Green, Greener, Greenest: 
Navigating the Forest of "Green" Building Standards

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Principal, Energy Logic, Inc.
A Declaration of Energy Independence

How Freedom from Foreign Oil Can Improve National Security, Our Economy, and the Environment
What is Green?
Everybody’s Talking Green
Global Climate Change
THE END OF CHEAP OIL

SPRAWL ON THE MALL?
BONUS TEAR-OUT MAP
OF WASHINGTON, D.C.

VAMPIRE SQUID,
FANGTOOTH FISH, AND
OTHER SEA ODDITIES
Upsala Glacier, Argentina

1928

2004

Source: Time magazine April, 2006
**LAND ICE**

**GREENLAND ICE LOSS RATE** ↓ 36-60 cubic miles per year

**SEA ICE**

**ARCTIC SEA ICE EXTENT** ↓ 38%

Satellite view of Greenland

Annual days of melt

4 21 36 54 75

Satellite view of the Arctic.

The red outline shows the ice cap extent in 1979

Source: NASA
Pale Green?

Or

Deep Green?
How to Go Green at Home

We use the term GREENIFY to characterize the steps involved for you to go GREEN at home. Our program has been carefully designed to help GREENIFY your home without causing any unnecessary interruptions to your daily tasks.

Getting Started

- Complete a very brief enrollment form and pay your application fee (low price of $149.00).
- Receive an email with our GREENIFY Guidelines ([View Sample](#))
- Work to implement the items on the list. Let us know any time you have questions.
- Fax or mail the signed and notarized GREENIFY Guidelines Submission page to Green Business Alliance.

Upon review and acceptance of the GREENIFY Guidelines, you will receive:

1. GREENIFIED plaque to prominently display in your residence
2. Window cling with the 2009 GREENIFIED Seal
3. GREENIFIED wrist bands for family members
4. Green Business Alliance canvas tote bag
About Green Seal

What We Do

Setting the standard, raising the bar

Green Seal works with manufacturers, industry sectors, purchasing groups, and governments at all levels to "green" the production and purchasing chain. We utilize a life-cycle approach, which means we evaluate a product or service beginning with material extraction, continuing with manufacturing and use, and ending with recycling and disposal. Products only become Green Seal certified after rigorous testing and evaluation, including on-site plant visits. Green Seal’s specific programs include:

- **Standards and Certification** — development of environmental leadership standards for specific product categories and certification of products and services that meet them

- **Greening Your Government** — technical assistance to all levels of government in their purchasing, operations, and facilities management

- **Choose Green Reports** — technical reports on products in a variety of categories giving specific brand recommendations of those that meet screening criteria

- **Greening the Lodging Industry** — long-term project with hotels and motels to green their operations and purchasing, including certification of specific properties

- Policy — leadership in green procurement policy (product recommendations), international policy for ecolabeling, etc.
Smarter living
Generating a new understanding for natural resources as the key to sustainable development – the 2000-watt society
Energy Use

The average energy requirement per capita world-wide is 2000 watts, but this fluctuates enormously from country to country. In developing nations it is often just a few hundred watts, while in other countries it may be up to 20 times higher!
The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions. These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.

The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so.

Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of “common but differentiated responsibilities.”

The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. 184 Parties of the Convention have ratified its Protocol to date. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the “Marrakesh Accords.”
Mean consumption German building stock

220 kWh/(m²a)

Consumption passive house Kranichstein

more than 90% energy savings by efficiency measures

fuel reduced to 15 kWh/(m²a)

specific final energy consumption kWh/(m²a)
Unsustainable Growth

Given the explosive nature of the development in energy consumption, we clearly cannot speak of «normal» growth. Over the past 50 years, global consumption has increased more than fourfold. (Chart excluding renewable energies and waste)
2.1.2 Definition of the Passive House standard

The term "Passive House" refers to a construction standard. The standard can be met using a variety of technologies, designs and materials. It is a refinement of the low-energy house (LEH) standard.

