Green Building Progress Report 2009

City of Scottsdale Green Building Program

January 11, 2010

Anthony Floyd, AIA, LEED-AP
City of Scottsdale
Office of Environmental Initiatives
## 2009 Green Single Family Permits

<table>
<thead>
<tr>
<th>2009 Quarter</th>
<th>Total SF Permits</th>
<th>Green SF Permits</th>
<th>Percentage of Total Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st}</td>
<td>21</td>
<td>5</td>
<td>24%</td>
</tr>
<tr>
<td>2\textsuperscript{nd}</td>
<td>24</td>
<td>6</td>
<td>25%</td>
</tr>
<tr>
<td>3\textsuperscript{rd}</td>
<td>31</td>
<td>11</td>
<td>36%</td>
</tr>
<tr>
<td>4\textsuperscript{th}</td>
<td>45</td>
<td>8</td>
<td>18%</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>30</td>
<td>25%</td>
</tr>
</tbody>
</table>

Source: Scottsdale CDS records
# Green Single Family Permit Activity (1998 - 2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Permits</th>
<th>Green Permits</th>
<th>Percentage of Total Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>2172</td>
<td>20</td>
<td>1%</td>
</tr>
<tr>
<td>1999</td>
<td>1554</td>
<td>36</td>
<td>2%</td>
</tr>
<tr>
<td>2000</td>
<td>1076</td>
<td>41</td>
<td>4%</td>
</tr>
<tr>
<td>2001</td>
<td>843</td>
<td>38</td>
<td>5%</td>
</tr>
<tr>
<td>2002</td>
<td>768</td>
<td>33</td>
<td>4%</td>
</tr>
<tr>
<td>2003</td>
<td>896</td>
<td>38</td>
<td>4%</td>
</tr>
<tr>
<td>2004</td>
<td>1137</td>
<td>247</td>
<td>22%</td>
</tr>
<tr>
<td>2005</td>
<td>852</td>
<td>439</td>
<td>52%</td>
</tr>
<tr>
<td>2006</td>
<td>685</td>
<td>177</td>
<td>26%</td>
</tr>
<tr>
<td>2007</td>
<td>573</td>
<td>106</td>
<td>19%</td>
</tr>
<tr>
<td>2008</td>
<td>200</td>
<td>35</td>
<td>18%</td>
</tr>
<tr>
<td>2009</td>
<td>121</td>
<td>30</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>10,877</td>
<td>1,240</td>
<td></td>
</tr>
</tbody>
</table>

Source: Scottsdale CDS records
Green Single Family Permit Activity

![Bar chart showing Green Single Family Permit Activity from 1998 to 2008. The chart highlights a significant increase in activity in 2004 and 2006.]

Production Home Builders

Updated Rating Checklist - 2009

Source: Scottsdale CDS records
Scottsdale Building Trends
1998 – 2009

● Energy Efficiency
  ● Cathedralized attics (insulation at roof deck)
  ● All buildings are at least 15% better than baseline energy codes
  ● Half of green homes are 25% or better than code

● Heat Island Mitigation
  ● Shaded building entrances, courtyards, outdoor living spaces and limited hardscape surfaces

● Active Solar Systems
  ● Significant increase in permits for photovoltaic (solar electric) and solar hot water system

● Water Efficiency
  ● Low water use landscaping and efficient irrigation
  ● Efficient hot water supply systems
## Scottsdale’s Energy Performance

Estimated energy savings and equivalent greenhouse gas reduction resulting from houses completed under the Green Building Program.

<table>
<thead>
<tr>
<th>Energy Measures</th>
<th>Savings and Pollution Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>1998 to 2009</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Per Home</strong></td>
</tr>
<tr>
<td>Sample Home Size</td>
<td>3,800 square feet</td>
</tr>
<tr>
<td>Average Annual Energy Reduction</td>
<td>2,830 Kilowatt hours (kWh) per year</td>
</tr>
<tr>
<td></td>
<td>42,110,400 Kilowatt hours (kWh)</td>
</tr>
<tr>
<td>Average Annual Energy Savings</td>
<td>$283 per year</td>
</tr>
<tr>
<td></td>
<td>$4,211,040</td>
</tr>
<tr>
<td>Annual Greenhouse Gas Reduction</td>
<td>2,700 pounds of carbon dioxide (C0₂)</td>
</tr>
<tr>
<td>Equivalent Cars removed from Street</td>
<td>1/5 the annual emission of an average car</td>
</tr>
<tr>
<td></td>
<td>annual emission of 2,976 average cars</td>
</tr>
</tbody>
</table>
Smart Market Report: The Green Home Consumer

