

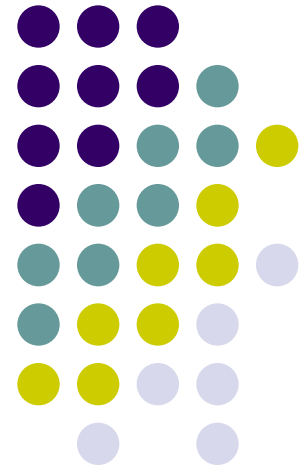
# Scottsdale Green Building Trends



## City of Scottsdale Green Building Program

March 4, 2016

Anthony Floyd, FAIA, LEED-AP  
City of Scottsdale  
Office of Environmental Initiatives





# City of Scottsdale Green Building Program

- **Established in 1998**
  - Rating criteria based on Sonoran Bioregion
- **Verification Process**
  - Integration with city plan review, permits and inspections
- **Public Outreach**
  - Green pre-apps with new permit applicants
  - Engagement with architects, builders, owners
  - Green Building Lecture Series
- **Periodic Updates**
  - Release of Green Home Rating Checklist v4.0





# Program Incentives

- **Scottsdale Green Building Designation**
- **Streamlined Documentation & Verification Process**
- **Technical and Permit Process Assistance**
- **No Green Building Application/Certification Fees**
- **Enhanced Market Niche**
  - city designation and listings
- **Promotion Material and Educational Programs**
  - logos, brochures, handouts, job site signs, lecture series



# Green Building Program Collaboration with other City Programs & Initiatives

1. General Plan Elements
2. Planning & Zoning Ordinances & Stipulations
3. Sensitive Design Principles
4. Energy Code
5. Water Conservation Ordinance
6. City Facility Management



SCOTTSDALE



# Green Building Lecture Series

- 1<sup>st</sup> Thursday of month
- Granite Reef Senior Center
- Average attendance - 30



## Sustainable Building in the Desert



November 6, 2014

### LEED for Homes, ENERGY STAR for Homes, and Scottsdale Green Building

Since 1998, over 1300 green homes have been certified under Scottsdale's green building program. What does this mean? Does it make a difference? Can we do better? Come hear about newly improved green building certification programs, their benefits and differences, including LEED for Homes, Energy Star, and Scottsdale's regionally derived program.

December 4, 2014

### Energy Disclosures in the Marketplace: Building Economic Value while Reducing Energy Costs

Energy efficiency is widely recognized as the most cost-effective way to reduce reliance on non-renewable fuel sources. While energy codes have made important strides over the last decade for new construction, benchmarking and disclosure programs have gained prominence for existing buildings. Hear about these programs and how they can drive the real estate market towards greater energy efficiency and value for existing homes and businesses.

February 5, 2015

### Edible Landscapes and Urban Gardening

Join urban gardeners as they share the benefits and how-tos of growing your own healthy food, herbs, edible flowers & fruit trees in our desert environment. Learn about our planting & harvesting seasons and how easy it is to raise chickens in your back yard. Find out about the wide range of community gardens available for you to participate in.

March 5, 2015

### Tiny House Movement

This is a social movement where people are downsizing the space they live in. Tiny Houses come in all shapes, sizes and forms but they focus on simplified living. People are joining this movement for many reasons, but the most popular reasons are because of environmental concerns, financial concerns and seeking more time and freedom. Hear from several local tiny house advocates about the choices they've made in pursuing tiny house living.

April 2, 2015

### Using Smart Technologies to Manage Energy and Water Use

Can energy dash boards, smart thermostats, integrated lighting controls and high efficiency plumbing fixtures make a difference? Hear about new and cutting-edge technologies that reduce our resource consumption, curtail our reliance on non-renewable resources, improve comfort/convenience, and lower utility costs.

May 7, 2015

### Cool Roofs in the Urban Desert

Did you know that 43% of all electricity consumed in Phoenix metro area homes is used for air conditioning? Cool roofs reduce energy use, ambient air temperature, air pollution, greenhouse gas emissions, and improve human health and comfort. Learn about cool roofing strategies from solar reflective surfaces to radiant barriers and attic ventilation techniques.

June 4, 2015

### Green Innovative Built Projects

Who are some of the local creative agents creating new building prototypes for the 21st century? What are the innovative features? Come see and hear about successes with innovative residential and commercial projects that exemplify principles of resource conservation, energy independence and healthy living.