Figure 1: Comparison of specific energy consumption levels of dwellings
The increase in efficiency in the area of light production is a prime example of rapid technological development. In 1879, the Edison light bulb produced a luminous flux of 3 lumens per watt, compared with 100 lumens per watt produced by fluorescent lamps and LED elements (see large photo).
Focus starting to be put on housing
Systems Thinking

Holds it all together
Changes the way we think about houses
  How they are built
  How they interact with people
  How they integrate with the environment
  How they perform

Foundation
Building a House

Yesterday

Trades
  Design
  Foundation
  Framing
  Plumbing
  Electrical

Individual & Separate

Drafty, uncomfortable, yet durable houses

Expectation?
Building a House
Today

We have added
Thermal Insulation
Tighter Building Envelopes
Heating & Cooling Systems

Yet is our House
comfortable
Durable
Safe
Energy Efficiency
Environmental

Expectation
Two comfort strategies

- Poorly insulated house: Heating system has to work harder (use more fuel/higher costs) because a lot more heat is escaping to the outside but, the house is still maintained at a comfortable 70°F.

- Well insulated house: Less fuel is required to keep the house at 70°F because the insulation reduces heat loss - keeping heat inside the house longer.
Move to a Systems Approach

The various parts work together

Achieving what they could not on their own

Safety
Comfort
Durability
Efficiency
Environmental
If the House is an Operating System

There are three main components to the system...
The Components of the System

The Structure

The Equipment & Systems

The Occupants
The Basic Requirements of the Thermal Envelope

Barrier / Boundary

Control Heat flow
Control air flow
Control water and vapor flow
Control rain penetration
Control light and solar gain
Control noise
Provide strength and rigidity

Be Durable & Provide

Safety
Comfort
Efficiency
Environmental

Can You Define Where It Is?

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Lance Wright www.greenenergyman.com
Where is the Thermal Envelope?
Systems for Comfort & Security

Heating equipment
Cooling equipment
Humidification &
dehumidification equipment

Others systems
Lights & Appliances
Electronics
Security
Plumbing

Safety and Comfort
Durable
Efficient
Environmental

Whose Responsible for it?

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Occupant Factors

Density of bodies

Lifestyle

Maintenance

Operation
Three Components of the System

The Structure

The Equipment & Systems

Must operate in harmony in a particular environment

The Occupants
Controlling the Elements in the Environment
Climate Zones—2006 IECC
We Create Micro Climates
Micro Climate

Controlled environment
  Consistent Comfort
    Temperature
    Humidity
  Air Quality

Predictability / Control
  Tighter
  Insulation
  Mechanical Systems
  Ventilation
Systems Thinking

House as a system is the backbone of applied building science.

Revolutionized how we think about housing today.

Every change must be evaluated to determine its effect on the system.

The components working together to achieve what they could not on their own!

Will it affect

- Moisture, heat or air flow?
- Indoor air quality?
- Comfort, safety or health of the occupants?
- Durability & Performance
- Efficiency
- Environment

It’s a “holistic” approach

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Lance Wright www.greenenergyman.com
<table>
<thead>
<tr>
<th>Organization</th>
<th>Who are they?</th>
<th>Standard Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Standards Groups</td>
<td>A membership association dedicated to building safety and fire prevention by the development of international residential and commercial building codes. ICC holds hearings and adopts updated codes every three years.</td>
<td>International Energy Conservation Code (IECC) <a href="http://www.iccsafe.org">www.iccsafe.org</a></td>
</tr>
<tr>
<td>International Code Council (ICC)</td>
<td></td>
<td>National Green Building Standard ICC-700 - jointly developed with ICC and including both energy guidelines and a rating system. <a href="http://www.nahbgreen.org">www.nahbgreen.org</a></td>
</tr>
<tr>
<td>National Association of Home Builders (NAHB)</td>
<td>D.C.-based trade association for the housing &amp; building industry with the mission to provide safe and affordable housing. Founded in 1942, NAHB is a federation of more than 800 state and local associations.</td>
<td></td>
</tr>
<tr>
<td>II. Government Entities</td>
<td>Various state, county, and local entities.</td>
<td>Varies</td>
</tr>
<tr>
<td>III. Certification Groups</td>
<td>The U.S. Green Building Council (USGBC) is a 501(c)(3) non-profit community of leaders working to make green buildings available to everyone. Expressed through LEED certification, this rating system defines how buildings compare within a wide range of measureable criteria.</td>
<td>Leadership in Energy and Environmental Design (LEED). Presently the most widely known rating system in the U.S. <a href="http://www.usgbc.org">www.usgbc.org</a></td>
</tr>
</tbody>
</table>
Residential State Energy Codes

http://www.energycodes.gov/implement/state_codes/
## Summary of Sustainability Rating Systems