- Surveyed one million U.S. households
- 80% of respondents believe green homes are more economical, offer better and healthier places to live
- “Making homes greener is now the number one reason for home improvement (42%) over remodeling for comfort reasons (34%) or to improve appearance (24%)”
- “Green home buyers and remodelers cut across all demographic lines”

Source: McGraw-Hill, Fall 2008
Smart Market Report: The Green Home Consumer

- 70% of home buyers are more inclined to buy a green home in a down economy than a non-green home.
  - 56% of those surveyed who have bought green homes earn less than $75K/year; 29% earn less than $50K.

Source: McGraw-Hill, Fall 2008
# Green Home Rating Programs Comparative Overview

**Prepared by the Residential Green Building Committee, USGBC Arizona Chapter**

<table>
<thead>
<tr>
<th>Program Measures</th>
<th>LEED for Homes</th>
<th>ICC 2000/NAHB</th>
<th>City of Scottsdale Green Building Program</th>
<th>Pima County Regional Residential GB Program</th>
<th>Cochise County Sustainable Building Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entry certification level</strong></td>
<td>Certified</td>
<td>Bronze</td>
<td>Entry Green Building Scottsdale GB Advisory Committee &amp; Open Meeting Law process</td>
<td>Bronze</td>
<td>Cochise County Sustainable Building Advisory Committee</td>
</tr>
<tr>
<td><strong>Consensus built</strong></td>
<td>USGBC process</td>
<td>ANSI process</td>
<td>Scottsdale GB Advisory Committee &amp; Open Meeting Law process</td>
<td>Pima County GB Advisory Committee &amp; Open Meeting Law process</td>
<td>Cochise County Sustainable Building Advisory Committee</td>
</tr>
<tr>
<td><strong>Third Party certification</strong></td>
<td>Yes, and legally binding accountability forms signed by builder for unverifiable field items</td>
<td>Yes</td>
<td>Yes, field verifiable items done by bldg. inspectors; Certification of Completion rec'd for unverifiable field items (i.e., recycled content, zero VOC)</td>
<td>Yes, field verifiable items done by bldg. inspectors; Certification of Completion rec'd for unverifiable field items (i.e., recycled content, zero VOC)</td>
<td>Yes, certification done by selected Cochise County Sustainable Building Advisory Committee Members</td>
</tr>
<tr>
<td><strong>Energy: Key Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Energy Star or equivalent</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Mandatory</td>
<td>Mandatory</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- 90% party performance test</td>
<td>Mandatory</td>
<td>Net in CA</td>
<td>Mandatory</td>
<td>Mandatory</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Meet code</td>
<td>Yes</td>
<td>Optional (points)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Water: Key Measures</strong></td>
<td>Indoor and outdoor Points for total home compliance</td>
<td>Indoor and outdoor Points per fixture</td>
<td>Indoor and outdoor Points for indoor, Points for outdoor</td>
<td>Indoor and outdoor Some mandatory, some optional (points)</td>
<td>Indoor and outdoor Some mandatory, some optional (points)</td>
</tr>
<tr>
<td>- Types of measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- High-efficiency water fixtures</td>
<td>Indoor and outdoor Points for total home compliance</td>
<td>Indoor and outdoor Points per fixture</td>
<td>Indoor and outdoor Points for indoor, Points for outdoor</td>
<td>Indoor and outdoor Some mandatory, some optional (points)</td>
<td>Indoor and outdoor Some mandatory, some optional (points)</td>
</tr>
<tr>
<td><strong>IEQ: Key Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- MERV 6 filters</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- No unvented/vented combustion appliances</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- No air handling equip. in garage</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td><strong>Materials: Key Measures</strong></td>
<td>Mandatory (max of 10% points available per framing area)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Mandatory</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Construction waste mgmt plan</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>N/A</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Minimize excess lumber in framing</td>
<td>Mandatory (max of 10% points available per framing area)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>N/A</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Storage and collection of recyclables</td>
<td>Mandatory (recycling area in or near kitchen)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Mandatory</td>
<td>Optional (points)</td>
</tr>
<tr>
<td><strong>Site: Key Measures</strong></td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Erosion controls during constr.</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Landscaping measures</td>
<td>Mandatory</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td>- Protected entrances</td>
<td>N/A</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
<td>Optional (points)</td>
</tr>
<tr>
<td><strong>Program Fees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Single family home</td>
<td>Members: $375/unit</td>
<td>Members: $200/unit</td>
<td>Members: $375/unit</td>
<td>Members: $200/unit</td>
<td>Members: $375/unit</td>
</tr>
<tr>
<td>- Production homes</td>
<td>Members: $197/unit</td>
<td>Members: $100/unit</td>
<td>Members: $197/unit</td>
<td>Members: $100/unit</td>
<td>Members: $197/unit</td>
</tr>
<tr>
<td><strong>Verification Fees</strong></td>
<td>TBD by market</td>
<td>TBD by market</td>
<td>Other than city inspections, TBD by market</td>
<td>No fees if participating in utility energy program, or using prescriptive path</td>
<td>No fees if participating in utility energy program, or using prescriptive path</td>
</tr>
</tbody>
</table>
Foster Residence - 2004
AAC walls, Daylighting, Solar Power, Metal Framing - Edwards Design Group
Hovey Residence - 2004
Scottsdale’s first Building Integrated Solar PV System
McDonnell Residence - 2005
Downtown in-fill development
Live-work remodel and addition

