

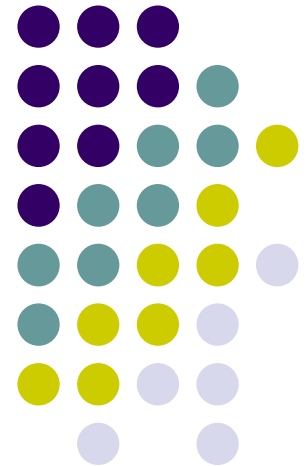
Green Building Progress Report 2009



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

2009 Quarter	Total SF Permits	Green SF Permits	Percentage of Total Permits
1 st	21	5	24%
2 nd	24	6	25%
3 rd	31	11	36%
4 th	45	8	18%
Total	121	30	25%

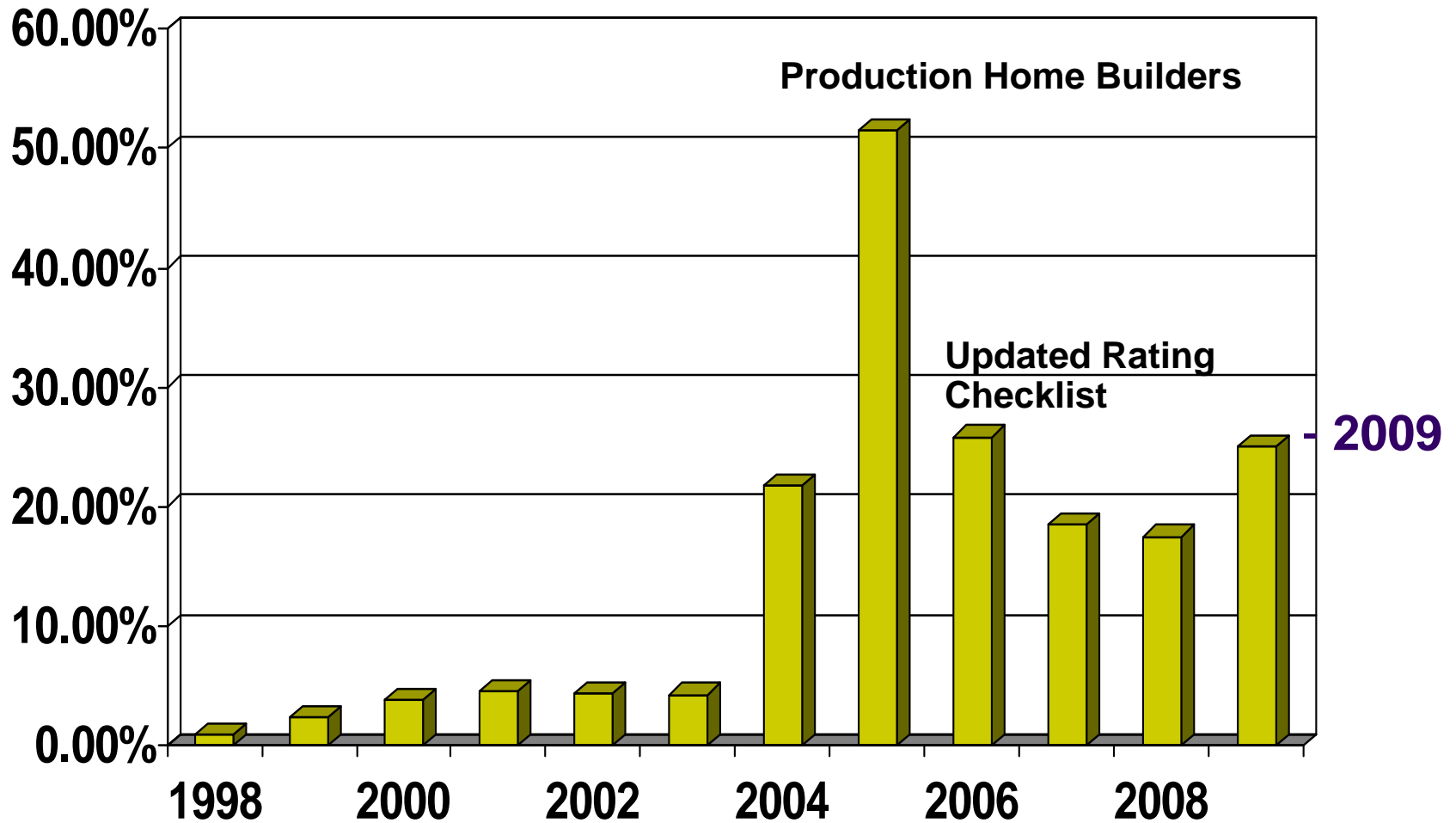
Source: Scottsdale CDS records

Green Single Family Permit Activity (1998 - 2009)