Scottsdale  
Granite Reef  
Senior Center,  
located at  
1700 N. Granite  
Reef Road  
(NW corner of  
McDowell and  
Granite Reef)

7 to 8:30 pm

Free Admission

November 2014 to June 2015

# Scottsdale Building Trends

## 1998 – 2015

### ● Energy Efficiency

- Cathedralized attics (insulation at underside of roof decks)
- Amended 2006 Energy Code with 15% improved efficiency
- Energy Star certified products and LED lighting
- 2012 Energy Code with additional 10% improved efficiency

### ● Indoor Environmental Quality

- Outside fresh air intake for whole-house mechanical ventilation

### ● Water Efficiency

- Xeriscaping and efficient irrigation systems
- Efficient hot water delivery systems
- High efficiency plumbing fixtures

### ● Heat Island Mitigation

- Recessed entrances, shaded outdoor spaces and courtyards

### ● Solar Panel Systems

- Streamlined permit process for PV and hot water systems



# New Green Home Rating Checklist

## July 2015

### New Mandatory Baseline Measures in accord with Changing Codes, Industry Standards and the Market

SCOTTSDALE



GREEN BUILDING  
PROGRAM

City of Scottsdale

#### Green Home Rating Checklist

New Construction, Major Remodels & Additions

Version 4.0 (July 2015)

Plan Check # \_\_\_\_\_ Building Permit # \_\_\_\_\_ GB Rating \_\_\_\_\_

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) not more than three stories in height with a separate means of egress (International Residential Code - IRC Section R101.2).

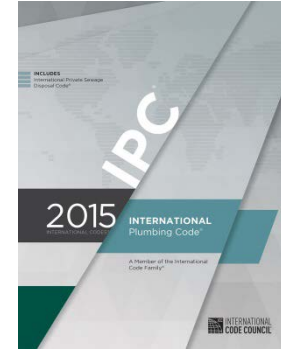
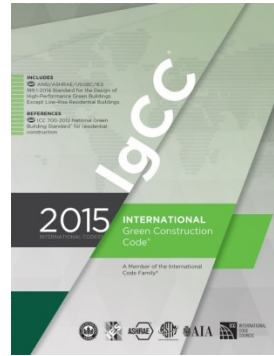
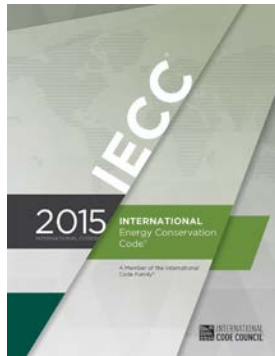
All building system components, materials, and equipment must be installed per code and manufacturer's instructions.

Tier 1 - Baseline GB Designation	Tier 2 - Advanced GB Designation
<ul style="list-style-type: none"> <li>Meet all <u>30 mandatory measures</u> (p. 2 – 7).</li> </ul>	<ul style="list-style-type: none"> <li>Meet all <u>30 mandatory measures</u> (p. 2 – 7).</li> <li>Accumulate <u>30 or more points</u> from the rated options in the checklist (p. 8 - 17).</li> </ul>

#### Advanced Level - Rating Categories and Maximum Available Points

1. Site	12 pts	6. Lighting and Power	6 pts	11. Doors, Cabinetry, Trim	10 pts
2. Structural Elements	21 pts	7. Plumbing System	5 pts	12. Flooring	8 pts
3. Energy Rating/Renewables	33 pts	8. Roofing	11 pts	13. Solid Waste	6 pts
4. Thermal Envelope	7 pts	9. Exterior Finishes	5 pts	14. House Size	+/- varies
5. HVAC	16 pts	10. Interior Finishes	4 pts	15. Innovative Design	8 pts