Daylighting, solar control
energy efficient building envelope
Strata International – 2005
Saebi Alternative Building System – Load bearing foam foundation, walls and roof
Beaulieu Residence - 2006

Earth sheltered, renewable energy, passive cooling, vegetated roofs, site integration, outdoor living, indoor natural ventilation, gray water recycling
Privada Development - 2009
Monarch Communities

Solar hybrid system (PVT) for generating electricity, hot water, space heating and cooling.
Green Commercial / Institutional Projects completed in 2009

<table>
<thead>
<tr>
<th>Project</th>
<th>Type</th>
<th>Green Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown Fire Station 2</td>
<td>City</td>
<td>LEED-NC Platinum</td>
</tr>
<tr>
<td>Gateway Access Trailhead</td>
<td>City</td>
<td>LEED-NC Platinum</td>
</tr>
<tr>
<td>Appaloosa Library</td>
<td>City</td>
<td>LEED-NC Gold (Pending)</td>
</tr>
<tr>
<td>Arabian Library</td>
<td>City</td>
<td>LEED-NC Certified</td>
</tr>
<tr>
<td>SkySong Innovation Center</td>
<td>Commercial</td>
<td>LEED-CS Silver</td>
</tr>
<tr>
<td>General Dynamics</td>
<td>Industrial</td>
<td>LEED-EB/OM Certified</td>
</tr>
<tr>
<td>Black Rock Studio Architects Office</td>
<td>Commercial</td>
<td>Scottsdale Green Building Rating</td>
</tr>
<tr>
<td>John Douglas Architects Office</td>
<td>Commercial</td>
<td>Scottsdale Green Building Rating</td>
</tr>
<tr>
<td>Microsoft Retail Store</td>
<td>Retail</td>
<td>LEED-CI Certified</td>
</tr>
</tbody>
</table>
Granite Reef Senior Center

Scottsdale’s 1st LEED Gold certified city facility - 2006
Scottsdale Senior Center at Granite Reef

Partnership with SRP electric utility company to provide solar electric (PV) shade canopy using transparent solar panels and roof mounted solar electric (PV) panels.
Lost Dog Wash Trailhead Building

Scottsdale Green Building Program Rating - 2007
Rammed earth, PV, graywater, rainwater harvesting, pervious paving
Downtown Fire Station 2

Scottsdale’s 1st LEED Platinum certified city facility - 2009
Solar, cool tower, graywater, rainwater harvesting, pervious paving
Appaloosa Library - 2009

Gateway Access Trailhead Building - 2009

Arabian Library – 2008/2009 certification
SkySong
ASU Scottsdale Innovation Center

SkySong - 2009
Phase I & II Office Buildings

Amanda Wills, Earth911.com
General Dynamics Facility

Certified Green under the new LEED Operations and Maintenance designation – EB/OM

- **2009** – General Dynamics became the first industrial site of its size to receive the LEED-EB/OM designation
- **2005** - General Dynamics received the first EB certification during the LEED pilot program

- Conversion of 250,000 square feet of lawn to a Xeriscape
- Diverted 575 tons of recyclable materials from local landfills
Downtown Green Building Projects - 2009