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%
Total	10,877	1,240	

Source: Scottsdale CDS records

Green Single Family Permit Activity



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

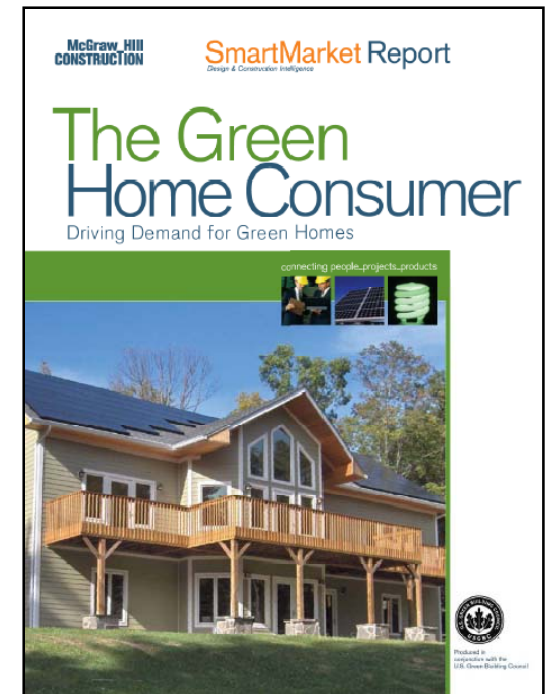
Estimated energy savings and equivalent greenhouse gas reduction resulting from houses completed under the Green Building Program.

Energy Measures	Savings and Pollution Reduction	
	1998 to 2009	
	Per Home	Annual Cumulative Savings for 1,240 homes
Sample Home Size	3,800 square feet	
Average Annual Energy Reduction	2,830 Kilowatt hours (kWh) per year	42,110,400 Kilowatt hours (kWh)
Average Annual Energy Savings	\$283 per year	\$4,211,040
Annual Greenhouse Gas Reduction	2,700 pounds of carbon dioxide (CO ₂)	40,176,000 pounds of carbon dioxide (CO ₂) avoided
Equivalent Cars removed from Street	1/5 the annual emission of an average car	annual emission of 2,976 average cars

Smart Market Report: The Green Home Consumer

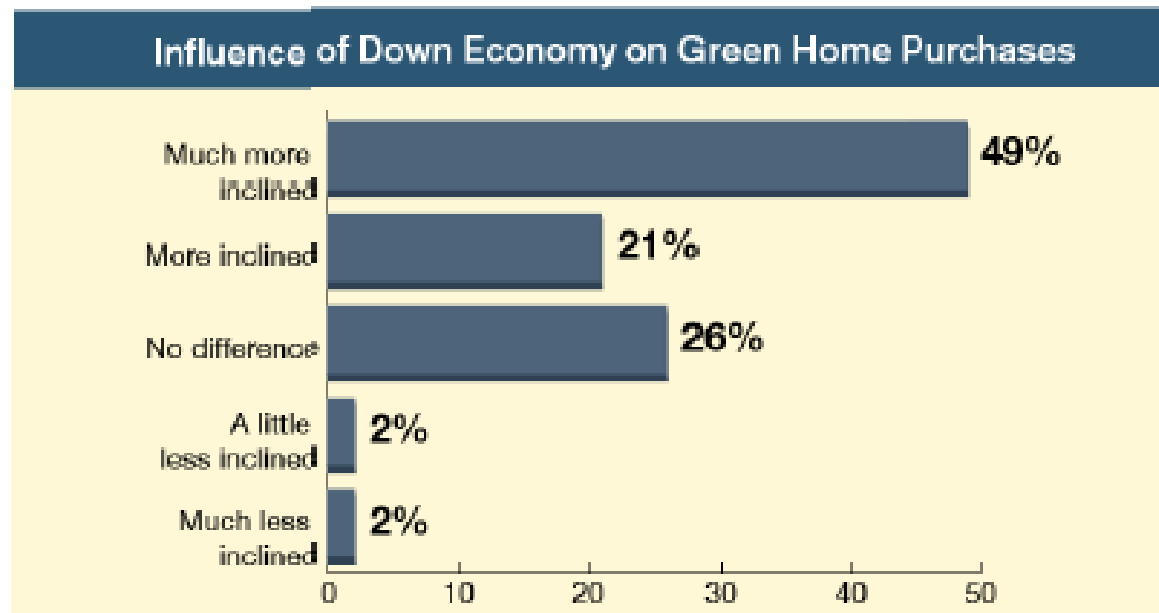
- Surveyed one million U.S. households
- **80% of respondents** believe green homes are more economical, offer better and healthier places to live
- **“Making homes greener** is now the number one reason for home improvement (42%) over remodeling for comfort reasons (34%) or to improve appearance (24%)”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