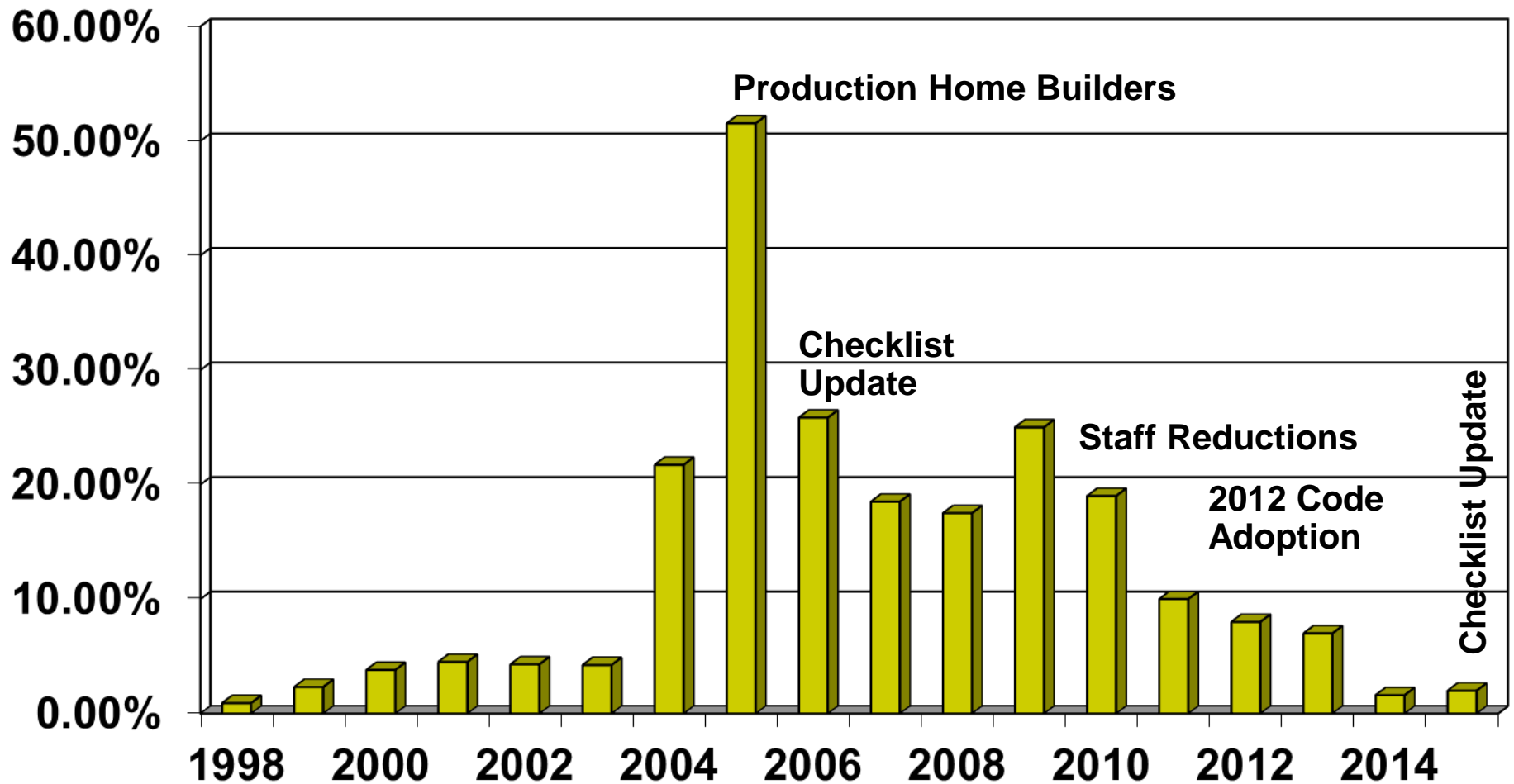
# Adoption of 2015 Building Codes



- **Code Amendments related to energy efficiency, water conservation and indoor environmental quality**
  - International Energy Conservation Code (IECC)
  - International Green Construction Codes (IgCC)
  - International Residential Code (IRC)
  - International Plumbing Code (IPC)
- **Letter of Support received from the Environmental Quality Advisory Board (EQAB) in June 2015**
- **Awaiting council action - expected effective date 7/1/16**