Scottsdale Green Building Rated

Black Rock Studio
Weddle Gilmore
Optima Camelview Village

Largest Scottsdale Green Building Project  (Phase I-III, 2005-2010)
11 buildings - 700 residential units - 24,000 sq. ft. retail – 13 acre site
23 acres of vegetated terraces – Seeking LEED Silver certification
Hyatt Regency Scottsdale at Gainey Ranch

Largest Solar Hot Water System
Installed in a Hotel

- Solar thermal system provides domestic hot water for
  - 492 guest rooms
  - main laundry services room
  - restaurants
- Designed to reduce the resort’s energy use by 50%
- Estimated 3-year payback on investment
Green Choice Solar

Opening of New Scottsdale Solar Company
Scottsdale Airpark Open House - December 2009

- Solar PV design-build company
  - residential and commercial installations
  - roof-mounted and covered parking systems
- First 100% solar powered office in Scottsdale
  - office is designed to provide all of its electricity needs
  - one of the first solar powered commercial office buildings in the state of Arizona
Established in 1998 as a voluntary program for private sector development
- staff and citizen initiative
Rating criteria
- residential and commercial projects
Verification Process
- integration with building plan review, permits and inspections
Green Building Advisory Committee
- program input, policy development and outreach
Green Building Program
Incentives

- Expedited review & process assistance
- Market differentiation for builders & designers (directory and signs)
- Promotion material, education & public events
Lectures and Workshops

- **Green Building Lectures**
  - 1st Thursday of each month
  - avg. attendance is 45

- **Solar Lectures**
  - 3rd Thursday of each month
  - avg. attendance is 25

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**Free Monthly Lecture Series**

**Green Building Lecture Series**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 4, 2008</td>
<td>Choosing Green: An Intro to Energy Efficient, Sustainable, Healthy Homes</td>
</tr>
<tr>
<td>October 2, 2008</td>
<td>Home Improvements and Green Remodeling</td>
</tr>
<tr>
<td>November 6, 2008</td>
<td>Natural, Recycled &amp; Reclaimed Building Materials</td>
</tr>
<tr>
<td>December 4, 2008</td>
<td>Resource Efficient Wall and Roof Systems</td>
</tr>
<tr>
<td>February 5, 2009</td>
<td>Building Science: The System Approach to Energy Efficiency</td>
</tr>
<tr>
<td>March 5, 2009</td>
<td>Intertors and Indoor Environmental Quality</td>
</tr>
<tr>
<td>April 2, 2009</td>
<td>Water Efficiency in the Sonoran Desert</td>
</tr>
<tr>
<td>May 7, 2009</td>
<td>Innovative Green Built Projects in the Phoenix/Scottsdale Area</td>
</tr>
<tr>
<td>June 4, 2009</td>
<td>GREEN Feng Shui</td>
</tr>
</tbody>
</table>

**Location:** Granite Reef Senior Center

**Information:**

- Scottsdale Green Building Program
  - (480) 312-7692

**Website:**

- [www.scottsdaleaz.gov/greenbuilding](http://www.scottsdaleaz.gov/greenbuilding)

**Subscribe to:**

- Green Building Events
  - [Go to](http://go.to/375帅哥)
Green Building Rating Checklist

City of Scottsdale

Green Building Rating Checklist
Residential – New Construction, Major Remodels & Additions
Sept. 1, 2006 - Update

Plan Check # ___________ Building Permit # ___________ GB Total Points ___________
Project or Owner’s Name - ________________________________________________________
Project Address - ________________________________________________________________
Designer Name - __________________________________________________________________
Builder Name - __________________________________________________________________

Use this rating worksheet to qualify projects under the Green Building Program for one- and two-family dwellings and multiple single-family dwellings (townhouses and condominiums) not more than three stories in height with a separate means of egress (International Residential Code - IRC Section R101.2).

All building system components, materials, and equipment must be installed per code and manufacturer’s instructions.