August 6, 2009

Prepared by the
Residential Green
Building Committee,
USGBC Arizona
Chapter



Program Measures	LEED for Homes	ICC 700/NAHB	City of Scottsdale Green Building Program	Pima County Regional Residential GB Program	Coconino County Sustainable Building Program
Entry certification level	Certified	Bronze	Entry Green Building	Bronze	Entry Level
Consensus built	USGBC process	ANSI process	Scottsdale GB Advisory Committee & Open Meeting Law process	Pima County GB Advisory Committee & Open Meeting Law process	Coconino County Sustainable Building Advisory Committee
Third Party certification	Yes, and legally binding accountability form signed by Builder for unverifiable field items	Yes	Yes, field verifiable items done by bldg. inspectors; Certificate of Completion req'd for unverifiable field items (i.e. – recycled content, zero VOC)	Yes, field verifiable items done by bldg. inspectors; Submittal req'd for unverifiable field items (i.e. – recycled content, zero VOC)	Yes, certification done by selected Coconino County Sustainable Building Advisory Committee Members
Energy: Key Measures - Energy Star or equivalent - 3 rd party performance test - Meet code	Mandatory Mandatory Yes	Optional (points) Optional (points) Not in CA	Mandatory Mandatory (10/09) Yes	Mandatory Mandatory Yes	Optional (points) Optional (points) Yes
Water: Key Measures - Types of measures - High-efficiency water fixtures	Indoor and outdoor Points only for total home compliance	Indoor and outdoor Points per fixture	Indoor and outdoor Mandatory for indoor; Points for outdoor	Indoor and outdoor Points per fixture	Indoor and outdoor Some mandatory, some optional (points)
IEQ: Key Measures - MERV 8 filters - No unsealed/unvented combustion appliances - No air handling equip. in garage	Mandatory Mandatory Mandatory	Optional (points) Optional (points) Optional (points)	Mandatory Mandatory Mandatory	Optional (points) Optional (points) Optional (points)	N/A Optional (points) Optional (points)
Materials: Key Measures - Construction waste mgmt plan - Minimize excess lumber in framing - Storage and collection of recyclables	Mandatory Mandatory (max of 10% excess for home compliance) N/A	Optional (points) Points available per framing area N/A	Optional (points) Optional (points) Mandatory (recycling area in or near kitchen)	N/A Options (points) available per framing technique Optional (points)	Optional (points) Optional (points) Optional (points)
Site: Key Measures - Erosion controls during constr. - Landscaping measures - Protected entrances	Mandatory Mandatory N/A	Optional (points) Optional (points)	Optional (points) Mandatory Mandatory (protection from direct summer sun)	Mandatory Optional (points) Enclosed Vestibule (points)	Optional (points) Optional (points) Optional (points)
Program Fees - Single family home - Production homes	Members: \$375/unit Members: \$107/unit	Members: \$200/unit Members: \$200/unit	No fees No fees	No fees No fees	No fees No fees
Verification Fees	TBD by market	TBD by market	Other than city inspections, TBD by market	No fees if participating in utility energy program, or using prescriptive path	No fees



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

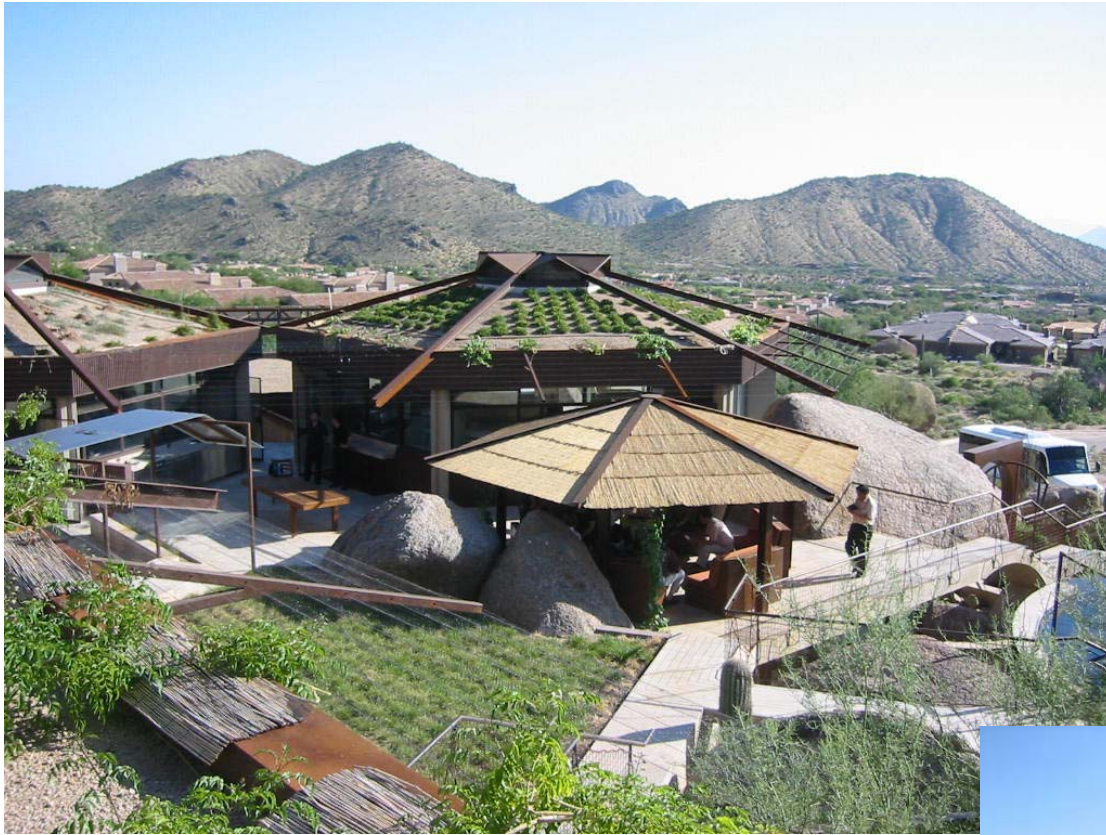
Daylighting, solar control
energy efficient building envelope