# Percentage of Green Single Family Permits 1998 - 2015



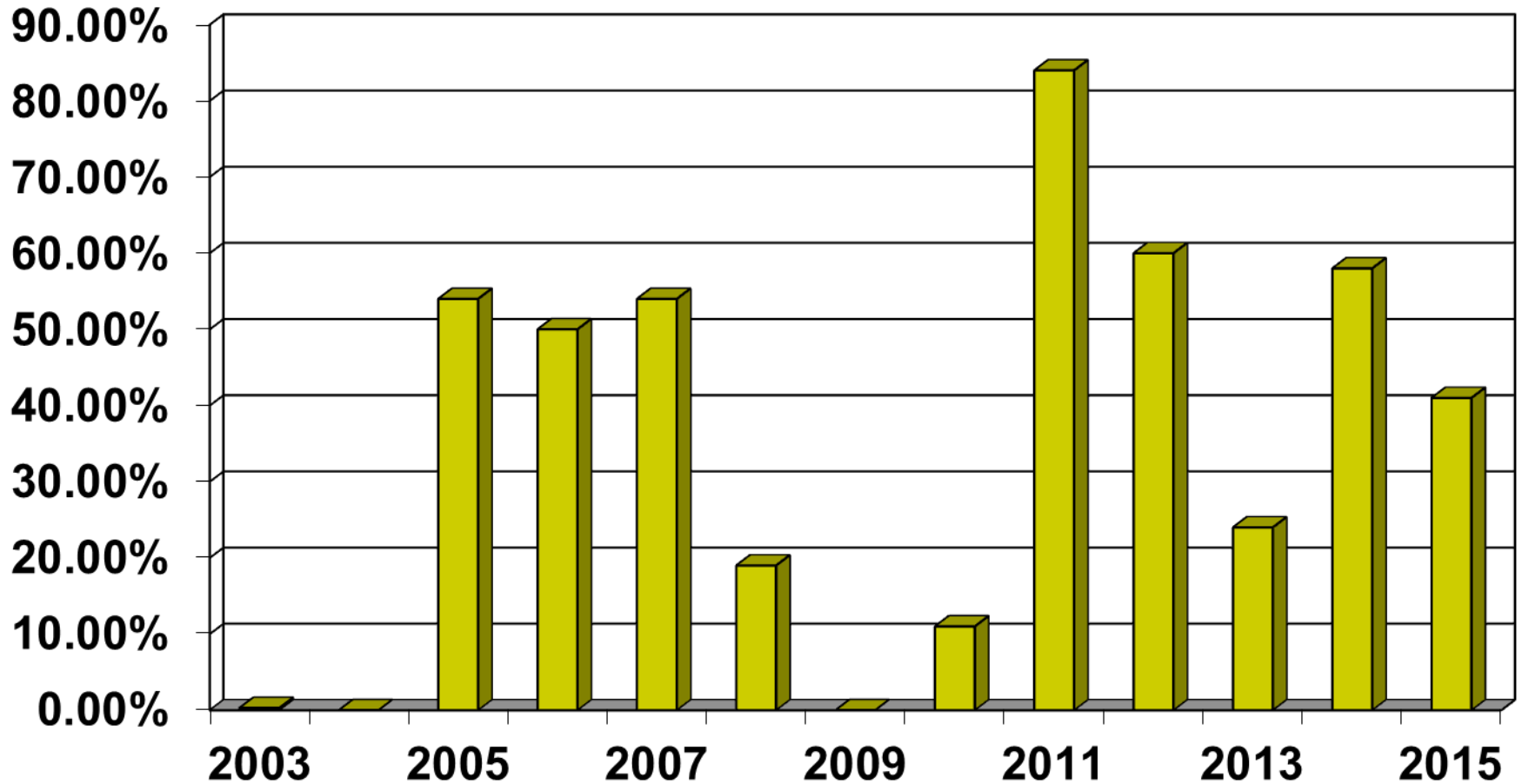
Source: Scottsdale CDS records

# Green Single Family Permits (1998 - 2015)

Year	Total Permits	Green Permits	Percentage of Total Permits
1998	2172	20	1%
1999	1554	36	2%
2000	1076	41	4%
2001	843	38	5%
2002	768	33	4%
2003	896	38	4%
2004	1137	247	22%
2005	852	439	52%
2006	685	177	26%
2007	573	106	19%
2008	200	35	18%
2009	121	30	25%
2010	149	28	19%
2011	155	15	10%
2012	265	21	8%
2013	400	26	7%
2014	440	7	1.6%
2015	438	9	2%
<b>Total</b>	<b>12,724</b>	<b>1,346</b>	<b>11%</b>