<table>
<thead>
<tr>
<th>Entry Level</th>
<th>Advanced Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Meet all mandatory measures and adjust rating for house size (p. 2 – 7).</td>
<td></td>
</tr>
<tr>
<td>- Accumulate 50 - 99 points from the rating checklist (p. 8 - 26).</td>
<td></td>
</tr>
<tr>
<td>- Meet all mandatory measures and adjust rating for house size (p. 2 – 7).</td>
<td></td>
</tr>
<tr>
<td>- Accumulate 100 or more points from the rating checklist (p. 8 - 26).</td>
<td></td>
</tr>
</tbody>
</table>

Summary of Rating Categories

| 5. Heating, Ventilation, & Air Conditioning | 10. Interior Finishes | |
Growing Momentum
Towards Sustainable Building Practices

- **Changing Regulatory Environment**
  - local guidelines, ordinances and policy; building and energy codes; federal energy policy and stimulus funding

- **Improved Verification Process**
  - energy and green training for inspectors and 3rd party verifiers
  - documentation and verification methods during plan review and inspections
  - certificate of completion and accountability forms

- **Building Performance Verification**
  - measuring energy, water and IAQ performance
Energy Efficiency Trends

- **Scottsdale Home Market (2009)**
  - All new homes constructed in 2009 are at least 15% above 2006 IECC (International Energy Conservation Code)
  - Of the green program custom homes (9 total)
    - 57% are at least 30% above 2006 IECC
    - average is 32% above 2006 IECC
  - Of the green program production homes (15 total)
    - 20% are at least 30% above 2006 IECC
    - average is 26% above 2006 IECC

Source: Scottsdale CDS REScheck records
NAHB/ICC 700
National Green Building Standard
Requires 15 to 60% Energy Reduction

Minimum Energy Requirements of National Green Building Standard Homes

National Association of Home Builders (NAHB) and International Code Council (ICC)
Energy Efficiency Trends
50% Energy Reduction

Since June 2006, over 60,000 new homes have been designed, built, and certified to meet a minimum 50% energy reduction below the 2006 IECC baseline energy code.

Homes were certified to receive $2,000 federal tax credit for a new energy efficient home that achieves 50% energy savings for heating and cooling over the 2004 IECC and supplements (2004 IECC is equivalent to 2006 IECC).

- 2006 – 6,000 homes
- 2007 – 23,702 homes
- 2008 – 21,939 homes
- 2009 – 20,000 homes (estimate)

IECC – International Energy Conservation Code

Source: RESNET
Meeting a 30% energy consumption reduction target below code will save households in every region of the U.S. between $403 and $612 per year after the cost of efficiency measures is factored in.

- based on a 2,500 sq. ft. new home with additional cost for efficiency measures added into a 30-year mortgage at 7% APR
- annual savings evaluated relative to the 2006 IECC, using average utility rates and climate data for Atlanta, Chicago, Denver, Houston, New Orleans, Phoenix and Seattle

Source: National Renewable Energy Laboratory (NREL)
At current energy prices and mortgage interest rates, the **average cost-neutral point** for home efficiency upgrades is a **45% energy reduction** below 2006 IECC energy code baseline.

- estimates based on the cities of Atlanta, Chicago, Denver, Houston, New Orleans, Phoenix and Seattle evaluated relative to the baseline 2006 IECC and a 30-year mortgage at 5.5% APR

Source: National Renewable Energy Laboratory (NREL)
Federal Tax Credits for Energy Efficiency and Renewable Energy
30% of Cost for Existing Homes and New Construction

UPDATED September 14, 2009

Quick link to this page: energystar.gov/taxcredits

Federal Tax Credits for Energy Efficiency includes:

* Tax Credits for Consumers
  * Tax credits are available at 30% of the cost, up to $1,500, in 2009 & 2010 (for existing homes only) for:
    * Windows and Doors
    * Insulation
    * Roofs (Metal and Asphalt)
    * HVAC
    * Water Heaters (non-solar)
    * Biomass Stoves
  * Tax credits are available at 30% of the cost, with no upper limit through 2016 (for existing homes & new construction) for:
    * Geothermal Heat Pumps
    * Solar Panels
    * Solar Water Heaters
    * Small Wind Energy Systems
    * Fuel Cells

Frequently Asked Questions:

Are there new ENERGY STAR appliance rebates?

Is there a tax credit for air conditioners?

Is there a tax credit for water heaters?

What tax form do I need?

Are installation costs covered by the tax credits?

