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  - Incentives and mandates
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  - Outreach
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2007 Study of Green Building Programs

- Examines growth and effectiveness of Green Building Policies in cities
Local and State Governmental Programs

- Arkansas
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- Georgia
- Hawaii
- Illinois
- Maine
- Maryland
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- New Mexico
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- North Carolina
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- Vermont
- Virginia
- Washington
- Washington, DC
- Wisconsin
2007 Study of Green Building Programs

- Ninety-two cities have green building programs, or 14 percent of all cities with a population greater than 50,000.
- Thirty-nine percent or about 42 million Americans live in cities with green building programs.
Green Building Programs in Cities with a Population over 50,000
U.S. Cities with Green Building Programs
Strategies for Transforming Building Practices in the Private Sector

- Policies that Establish Green Building Requirements
- Policies that Provide Expedited Review for Green Building Projects
- Policies that Provide Direct Financial Incentives for Green Building Projects:
  - Grants, Fee Waivers, Tax Breaks and Bonus Development

Environmental Law Institute
Local and State Ordinances

- **Public Facilities**
  - mandate to meet LEED or equivalent green building rating benchmark
  - lead by example

- **Private Development**
  - incentives and mandates
Local Government Sustainability Programs

- Sustainable Practice Categories
  - Environmentally Preferable Purchasing
  - Planning and Transportation
  - Landscape Management
  - Building Practices
  - Waste Management
Green Building Program

Sustainable Building in the Sonoran Desert

- Climatic and geographic characteristics are unique to the region.
- Utilization of local resources such as solar for energy and daylighting.
- Regional materials.
Green Building Program

- Voluntary participation
- Qualification criteria
- Oversight by Green Building Advisory Committee
  - program criteria, education, outreach
Integration with Development Process

- Planning and Development
  - Development Review Process
  - Plan Review and Inspections
- Building and Energy Codes
  - IBC, IRC, IECC
Incentives

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

1. Project Qualification
2. Plan Review & Permitting
3. Inspections
4. Certificate of Occupancy
Rating Checklist

- **Mandatory Items** (28 requirements)
- **Rating Options**
  - 135 total options with 270 max. possible points
- **Rating Levels**
  - Entry Level – 50 to 100 points
  - Advanced Level – 100 to 200 points
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>• Meet all mandatory measures and adjust rating for house size (p. 2 – 7).</td>
</tr>
<tr>
<td>• Accumulate <strong>50 - 99 points</strong> from the rating checklist (p. 8 – 26).</td>
<td>• Accumulate <strong>100 or more points</strong> from the rating checklist (p. 8 – 26).</td>
</tr>
</tbody>
</table>

**Summary of Rating Categories**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Heating, Ventilation, &amp; Air Conditioning</td>
<td>10. Interior Finishes</td>
<td></td>
</tr>
</tbody>
</table>
## Green Home Permit Activity

<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>0.92%</td>
</tr>
<tr>
<td>1999</td>
<td>1554</td>
<td>36</td>
<td>2.32%</td>
</tr>
<tr>
<td>2000</td>
<td>1076</td>
<td>41</td>
<td>3.81%</td>
</tr>
<tr>
<td>2001</td>
<td>843</td>
<td>38</td>
<td>4.51%</td>
</tr>
<tr>
<td>2002</td>
<td>768</td>
<td>33</td>
<td>4.30%</td>
</tr>
<tr>
<td>2003</td>
<td>896</td>
<td>38</td>
<td>4.24%</td>
</tr>
<tr>
<td>2004</td>
<td>1083</td>
<td>231</td>
<td>21.1%</td>
</tr>
<tr>
<td>2005</td>
<td>1263</td>
<td>436</td>
<td>34.5%</td>
</tr>
<tr>
<td>2006</td>
<td>1069</td>
<td>371</td>
<td>34.7%</td>
</tr>
<tr>
<td>2007</td>
<td>891</td>
<td>207</td>
<td>23.2%</td>
</tr>
</tbody>
</table>
Green Home Permit Activity

![Bar chart showing green home permit activity from 1998 to 2007.](chart.png)
## Solar Electric (PV) Permits

<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>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Permits</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>13</td>
<td>10</td>
<td>20</td>
<td>28</td>
</tr>
</tbody>
</table>
Solar Electric (PV) Permits

The chart above illustrates the number of solar electric (PV) permits over the years from 1998 to 2007. The data shows a significant increase in permits from 2002 onwards, culminating in a peak in 2007. This indicates a growing interest and adoption of solar electric systems during this period.
## Solar Hot Water Permits

