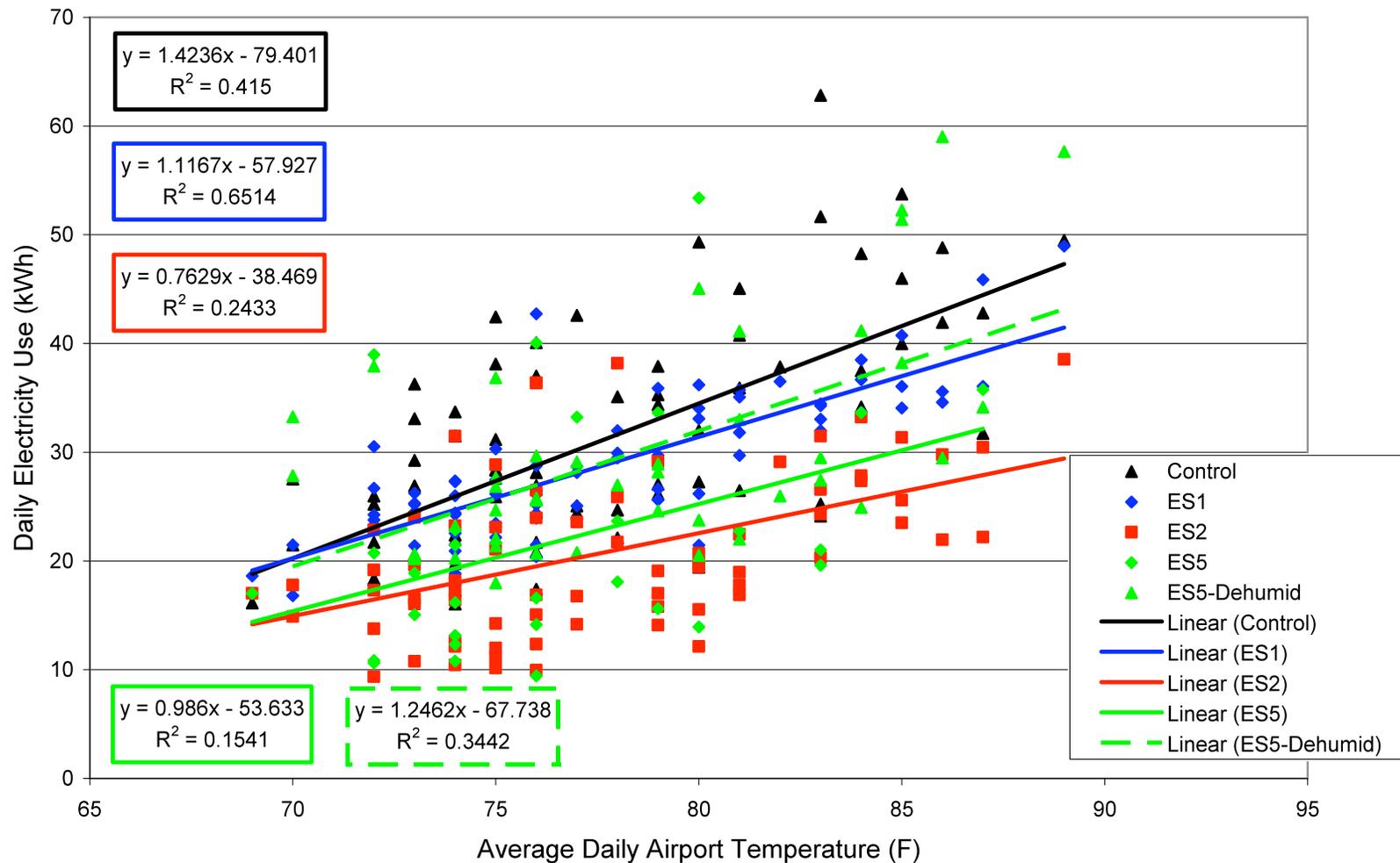
# Cost vs. Benefit - Winter

Graph 5: Daily Gas Use vs. Average Outdoor Temperature



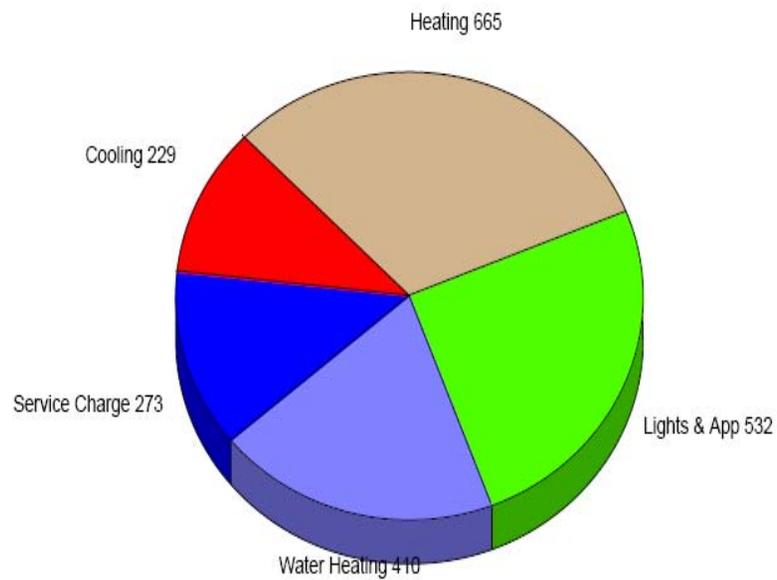
# Cost vs. Benefit - Summer

Graph 5  
Daily Electricity Use vs. Average Outdoor Temperature



# Energy Comparison

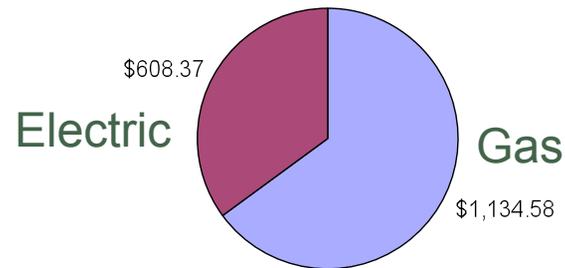
## Control Home (RemRate Prediction)



Est. Total Annual Energy Cost is **\$2,109**

# Energy Comparison, Cont'd

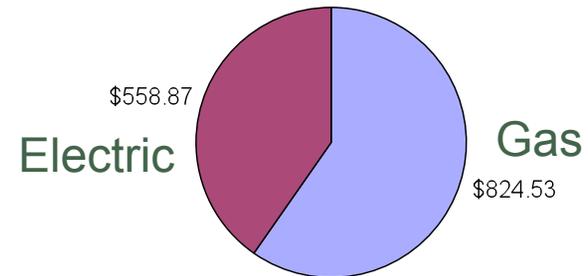
Annual Energy Cost for Control Home



Total Annual Energy Cost is **\$1742.95**

Total Annual Energy Cost is **\$1383.40**

Annual Energy Cost for ES1 Green Home



**Difference = \$359.55**

Figures include Rate + Tax + Fees

## Patrician Place:

# Top Prescriptive Energy Construction Ideas

### New and remodel (est. cost upcharge for new only):

- Insulation: Upgrade attic and wall. \$900-\$4500.
- Caulk and seal package. \$350-\$750.
- HVAC: Right-sized high efficiency furnace and A/C. \$850-4500.
- Hot water heaters: Higher efficiency. \$350-\$1800.
- Energy Star bath fans and/or managed fresh air intakes. \$275-\$1850.
- Windows: High efficiency/low infiltration. \$350-\$2500.
- Appliances: Energy Star DW/ fridge/washer. \$25-\$650.
- Lighting: Energy Star fixtures with CFL's. \$250-\$450
- Water Consumption: Low flow devices. \$20-\$450.
- Advanced Framing. Priceless.

### General Design Principles:

- Size of home