All FAQs

Search FAQs by Keyword: Search

www.energystar.gov/taxcredits
Tax Credits for Home Builders

$2,000 tax credit for a new energy efficient home that achieves 50% energy savings over 2004 IECC

UPDATED June 11, 2009

Eligible contractors need to fill out IRS Form 8908 to get the tax credit. The IRS has provided the following guidance regarding the tax credits for constructing energy efficient new homes available under the Energy Policy Act of 2005:

- IRS Notice 2006-27 provides guidance for the credit for building energy efficient homes other than manufactured homes.
- IRS Notice 2006-28 provides guidance for the credit for building energy efficient manufactured homes.

Home builders are eligible for a $2,000 tax credit for a new energy efficient home that achieves 50% energy savings for heating and cooling over the 2004 International Energy Conservation Code (IECC) and supplements. At least 1/3 of the energy savings must come from building envelope improvements. This credit also applies to contractors of manufactured homes conforming to Federal Manufactured Home Construction and Safety Standards.

There is also a $1,000 tax credit to the producer of a new manufactured home achieving 30% energy savings for heating and cooling over the 2004 IECC and supplements (at least 1/3 of the savings must come from building envelope improvements), or a manufactured home meeting the requirements established by EPA under the ENERGY STAR program.

Please note that, with the exception of the tax credit for an ENERGY STAR qualified manufactured home, these tax credits are not directly linked to ENERGY STAR. Therefore, a builder of an ENERGY STAR qualified home may be eligible for a tax credit but it is not guaranteed.

These tax credits apply to new homes located in the United States whose construction is substantially completed after August 8, 2005 and that are acquired from the eligible contractor for use as a residence from January 1, 2006 through December 31, 2009.
Tax Deductions for Commercial Buildings

$1.80 per square foot for saving at least 50% the energy savings over ASHRAE 90.1

UPDATED June 11, 2009

A tax deduction of up to $1.80 per square foot is available to owners or designers of new or existing commercial buildings that save at least 50% of the heating and cooling energy of a building that meets ASHRAE Standard 90.1-2001. Partial deductions of up to $0.60 per square foot can be taken for measures affecting any one of three building systems: the building envelope, lighting, or heating and cooling systems. These tax deductions are available for systems “placed in service” from January 1, 2006 through December 31, 2013.

Take the ENERGY STAR Challenge to find the best opportunities for energy savings, set goals for improvement, and achieve superior energy efficiency.

- Commercial Building Tax Deduction Coalition [EXIT](http://www.irs.gov)
American Clean Energy and Security Act of 2009 (Waxman-Markey)

- **Sec. 201** calls for updating of national building energy codes to meet energy reduction targets:
  - **2010**, 30% below the baseline energy code (IECC 2006 and ASHRAE 90.1-2004),
  - **2014-2015**, 50% below the baseline energy code, and
  - **2018-2030**, 5% additional reduction every three years

Passed by US House of Representatives on 6/26/09
## Energy Performance Testing

**Scottsdale Green Homes in 2009**

<table>
<thead>
<tr>
<th>Project</th>
<th>Completion Date</th>
<th>Size (sq. ft.)</th>
<th>Governing Building Code (at time of permit)</th>
<th>Energy Audit, Performance Testing and Rating (8/09 to 1/10)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Becker Residence</strong></td>
<td>8/02</td>
<td>2,654</td>
<td>UBC 1997</td>
<td>HERS Index - 73</td>
</tr>
<tr>
<td>(exterior insulated masonry wall construction)</td>
<td></td>
<td></td>
<td></td>
<td>27% better than 2006 IECC</td>
</tr>
<tr>
<td><strong>Loloma 5 Town Homes</strong></td>
<td>10/04</td>
<td>1,612</td>
<td>UBC 1997</td>
<td>HERS Index - 76</td>
</tr>
<tr>
<td>(exterior insulated masonry &amp; wood frame construction)</td>
<td></td>
<td></td>
<td></td>
<td>24% better than 2006 IECC</td>
</tr>
<tr>
<td><strong>McDonnell Infill Office/Residence</strong></td>
<td>12/04</td>
<td>2,241</td>
<td>UBC 1997</td>
<td>HERS Index - 61</td>
</tr>
<tr>
<td>(exterior insulated masonry wall construction)</td>
<td></td>
<td></td>
<td></td>
<td>39% better than 2006 IECC</td>
</tr>
<tr>
<td><strong>Krahman/Wallenmeyer Residence</strong></td>
<td>8/08</td>
<td>5,508</td>
<td>IRC 2003</td>
<td>HERS Index - 10</td>
</tr>
<tr>
<td>(exterior insulated wood frame wall construction)</td>
<td></td>
<td></td>
<td></td>
<td>(65 w/o solar)</td>
</tr>
<tr>
<td><strong>Moore Remodel</strong></td>
<td>1/10</td>
<td>1,842</td>
<td>IRC 2003</td>
<td>HERS Index - ____</td>
</tr>
<tr>
<td>(exterior insulated masonry wall construction)</td>
<td></td>
<td></td>
<td></td>
<td>____% better than 2006 IECC</td>
</tr>
</tbody>
</table>
Use of Renewable Energy in Green Homes