Source: Scottsdale CDS records

# Green Multifamily Dwelling Unit Permits 2003 - 2015

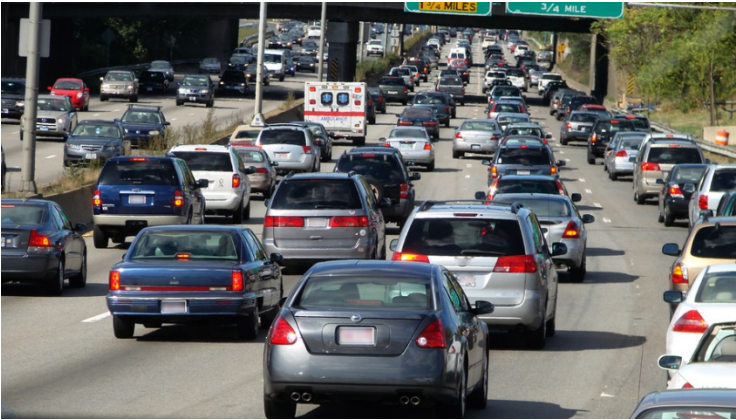


Source: Scottsdale CDS records

## Green Multifamily Dwelling Unit Permits (2003 - 2015)

Year	Total Permits	Green Permits	Percentage of Total Permits
2003	1,500	5	<b>0.3%</b> Includes 5 units at Loloma 5 Townhomes
2004	1,025	0	<b>0%</b>
2005	483	261	<b>54%</b> Includes 253 units at Optima Camelview Village, 8 units at The Duke Earll Drive Townhomes
2006	743	373	<b>50%</b> Includes 299 Optima Camelview Village units, 74 units at Safari (non-green units include Waterfront Towers, Monterey, Barolo)
2007	621	335	<b>54%</b> Includes 198 Optima Camelview Village units, 96 at Corriente, 38 at Safari, 3 at Engle Villas Desert Park Village (non-green units include 17 at Waterfront Towers, 6 at Canavest, 6 at Hancock, 8 at Eagles Pass, 93 at Artesia, 18 at Villa Contendo, 36 at Paseo Village, 100 at Sage, 2 at Clayton)
2008	402	76	<b>19%</b> Includes 56 Optima Camelview Village units, 8 at Engle Villas at Desert Park Village, 10 at Upton, 2 at Safari (non-green units include 68 Silverstone apartments, 16 at Encore Grayhawk, 9 at Artesia, 18 at Wilshire, 7 at Courtyards at Desert Park, 2 at Hancock, 3 at Residences on Main, 203 at Classic Residences at Silverstone)
2009	24	0	<b>0%</b> (non-green projects include 5 at 6 <sup>th</sup> Street Lofts, 8 at Encore Grayhawk, 8 at Courtyards at Desert Park, 3 at Hancock)
2010	264	29	<b>11%</b> Includes 28 Optima Camelview Village units, 1 Meritage model (non-green projects include 118 at Princess Maravilla Casitas, 14 at Courtyard Desert Park, 12 at Encore Grayhawk, 80 at Ten Lofts, 11 misc.)
2011	301	254	<b>84%</b> Includes 210 Optima Sonoran I units, 44 at Optima Camelview Village (non-green projects include 39 at Princess Maravilla Casitas, 8 at Encore Grayhawk)
2012	1,024	613	<b>60%</b> Includes 325 SkySong units, 264 at Broadstone Lincoln, 24 at Corriente (non-green projects include 388 at TDI One Scottsdale)
2013	2,128	507	<b>24%</b> Includes 200 Optima Sonoran II units, 259 at Broadstone Waterfront, 48 at Corriente (non-green projects include 416 at Mark Taylor on McDowell, 369 at Portales, 303 at TDI One Scottsdale, 49 at Sage, 220 at Archstone DC Ranch, 240 at Liv North, 24 at Pinnacle Point/Eagle Pass)
2014	1,798	1,033	<b>58%</b> Includes 202 units at Optima Sonoran Village II; 267 at Scottsdale Quarter Crescent ; 556 at Clayton Apartments; 8 at Project MZ
2015	471	195	<b>41%</b> Includes 6 units at First Avenue Townhomes; 89 at Envy Condos; 97 at Inspire on Earll Condos
<b>Total</b>	<b>10,784</b>	<b>3,681</b>	<b>34%</b>

# Environmental Results - 2015



Equivalent of **6,774 cars** removed from the street as a result of energy savings of **1,346 green homes**