<table>
<thead>
<tr>
<th>Rating Systems</th>
<th>Organization</th>
<th>Energy Efficiency</th>
<th>Green</th>
<th>Notes/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Green Building</td>
<td>National Ass. of Home Builders (NAHB) and ICC</td>
<td>Energy Star or similar</td>
<td>X</td>
<td>The newest program - NAHB Green Building Program offers two resources for scoring homes: the ANSI approved ICC 700-2008 National Green Building Standard, and the NAHB Model Green Home Building Guidelines. Both offer a variety of line items that a builder can choose from in creating a green home. <a href="http://www.iccsafe.org/news/green/">http://www.iccsafe.org/news/green/</a> ICC jointly developed this system with the NAHB.</td>
</tr>
<tr>
<td>ICC-700</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEED for Homes</td>
<td>U.S. Green Building Council (USGBC)</td>
<td>ES or similar</td>
<td>X</td>
<td>LEED’s certification programs are presently the most widely known benchmarks for the design, construction, and operation of high performance green buildings. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. <a href="http://www.usgbc.org/DisplayPage.aspx?CMSPageID=147">http://www.usgbc.org/DisplayPage.aspx?CMSPageID=147</a></td>
</tr>
<tr>
<td>Built Green Colorado</td>
<td>Denver’s HBA (Home Builders Association)</td>
<td>ES</td>
<td>X</td>
<td>Introduced in 1995, Built Green Colorado is one of oldest and largest green home building programs in the nation—a voluntary, industry-driven program of the Home Builders Association of Metro Denver offered to builders across the state. The purpose of Built Green Colorado is to encourage home builders to use technologies, products, and practices that result in homes that are better built and better for the environment. <a href="http://www.builtgreen.org/">http://www.builtgreen.org/</a></td>
</tr>
<tr>
<td>Energy Star</td>
<td>EPA And DOE</td>
<td>ES</td>
<td></td>
<td>To earn the ENERGY STAR rating, a home must meet guidelines for energy efficiency set by the U.S. Environmental Protection Agency. These homes are at least 15% more energy efficient than homes built to the 2004 International Residential Code (IRC), and typically include additional energy-saving features that make them 20–30% more efficient than standard homes. <a href="http://www.energystar.gov/index.cfm?c=new_homes.nh_features">http://www.energystar.gov/index.cfm?c=new_homes.nh_featureshttp://www.energystar.gov/</a></td>
</tr>
<tr>
<td>Passive House</td>
<td>Passive House Institute US</td>
<td>Passive House Planning Program (PHPP)</td>
<td>No sep. green credit for materials, size, site, or water issues.</td>
<td>Passivhaus is a European energy certification system that is often described as “the world’s strictest energy standard.” It was formally introduced into the United States in January of 2008. Passive House design uses strict building techniques to capture solar energy instead of relying predominantly on “active” systems to bring a building to near-zero-energy use. High performance windows, super-insulation, an airtight building shell, limitation of thermal bridging, and balanced energy recovery ventilation make possible extraordinary reductions in energy use and carbon emission. <a href="http://www.passivehouse.us/passiveHouse/PassiveHouseInfo.html">http://www.passivehouse.us/passiveHouse/PassiveHouseInfo.html</a></td>
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</tbody>
</table>
Climate Zones—2006 IECC
### Prescriptive table