- **National Market (2008)**
  - 23% of green homeowners are using renewable energy

- **Scottsdale Market (2009) YTD 10/16/09**
  - 42% of newly constructed Scottsdale green building program homes are using renewable energy (PV systems)
    - 10 out of 24 single family permits issued

*Source: McGraw-Hill Green Smart Market report and Scottsdale CDS System*
Net Zero Energy and the Smart House

**The Smart House**
Xcel Energy’s Smart Grid Consortium is imagining a future that would allow you to communicate your energy choices to the power grid and automatically receive electricity based on your personal needs.

**The potential benefits:**
- Lower cost of power
- Cleaner power
- A more efficient and resilient grid
- Improved system reliability
- Increased conservation and energy efficiency

**Plug-in Hybrid Electric Car**
Xcel Energy is studying how plug-in electric vehicles can store energy, act as backup generators for homes and supplement the grid during peak hours.

**Smart Meter**
Real-time pricing signals create increased options for consumers.

**Smart Appliances**
Smart appliances contain on-board intelligence that "talks" to the grid, senses grid conditions and automatically turns devices on and off as needed.

**High-Speed Connections**
Advanced sensors distributed throughout the grid and a high-speed communications network tie the entire system together.

**Customer Choice**
Customers may be offered an opportunity to choose the type and amount of energy they’d like to receive with just the click of a mouse on their computer. 100 percent green power? A mix of sources? The cheapest priced source? In Smart Grid City, it could be up to you.

**Smart Thermostat**
Customers can opt to use a smart thermostat, which can communicate with the grid and adjust device settings to help optimize load management. Other “smart devices” could control your air conditioner or pool pump.
## Solar Permits - 2009

Solar Demand Grows Despite the Recession

<table>
<thead>
<tr>
<th>2009 Quarter</th>
<th>Solar Electric PV Permits</th>
<th>Solar Hot Water Permits</th>
<th>Total Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>30</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>51</td>
<td>21</td>
<td>72</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>70</td>
<td>36</td>
<td>106</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>86</td>
<td>51</td>
<td>137</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>237</strong></td>
<td><strong>126</strong></td>
<td><strong>363</strong></td>
</tr>
</tbody>
</table>

Source: Scottsdale CDS permit records
Solar Permits 2001 to 2009

Solar Demand Grows Despite the Recession

Solar Electric (PV)

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Permits</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>13</td>
<td>10</td>
<td>20</td>
<td>28</td>
<td>47</td>
<td>237</td>
</tr>
</tbody>
</table>

Solar Hot Water

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Permits</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>40</td>
<td>126</td>
</tr>
</tbody>
</table>

Source: Scottsdale CDS permit records
Solar Permits 2001 to 2009

Solar Demand Grows Despite the Recession

Source: Scottsdale CDS permit records
U.S. Solar Market Becomes Global Demand Leader by 2012

- Over the next three years, the U.S. will experience the most rapid demand growth of any major PV market in the world
  - GTM Research estimates that demand for solar photovoltaic installations will grow by roughly 50 percent
  - About 50,000 green jobs and over $6.1 billion in annual investment would be created in the process, greening 1.5 million homes with solar power by 2012
  - U.S. will rival Germany as the industry's largest solar energy market

Best AZ City for Solar Permit Process

Permitting Champion Spotlight
Scottsdale, Arizona

Scottsdale issues same day or ‘over-the-counter’ solar permits for typical residential solar energy systems. Permit fees are a flat $149 - the cost of the electrical permit and building permit combined - not some valuation of the total PV system which can result in unduly high fees. Scottsdale even allows for electronic submission of permitting documents.