# Energy Savings and Environmental Impact Reduction of Scottsdale Green Homes

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

Green Home Energy Measures	Energy Savings and Pollution Reduction	
	Per Home	Total Savings for 1,346 green homes in 2015
<b><u>Average Custom Home</u><sup>1</sup></b>	<b>5,500 square feet</b>	
<b>Average Annual Energy Reduction<sup>1</sup></b>	34,670 Kilowatt-hours (kWh) per year	46,665,820 Kilowatt-hours (kWh)
<b>Average Annual Energy Cost Savings</b>	<b>\$4,147.53 per year</b> (0.1196 per kWh) <sup>2</sup>	<b>\$5,581,232.07</b> (0.1196 per kWh) <sup>2</sup>
<b>Equivalent Annual Greenhouse Gas Reduction<sup>3</sup></b>	26.4 tons of carbon dioxide (CO <sub>2</sub> )	35,471 tons of carbon dioxide (CO <sub>2</sub> ) avoided
<b>Equivalent Passenger Vehicles removed from Street<sup>3</sup></b>	5 cars	6,774 cars

Sources: <sup>1</sup>Scottsdale Green Home Energy Study (2009); <sup>2</sup>[electricitylocal.com/states/arizona/scottsdale](http://electricitylocal.com/states/arizona/scottsdale); <sup>3</sup>[epa.gov/energy/greenhouse-gas-equivalencies-calculator](http://epa.gov/energy/greenhouse-gas-equivalencies-calculator)

# Energy Savings and Environmental Impact Reduction of Scottsdale Green Homes

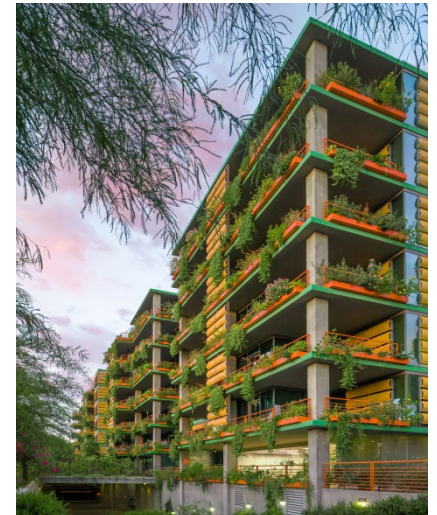
Estimated energy savings and equivalent greenhouse gas reduction resulting from houses completed under the Green Building Program.

Green Home Energy Measures	Energy Savings and Pollution Reduction	
	Per Home	Total Savings for 1,346 green homes in 2015
<b><u>Small Custom Home</u><sup>1</sup></b>	<b>2,700 square feet</b>	
<b>Average Annual Energy Reduction<sup>1</sup></b>	14,390 Kilowatt hours (kWh) per year	19,368,940 Kilowatt hours (kWh)
<b>Average Annual Energy Cost Savings</b>	<b>\$1,721.04 per year</b> (0.1196 per kWh) <sup>2</sup>	<b>\$2,316,525.22</b> (0.1196 per kWh) <sup>2</sup>
<b>Equivalent Annual Greenhouse Gas Reduction<sup>3</sup></b>	10.9 tons of carbon dioxide (CO <sub>2</sub> )	14,722 tons of carbon dioxide (CO <sub>2</sub> ) avoided
<b>Equivalent Passenger Vehicles removed from Street<sup>3</sup></b>	2.1 cars	2,812 cars

Sources: <sup>1</sup>Scottsdale Green Home Energy Study (2009); <sup>2</sup>[electricitylocal.com/states/arizona/scottsdale](http://electricitylocal.com/states/arizona/scottsdale); <sup>3</sup>[epa.gov/energy/greenhouse-gas-equivalencies-calculator](http://epa.gov/energy/greenhouse-gas-equivalencies-calculator)

# Scottsdale Commercial Projects - 2015

- **Projects approved under the International Green Construction Code (IgCC)**
  - SkySong Residential
  - Optima Sonoran Village, phase II
  - Scottsdale Quarter Crescent Apartments
  - Scottsdale Quarter Office and Retail
  - Douglas Townhomes





# Scottsdale's First Energy Star Certified City Building



2015

In recognition of superior energy performance,  
the U.S. Environmental Protection Agency awards  
the ENERGY STAR® to

**Airport Business Center**

Buildings that earn EPA's ENERGY STAR use 35 percent  
less energy and generate 35 percent fewer greenhouse  
gas emissions than similar buildings across the nation.



  
\_\_\_\_\_  
Jean Lupinacci  
Director, ENERGY STAR Commercial & Industrial Branch

June 04, 2015

\_\_\_\_\_  
Date



# Office of Environmental Initiatives

Community and Economic Development

Green Building Program

Anthony Floyd, FAIA, LEED-AP

[afloyd@scottsdaleaz.gov](mailto:afloyd@scottsdaleaz.gov)

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