Strata International – 2005

Saebi Alternative Building System – Load bearing foam foundation, walls and roof



Scottsdale's
Highest Rated Green Home

Beaulieu Residence - 2006

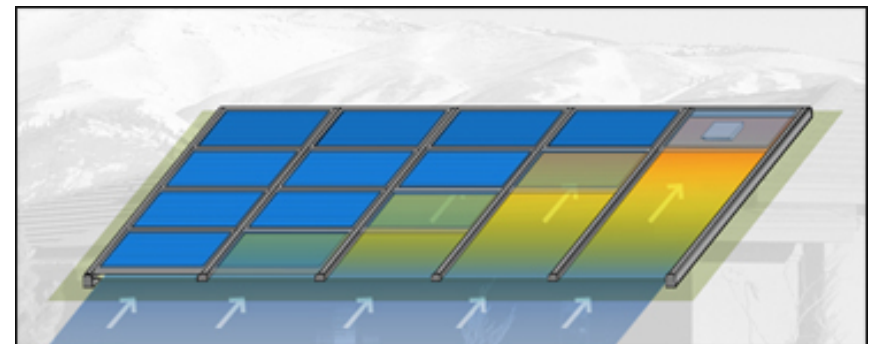
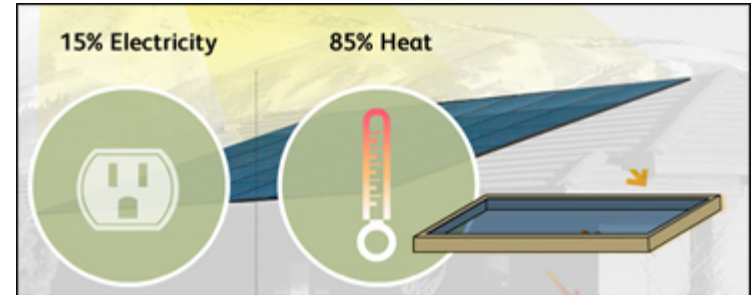
Earth sheltered, renewable energy,
passive cooling, vegetated roofs,
site integration, outdoor living,
indoor natural ventilation,
gray water recycling