Top 5 Best Cities for Solar Permitting*
1. Scottsdale
2. Fountain Hills
3. Peoria
4. Yuma County
5. Pima County

Honorable Mention: Tucson

Most In Need of Improvement
1. Mesa
2. Gilbert
3. Yavapai County
4. Paradise Valley
5. Dewey-Humboldt

*based on fee, time, and other criteria.
Solar Energy Incentives

- **Utility Company Incentives**
  - **APS** customers receive a rebate of $3 per watt of rated solar electric power installed in a grid-tied system up to $75,000 or 50% of system cost whichever is less.
  - **SRP** customers receive a rebate of $2.70 per watt of rated solar electric power installed in a grid-tied application up to $13,500 (declining incentive schedule through 4/30/15).

- **Arizona State Tax Credit**
  - 25% of solar system cost ($1000 max.)

- **Federal Tax Credit**
  - 30% of solar system cost (no limit)
Limitation of HOA Restrictions

Arizona Revised Statute 33-1816
Effective 9/19/07

- HOA can not prohibit the installation or use of solar energy panels, but can adopt reasonable rules regarding placement, provided the rules do not –
  - prevent the installation of the panels,
  - impair its function or restrict its use due to imposed location, or
  - adversely affect the cost or efficiency of the system
Without esthetic consideration of solar panel placement, panels requiring southern exposure could look like this lunar landing.
What would Scottsdale look like with a roofscape of solar panels?
Solar PV Submittal Guidelines

Residential Solar Plan Review
Quality Submittal Guidelines

This packet applies to roof-mounted solar photovoltaic and hot water systems only.

City of Scottsdale
One Stop Shop
7447 E. Indian School Road, Suite 105
480-312-2509

September 2009
Solar PV Panel Placement Design Guidelines

- South Facing Pitched Roofs
- North and East/West Facing Pitched Roofs
- Flat Roofs
Building Integrated PV Systems

SunPower SunTile is a roof-integrated solar tile for flat and S-Tile roofs.
Building Integrated PV Systems

Desert Mountain Residence, Scottsdale

Optima Biltmore Condo Project, Phoenix

Scottsdale Granite Reef Senior Center
Building Integrated PV Systems

Beaulieu Residence, Scottsdale
Next Steps

- **Setting benchmarks and identifying standards**
  - Above-code energy and green building programs raise the bar for new building standards and codes

- **New incentives and performance measures**
  - Develop suitable incentives and verification tools

- **Integration with planning and development process**
  - Establish framework for early consideration of sustainable design options
ASHRAE 189.1P
Standard for Green Building Design

- Design of High-Performance Green Commercial Buildings
  - provides minimum requirements for the design of sustainable buildings
  - 20-30% better than ASHRAE 90.1 - 2007
  - On-site renewable energy requirement
  - Energy measurement and verification
  - 20-40% reduction in water use
  - Publication due by March 2010

www.ashrae.org/publications/page/927
First integrated and regulatory framework for green commercial buildings

Designed to integrate and coordinate with the other International Codes

Voluntary systems have led market transformation and paved the way for a regulatory framework that includes specialized standards

Set for public release in March 2010
Transitional Tools

Short Term

- Promotion and Recognition
  - Community exposure and market differentiation
- Development Process Incentives
  - Expedited plan review
  - Reduced development fees
  - Feebates and rebates
- Voluntary Rating Systems
  - Market transformation
- Financial Incentives
  - Tax credits and exemptions
Institutional Tools

*Long Term*

- Development and Land Use Regulations
- Construction Standards and Codes
- Financing, Insurance and Property Value
  - Higher value for lower operating costs, durability and healthy interiors
  - Lower risks associated with healthy interiors, performance and durability
- Financial Incentives
  - Bonus densities
- Tax Structure
  - Tax Credits and exemptions

---

- Fireman’s Fund Insurance Company
  - A company of Allianz
    - Green Home Coverage
    - 5% credit to base premium for Green certified homes
Top Ten Green Building Trends to Watch in 2010

1. The smart grid and home energy monitor dashboards
2. Energy labeling for homes and office buildings
3. Buy-in to green building by the financial community
4. “Rightsizing” of homes
5. Eco-districts (walkable neighborhoods and accessible services)
6. Water efficiency
7. Carbon footprint calculations
8. Solar and Net Zero energy buildings
9. Building information modeling (BIM) software
10. Sustainable building education

Source: Earth Advantage Institute
For More Information

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Planning, Neighborhoods and Transportation Division
Green Building Program
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afloyd@scottsdaleaz.gov
480-312-4202
www.scottsdaleaz.gov/greenbuilding