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Window U-Factor</th>
<th>Skylight U-Factor</th>
<th>Ceiling R-Value</th>
<th>Wood Framed Wall R-Value</th>
<th>Mass Wall R-Value</th>
<th>Floor R-Value</th>
<th>Basement Wall R-Value</th>
<th>Slab R-Value and Depth</th>
<th>Crawl Space Wall R-Value</th>
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<tbody>
<tr>
<td>4</td>
<td>0.4</td>
<td>0.60</td>
<td>R-38</td>
<td>R-13</td>
<td>R-5</td>
<td>R-19</td>
<td>R-10/13</td>
<td>R-10/13</td>
<td>R-10/13</td>
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<tr>
<td>5</td>
<td>0.035</td>
<td>0.60</td>
<td>R-38</td>
<td>R-19 or 13+5</td>
<td>R-13</td>
<td>R-30</td>
<td>R-10/13</td>
<td>R-10/13</td>
<td>R-10/13</td>
</tr>
<tr>
<td>6</td>
<td>0.35</td>
<td>0.60</td>
<td>R-49</td>
<td>R-19 or 13+5</td>
<td>R-15</td>
<td>R-30</td>
<td>R-10/13</td>
<td>R-10/13</td>
<td>R-10/13</td>
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<tr>
<td>7</td>
<td>0.35</td>
<td>0.60</td>
<td>R-49</td>
<td>R-21</td>
<td>R-19</td>
<td>R-30</td>
<td>R-10/13</td>
<td>R-10/13</td>
<td>R-10/13</td>
</tr>
</tbody>
</table>

Lance Wright www.greenenergyman.com
## HERS Index and the IECC

### Energy Efficient

<table>
<thead>
<tr>
<th>Use</th>
<th>MMBtu</th>
<th>Cost ($1000)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>96.3</td>
<td>912</td>
<td>35%</td>
</tr>
<tr>
<td>Cooling</td>
<td>5.2</td>
<td>57</td>
<td>5%</td>
</tr>
<tr>
<td>Hot Water</td>
<td>24.8</td>
<td>197</td>
<td>8%</td>
</tr>
<tr>
<td>Lights/Appliances</td>
<td>5.7</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>0.1</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Service Charges</td>
<td>0.1</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Confirmed Rating**

- Heating: 96.3 MMBtu
- Cooling: 5.2 MMBtu
- Hot Water: 24.8 MMBtu
- Lights/Appliances: 5.7 MMBtu
- Photovoltaics: 0.1 MMBtu
- Service Charges: 0.1 MMBtu

- Cost: $912, $57, $197, $4, $0
- Percent: 35%, 5%, 8%, 2%, 0%

### 50% more efficient than 2004 IECC Code House

### 100 Bench Mark of 2004 / IECC Code House

### Mechanical Systems Features

- Water Heating: Instant water heater, Natural gas, 0.80 EF.
- Heating: Fuel-fired air distribution, Natural gas, 94.1 AFUE.
- Cooling: Air conditioner, Electric, 13.0 SEER.
- Duct Leakage to Outside: 151.00 CFM.
- Ventilation System: Air Cycler: 319 cfm, 1050.0 watts.
- Programmable Thermostat: Heating: Yes, Cooling: Yes

### Building Shell Features

- Ceiling Flat: R-38
- Vaulted Ceiling: R-38
- Above Grade Walls: R-20, R-13
- Infiltration: Low E .35 / .21
- Foundation Walls: R-11.0, R-19.0
- Slab: R-0.0 Edge, R-0.0 Under
- Method: Blower door test

### Lights and Appliance Features

- Percent Fluorescent Pin-Based: 10.00
- Clothes Dryer Fuel: Electric
- Percent Fluorescent CFL: 50.00
- Range/Oven Fuel: Natural gas
- Refrigerator (kWh/yr): 775.00
- Ceiling Fan (cfm/Watt): 0.00

---

*Certified Energy Rater*
An ENERGY STAR® Qualified Home

This home built at

7933 Place to Live, Longmont, CO

by Perfect builders

has been verified by EnergyLogic, Inc., an independent professional organization, to meet or exceed strict energy efficiency guidelines set by the U.S. Environmental Protection Agency.

HERS Index: 47

David Lee
Chief
ENERGY STAR Residential Branch

www.energystar.gov

Stan Rashkin
National Director
ENERGY STAR for Homes

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Lance Wright www.greenenergyman.com
Code Certificate

2006 INTERNATIONAL ENERGY CONSERVATION CODE ®
CERTIFIED HOME

This home built at

7933 Place to Live, Denver, CO
by Perfect builders

exceeds the minimum requirements for the 2006 International Energy Conservation Code

3/18/08

Building Features:

- Ceiling Flat: R-38
- Vaulted Ceiling: R-30
- Above Grade Walls: R-20, R-13
- Foundation Walls: R-110, R-130
- Exposed Floor: R-43
- Slab: R-0.0 Edge, R-0.0 Under

- Duct: R-8.0
- Window: U-Value = 0.350, SHGC = 0.210
- Heating: Fuel-fired air distribution, Natural gas, 94.0 AFUE
- Cooling: Air conditioner, Electric, 13.0 SEER
- Water Heating: Instant water heater, Natural gas, 0.80 EF, 0.0 Gal.