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



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

Granite Reef Senior Center



Gabor Lorant Architects

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



Weddle Gilmore Architects

B. Timmerman

Scottsdale Green Building Program Rating - 2007

Rammed earth, PV, graywater, rainwater harvesting, pervious paving

Downtown Fire Station 2



LEA Architects

Scottsdale's 1st LEED Platinum certified city facility - 2009

Solar, cool tower, graywater, rainwater harvesting, pervious paving

DSAA / DWL Architects



J. Jones

Appaloosa Library - 2009

Weddle Gilmore Architects



C. Brown

**Gateway Access
Trailhead Building - 2009**



Richard + Bauer Architects

Arabian Library – 2008/2009 certification



SkySong

ASU Scottsdale Innovation Center



SkySong - 2009
Phase I & II Office Buildings





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

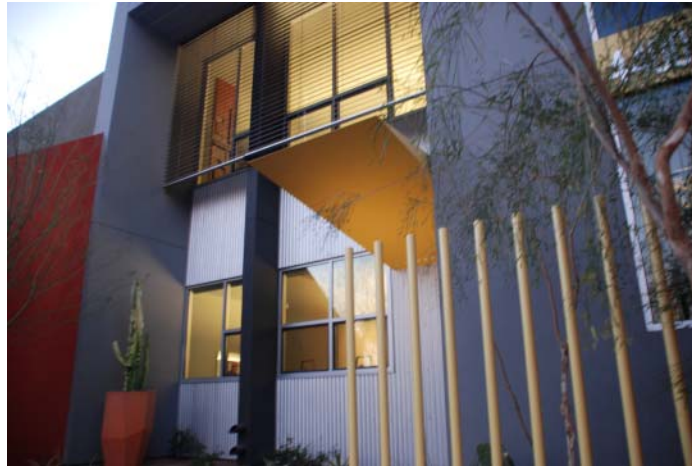




John Douglas Architecture Office

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





Green Building Program

- 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



SCOTTSDALE
GREEN BUILDING PROGRAM
City of Scottsdale
Green Building Lecture Series

Green Building advocates responsible use of our natural resources in the design and construction of our built environment. Each lecture will address one of the many Green Building topics that demonstrate energy/resource efficient, healthy, and environmentally responsible building practices.

Presented By:
City of Scottsdale Green Building Program

1st Thursday Each Month
7-9 PM

Location:
Granite Reef Senior Center
1700 N. Granite Reef Rd.
Scottsdale, AZ

Information:
Scottsdale Green Building Program
(480) 312-7942

Website:
www.scottsdaleaz.gov/greenbuilding

Subscribe to:
Green Building Events
Go to
www.scottsdaleaz.gov/listserve

Green Building

Lecture Series Schedule

FALL / WINTER / SPRING 2008-2009

Free Monthly Lecture Series

Date	Topic
September 4, 2008	Choosing Green: An Intro to Energy Efficient, Sustainable, Healthy Homes An overview of the green building practices including options, benefits, strategies, materials and rating criteria appropriate for the Sonoran Desert.
October 2, 2008	Home Improvements and Green Remodeling Learn about environmentally responsible and healthy remodeling practices that support sustainable desert living.
November 6, 2008	Natural, Recycled & Reclaimed Building Materials Regional materials that are compatible with our harsh desert environment, abundant, rapidly renewable, and support the local economy. Learn about opportunities to reuse quality materials and divert waste from our landfills.
December 4, 2008	Resource Efficient Wall and Roof Systems Resources efficient building systems that conserve energy and preserve our natural resources.
February 5, 2009	Building Science: The system approach to Energy Efficiency Learn about the principals of heat flow to create an energy an energy-efficient, safe, comfortable and healthy home. Hear about diagnostic tests used to locate energy performance problems.
March 5, 2009	Interiors and Indoor Environmental Quality Indoor air pollutants can be six times higher than outdoor air. This lecture will address strategies for minimizing indoor pollutants including material selection, ventilation, and filtration.
April 2, 2009	Water Efficiency in the Sonoran Desert An overview of water conservation practices, including indoor plumbing fixtures, xeriscape, gray water & rainwater harvesting.
May 7, 2009	Innovative Green Built Projects in the Phoenix/Scottsdale Area Learn about innovative projects that excel from the synergistic benefits of energy efficiency, renewable resources, water efficiency, and climatic responsive design.
June 4, 2009	GREEN Feng Shui With growing interest in Feng Shui and Green Design knowing about a new approach that blends all of them is very appealing to design enthusiasts. This lecture will highlight design strategies and info incorporating feng shui basics and green design.

- **Green Building Lectures**
 - 1st Thursday of each month
 - avg. attendance is 45
- **Solar Lectures**
 - 3rd Thursday of each month
 - avg. attendance is 25



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.

<u>Entry Level</u>	<u>Advanced Level</u>
<ul style="list-style-type: none"> Meet all mandatory measures and adjust rating for house size (p. 2 – 7). Accumulate <u>50 - 99 points</u> from the rating checklist (p. 8 – 26). 	<ul style="list-style-type: none"> Meet all mandatory measures and adjust rating for house size (p. 2 – 7). Accumulate <u>100 or more points</u> from the rating checklist (p. 8 – 26).