- Orientation--solar
- Density of community
- Infrastructure and community

# Third Party Green Program Costs

## Soft costs:

- Architect/Engineer Fee Adjustment
- Certification/Rater/Verifier Fees
- Administrative Overhead
- Legal/Liability/Insurance

## Hard Costs:

- Depends on Level of Rating Desired
- Workforce Housing Impacted More as Percentage of Base Home

# Talking Points

- Appraisals: Value Recognition
- Incentive or Mandate
- Third Party or Prescriptive Program
- Selection of Target Level
- Existing/New Homes
- State/Federal Incentives/Programs
- Energy Efficient Mortgages
- Rural/Suburban/Urban Points
- Generating Consumer Demand
- Owner/Tenant Education
- Market Rate/Subsidized
- EPA-BMP's/Sprinklers/Codes
- Every \$1000 Increase Removes 250,000 Families from Market
- “Affordable and Livable Could Be the Next ‘Cool’.” David Nicklaus. Post-Dispatch 3.30.2010.

# At&T Corporate Citizen in Green.

## From USGBC/RCGA seminar

- External Benchmarking
- Sustainable: what makes sense for the company
- Integrate sustainability into company culture; connect existing dots
- Know the starting point
- Mindful of terminology
- Work for low hanging fruit
- Avoiding being tone deaf
- Radical incrementalism (small steps)
- Overview
- Market opportunities vs. efficiencies
- Conservative company

# With Special Thanks To:



ST. LOUIS  
REGIONAL  
CHAPTER