The organization below certifies that the proposed building design described herein is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2006 IECC requirements in compliance with Chapter 4 based on Climate Zone 5B and with all mandatory requirements.

Name: Robby Schwarz
Organization: EnergyLogic, Inc.
Signature:
Organization:
Date: April 26, 2008

Built Green Certificate

EnergyLogic, Inc.

has verified that the home located at

15399 W. Iliff Drive, Lakewood, CO 80228

meets the requirements of

Built Green Colorado®

with an energy rating of 71 points and a green rating of 83 points from the Built Green Checklist

Robby Schwarz
2008.12.15 13:04:42
-0700

EnergyLogic, Inc.

Date or Rating
Upsala Glacier, Argentina

1928

2004
THE END OF CHEAP OIL
Why Passive House?

Optimize the House...  ... to the Heating System
Economic Feasibility as Core Concept:

Passive House Concept Developed in the early 1990s by Dr. Wolfgang Feist and Professor Bo Adamson as optimization of early superinsulation work

First Passive House Prototype built in 1990 in Kranichstein, Germany

70-80% reduction in overall energy consumption, 90-95% reduction of heating and cooling energy

Passivhaus Institut (PHI) founded in 1996
The Small Homes Council
University of Illinois, Urbana-Champaign:
Wayne Schick’s Team develops the Lo-Cal House in 1974-76

Walls:
- Double stud
- Walls, R-30

Roof:
- R-40

PHIUS
Passive House Institute US

PHPP Consultants Training I 08
May 20-22, 2008
Harold Orr builds the
Saskatchewan Conservation House
In Saskatoon, Canada in 1977

First superinsulated house that showed that airtight construction is feasible. It is equipped with a ventilation system with an air-to-air heat exchanger.

Peak heat load at -10 degrees Fahrenheit is 3000 watts (10,640 Btu per hour)

Walls: 12” thick, R-44

Roof: R-60
Eugene Leger builds the Leger House in Eastern Massachusetts in the US in 1979

The Leger House looked like a conventional American home, heated only by its own water heater

It was widely published and inspired William Shurcliff, a Harvard physicist/author on solar heated homes to a press release on superinsulation

Larger developments followed in Canada in 1980 (14 superinsulated homes, in Minnesota (140 superinsulated homes)

1982-83 Canada sponsors the R2000 program with free training for builders and small subsidies to offset cost and requirement for an airtightness test: a blower-door test. Over 1000 homes were built.

Conservative estimate of total superinsulated homes 1985 in the states and Canada is 10,000.

PHPP Consultants Training I 08
May 20-22, 2008
Envelope and Thermal Comfort Principles

1. Continuous Insulation- creating steady indoor temperatures that won’t drop below 50 degrees without heating source

2. Thermal Bridge Free Construction- minimizes condensation/ building deterioration

3. Compact Building Shape- excellent surface-to-volume ratio (< 1)

4. Airtightness- minimizes moisture diffusion into wall assembly

5. Balanced Ventilation with Heat Recovery with minimal Space Conditioning System - exceptional efficiency, indoor air-quality and comfort

6. Optimal Solar Orientation and Shading — maximizing solar gains for winter, minimizing gains for the summer case

7. Energy Efficient Appliances and Lighting- highly efficient use of household electricity

8. User Friendliness - user manuals are recommended to be given homeowners

PHPP Consultants Training I 08
May 20-22, 2008
Amory and Hunter Lovins finish the Rocky Mountain Institute in Snowmass, Colorado in 1984

“Tunneling through the cost barrier”
Amory Lovins

PHPP Consultants Training I 08
May 20-22, 2008
Eliminating the Heating System for Market Viability:

Cost asymptote occurs when standard heating system is eliminated
Wall Construction Components