<u>Summary of Rating Categories</u>		
1. Site	6. Electrical Power, Lighting, Appliances	11. Interior Doors, Cabinetry, Trim
2. Structural Elements	7. Plumbing System	12. Flooring
3. Energy Rating/Performance	8. Roofing	13. Solid Waste
4. Thermal Envelope	9. Exterior Finishes	14. Innovative Design
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

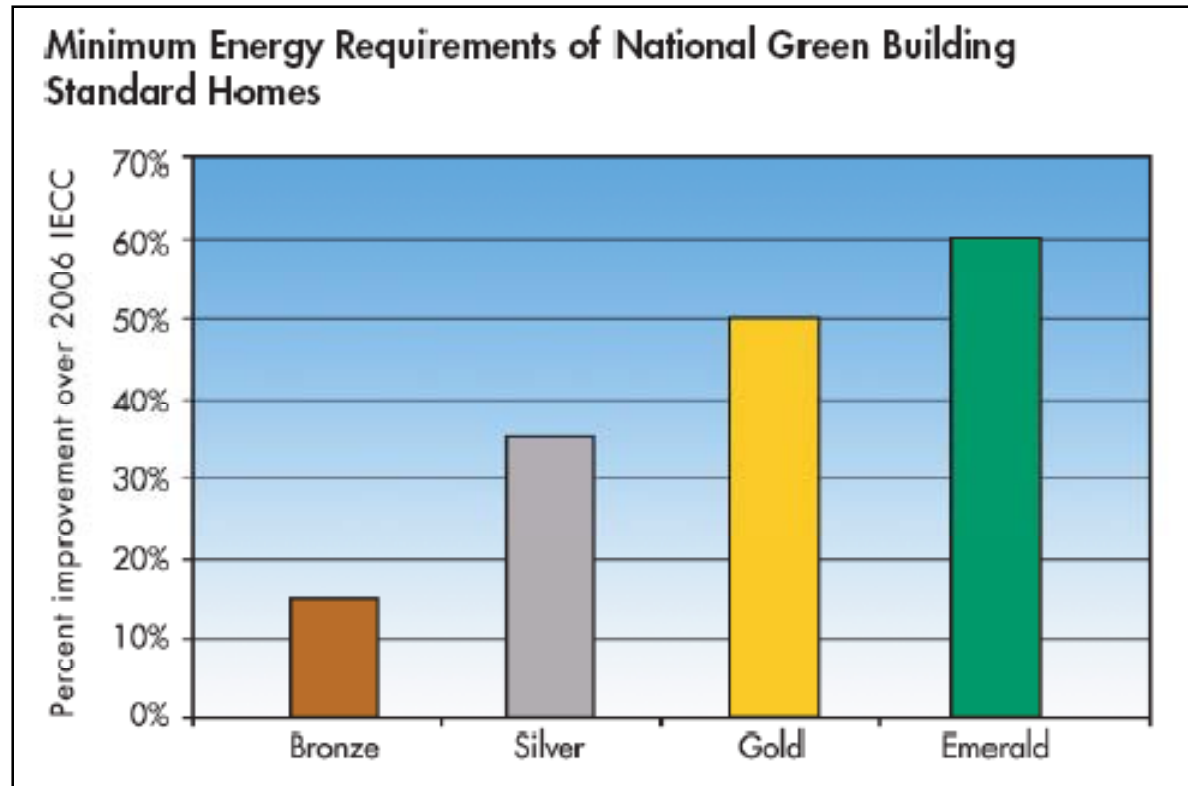
Source: Scottsdale CDS REScheck records



NAHB/ICC 700

National Green Building Standard

Requires 15 to 60% Energy Reduction



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)



Energy Efficiency Trends

Annual Cost Savings

- 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)



Energy Efficiency Trends

Cost Neutral Point

- 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:



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](#)  [EXIT](#)  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](#)  [EXIT](#)  provides guidance for the credit for building energy efficient homes other than manufactured homes.
- [IRS Notice 2006-28](#)  [EXIT](#)  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 1/5 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 \$.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.

- [IRS Notice 2006-52 \(6/2/2006\)](#) [EXIT ↗](#) provides guidance on deduction for energy efficient commercial buildings.
- [IRS Notice 2008-40 \(4/7/2008\) - Amplification of Notice 2006-52](#) [EXIT ↗](#)
- [Qualified Software for Calculating Energy Savings](#) [EXIT ↗](#)
- [Commercial Building Tax Deduction Coalition](#) [EXIT ↗](#)
- [Brochure: Commercial Energy Efficiency Incentives \(TIAP — May 2009, 2 pages\)](#) [EXIT ↗](#)

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

Project	Completion Date	Size (sq. ft.)	Governing Building Code (at time of permit)	Energy Audit, Performance Testing and Rating (8/09 to 1/10)
Becker Residence (exterior insulated masonry wall construction)	8/02	2,654	UBC 1997	HERS Index - 73 27% better than 2006 IECC
Loloma 5 Town Homes (exterior insulated masonry & wood frame construction)	10/04	1,612	UBC 1997	HERS Index - 76 24% better than 2006 IECC
McDonnell Infill Office/Residence (exterior insulated masonry wall construction)	12/04	2,241	UBC 1997	HERS Index - 61 39% better than 2006 IECC
Krahman/Wallenmeyer Residence (exterior insulated wood frame wall construction)	8/08	5,508	IRC 2003	HERS Index - 10 (65 w/o solar) 90% better than 2006 IECC
Moore Remodel (exterior insulated masonry wall construction)	1/10	1,842	IRC 2003	HERS Index - ____ ____% better than 2006 IECC



Becker Residence



Krahman/Wallenmeyer Residence



McDonnell Infill Office/Residence



Loloma 5 Town Homes



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.

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.

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.





Solar Permits - 2009

Solar Demand Grows Despite the Recession

2009 Quarter	Solar Electric PV Permits	Solar Hot Water Permits	Total Permits
1 st	30	18	48
2 nd	51	21	72
3 rd	70	36	106
4 th	86	51	137
Total	237	126	363

Source: Scottsdale CDS permit records

Solar Permits 2001 to 2009

Solar Demand Grows Despite the Recession

Solar Electric (PV)

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
No. of Permits	1	2	3	13	10	20	28	47	237

Solar Hot Water

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
No. of Permits	-	-	-	-	0	1	7	40	126

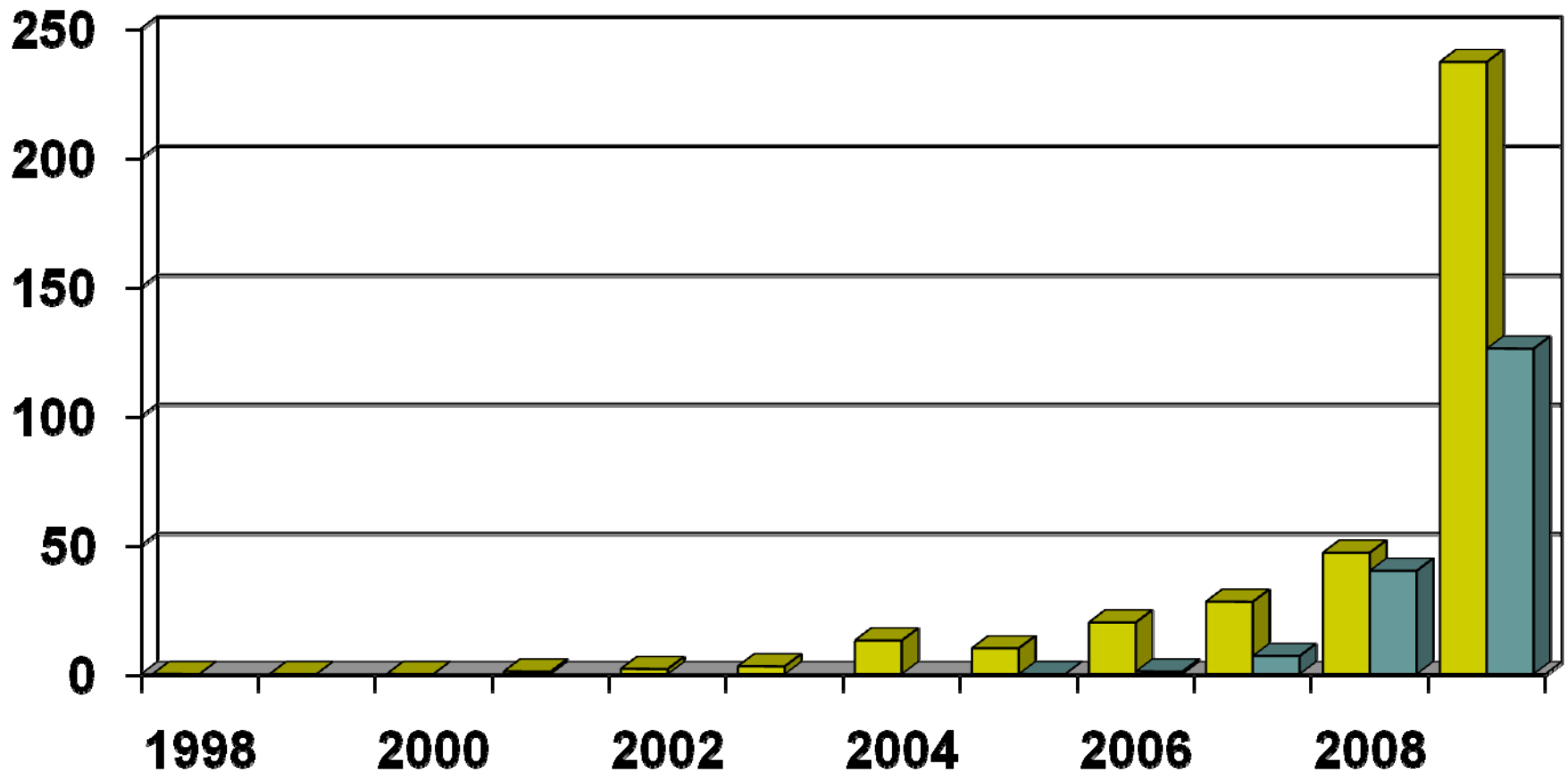
Source: Scottsdale CDS permit records

Solar Permits 2001 to 2009

Solar Demand Grows Despite the Recession

■ **PV** ■ **Hot Water**

2009



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



Source: “The United States PV Market Through 2013: Project Economics, Policy, Demand and Strategy,” - GTM Research