<table>
<thead>
<tr>
<th>Wall Type</th>
<th>Insulation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural insulated panel (SIP)</td>
<td>foam</td>
</tr>
<tr>
<td>Insulated Concrete Form (ICF)</td>
<td></td>
</tr>
<tr>
<td>Double stud wall</td>
<td>cellulose, fiberglass, foam,</td>
</tr>
<tr>
<td>Wooden I-Joist</td>
<td>cotton, wool, etc</td>
</tr>
<tr>
<td>Straw Bale</td>
<td>Straw</td>
</tr>
</tbody>
</table>

No ‘best’ method, just must meet the thermal resistance requirements of the building in the specific climate
Component Diagram of the Minimized Mechanical System:

- ERV/HRV with integrated hot water coil and/or Air to Air Heat Pump for heating/cooling
- Insulated Hot Water Tank w/ solar thermal collectors for DHW

(Image: Passivhaus Institut)

PHPP Consultants Training I 08
May 20-22, 2008
The Compact Energy Tower: “The Magic Box”
The Compact Energy Tower:

- Models exist on European market
- Could be produced economically in US if given demand
2.1.2 Definition of the Passive House standard

The term "Passive House" refers to a construction standard. The standard can be met using a variety of technologies, designs and materials. It is a refinement of the low-energy house (LEH) standard.

Figure 1: Comparison of specific energy consumption levels of dwellings
Mean consumption German building stock

Consumption passive house Kranichstein

fuel for space heating
220 kWh/(m²a)

more than 90% energy savings by efficiency measures

fuel reduced to 15 kWh/(m²a)

specific final energy consumption kWh/(m²a)
Outlook:

Passive House construction has grown exponentially in Germany and Austria and continues with that trend.

10,000 passive house units had been constructed by the end of 2007 and are inhabited.
Passive Houses in Europe
European Passive House Examples:

Single Family Residence, Austria

PHPP Consultants Training I 08
May 20-22, 2008
European Passive House Examples:

Passive House Office Building
Ulm, Germany

Single Family Passive House,
Austria

PHPP Consultants Training I 08
May 20-22, 2008
European Passive House Examples:

Passive House Gym
Heidelberg, Germany

Passive House School
Waldshut, Germany
European Passive House Examples:

Townhouses, Kronsberg
Hannover Germany
Passive Houses in various Climate Zones of the USA
Climate Zones—2006 IECC

The image shows a climate zone map of the United States, divided into various zones labeled with numbers and colors.

- Zone 1 includes Hawaii, Guam, Puerto Rico, and the Virgin Islands.
- Zone 2 covers the southeastern part of the US.
- Zone 3 includes most of the central and northern plains.
- Zone 4 covers parts of the Midwest and the northern Great Plains.
- Zone 5 includes the western US, with parts of the dry and moist regions.
- Zone 6 covers the westernmost parts of the US, including parts of the Pacific Northwest.

Additional details include:
- All of Alaska in Zone 7, except for the following Boroughs in Zone 8: Bethel, Dillingham, Fairbanks North Star, Nome, North Slope.
- Northwest Arctic, Southeast Fairbanks, Wade Hampton, Yukon-Koyukuk.
3 Passive Houses in Illinois
Fairview 1+2 and Smith House in Urbana, built in 2005-07 and 2003
Smith House - 2003

PHPP Consultants Training I 08
May 20-22, 2008
The Fairview House

Finished view from South-West

PHPP Consultants Training I 08
May 20-22, 2008
Tahan Residence, Berkeley - 2008

PHPP Consultants Training I 08
May 20-22, 2008
Wright-DuVivier Home - 2008
1960 South Gilpin, Denver, Co
Global Climate Change

1928

2004

Source: Time magazine April, 2006
Conclusions/ Questions?

Green is IN:
Environment, Economy, National Security

– Don’t just go with the most publicized program; choose one that will really make a difference for the community and the world.

– Look for programs with a strong systems approach and energy component.

– The foundation is Energy Efficiency, otherwise, it can’t be truly “green.”

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Lance Wright www.greenenergymen.com
References

Boulder Green Points program:  www.bouldergreenpoints.com
Boulder Ordinance 7565 updated Green Points program  on February 1, 2008

Green Globes
http://www.greenglobes.com

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