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-Humbolt

*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

Solar Design Guidelines



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

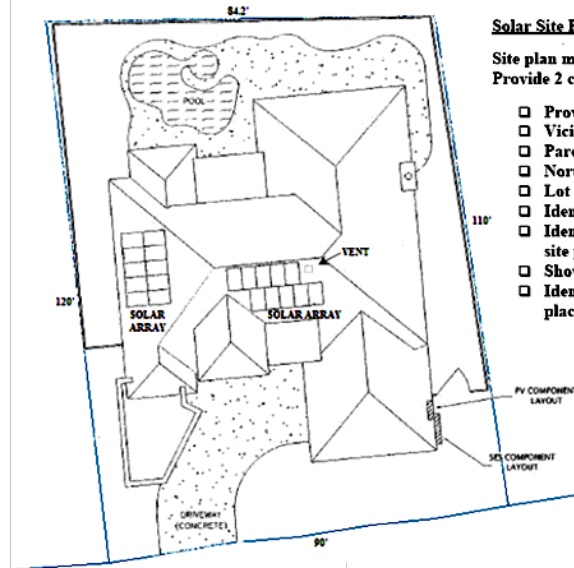


This packet applies to roof-mounted solar photovoltaic and hot water systems only.

City of Scottsdale
One Stop Shop
7447 E. Indian School Road, Suite 105
480-312-2500

September 2009

SOLAR SITE PLAN CHECKLIST/EXAMPLE

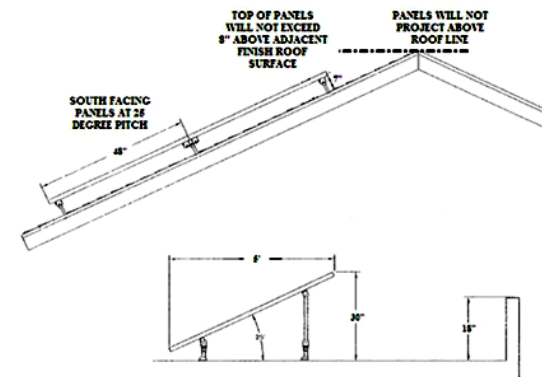


Solar Site Plan Checklist:

Site plan must be legible, show entire lot, and be proportional in scale. Provide 2 copies of site plan.

- ☐ Provide Zoning
- ☐ Vicinity Map
- ☐ Parcel # (APN), lot & subdivision
- ☐ North Arrow
- ☐ Lot dimensions
- ☐ Identify street
- ☐ Identify easements (i.e. NAOS or drainage easement—represent on site plan with dashed lines)
- ☐ Show all ridge lines, and/or parapets
- ☐ Identify all vents, chimneys, or other apparatus that may affect placement of panels

SOLAR ELEVATION EXAMPLE





City of Scottsdale
Green Building Program
 "Sustainable Building in the Sonoran Desert"

**SOLAR PANEL PLACEMENT DESIGN GUIDELINES
 FOR SINGLE FAMILY HOMES**

The following guidelines are to be used in the design and placement of solar panels (photovoltaic and solar thermal systems) on pitched and flat roofs of single-family dwellings for the purpose of compatible design. With a little foresight and planning, a solar system can be effectively integrated into the design of new and existing roofs. Those projects which comply with the design guidelines qualify for over the counter plan review. All other proposals will be required to be submitted for plan review.

A. South Facing Pitched Roofs (within 45° east or west of due south)

- 1) Solar panels should be low profile and parallel with the plane of the pitched roof.
- 2) Top of the panels should not exceed 8 inches above the adjacent finish roofing surface (e.g. - tile, shingles). Panels should not project above the roof ridge line.
- 3) Placement of panels should be uniform. Consider the panels as part of the overall roof configuration. Match the shape and proportions of the array with the shape and proportions of the roof.
- 4) Color of panel frames and support structure should be neutral and compatible with roof surface color (exposed frames and components should have a non-reflective surface).



- + Per guidelines
 - Not per guidelines

- **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



Illuminating
ENGINEERING SOCIETY

www.ashrae.org/publications/page/927

International Green Construction Code

- 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



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



Office of Environmental Initiatives

Planning, Neighborhoods and Transportation Division

Green Building Program

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480-312-4202

www.scottsdaleaz.gov/greenbuilding