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Permits</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>
Solar Hot Water Permits

Scottsdale Green Builder Choices
2005 - 2006

- Building envelope – 23%
- Heating, ventilation & cooling – 14%
- Sustainable site – 14%
- Interior Finishes – 13%
- Green power, lighting, appliances – 12%
- Plumbing systems – 6%
- Structural elements – 6%
- Roofing – 3%
- Exterior finishes – 3%
- Other – 6%
Scottsdale Green Builder Choices
2005 - 2006

- Building Envelope: 23%
- HVAC: 14%
- Site: 14%
- Interior Finishes: 13%
- Lighting & Appliances: 12%
- Plumbing: 6%
- Structural Elements: 6%
- Exterior Finishes: 6%
- Other: 6%
1950 3.37 people per household - 297 s.f. per person
1970 3.14 people per household - 478 s.f. per person
2000 2.62 people per household - 840 s.f. per person
Scottsdale House Trends

House Size

Production
Custom
Scottsdale House Trends

● Energy Efficiency
  ● Cathedralized attics
  ● At least 15% better than baseline energy code
  ● Half of green homes are 25% or better

● Passive design
  ● Shaded building entrances
  ● Courtyards
  ● Shaded patios and outdoor living spaces

● Water Efficiency
  ● Demand controlled hot water recirculation pumps
2007 Accomplishments

- Updated Green Home Rating Process
- Green Multi-Family Rating Checklist
- Green Tenant Improvement Rating Checklist
- Energy code and green building related amendments as part of 2006 I-Code adoption process
- Granite Reef Senior Center Dedication as the city’s first LEED Gold certified public facility
  - Tours conducted throughout year
Granite Reef Senior Center

Scottsdale’s 1st LEED Gold certified city facility – April 2007
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 - McDowell Sonoran Preserve
Scottsdale Fire Station No. 602
Completed July 2008
Solar, cool tower, graywater, rainwater harvesting, pervious paving
2007 Accomplishments

- Green Building Expo – Oct. 5th and 6th
  - 10,000 attendees over the course of two days
  - 120 exhibitors
  - 24 educational sessions along with a concurrent Sustainable Film Festival
  - Demonstrations including the solar energy, Segway personal transport vehicle and the latest in electric and alternative fuel cars
Green Building Expo
Scottsdale Center for the Performing Arts
Exhibits, Demonstration and Speakers
Green Building Expo
Scottsdale Center for the Performing Arts

Solar Cook Off Competition
2007 Accomplishments

- Valley Forward Environmental Excellence Award
  - GB Expo Committee and collaborative of the cities of Scottsdale, Phoenix and Tempe
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
Design Day & Info Fair

- Co-sponsored by the Citizen & Neighborhood Resources Dept.
- Free design consultation for South Scottsdale residents
- Held in at local High School
- Remodeling information tables & exhibits
Tours and Outreach

- Green Building Tours
- Green Building Newsletter
- Presentations and exhibits at community & association events
- Collaboration with other cities, state/county agencies, utilities, associations and educational institutions
2007 Accomplishments

- ICC video on Scottsdale’s green building initiatives
- Green Building/Sustainability chapter
  - 2007 edition of the Building Department Administration book
- Spring and Fall Green Building Class at AZ ICC Education Institute
- Scottsdale Green Building presentation made to MAG Building Codes Committee
2007 Accomplishments

- City representation on US Green Building Council’s Building Codes Committee
- City representation on NAHB/ICC Green Standard Development Committee
- City representation on LEED for Homes pilot program
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>1998 to 2007</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1998 to 2007</td>
</tr>
<tr>
<td></td>
<td>Per Home</td>
<td>Annual Cumulative Savings for 1,150 homes</td>
</tr>
<tr>
<td>Average Home Size</td>
<td>3,800 square feet</td>
<td></td>
</tr>
<tr>
<td>Average Annual Energy Reduction</td>
<td>2,830 Kilowatt hours (kWh) per year</td>
<td>3,254,500 Kilowatt hours (kWh)</td>
</tr>
<tr>
<td>Average Annual Energy Savings</td>
<td>$283 per year</td>
<td>$325,450</td>
</tr>
<tr>
<td>Annual Greenhouse Gas Reduction</td>
<td>2,700 pounds of carbon dioxide (C0₂)</td>
<td>3,105,000 pounds of carbon dioxide (C0₂) avoided</td>
</tr>
<tr>
<td>Equivalent Cars removed from Street</td>
<td>1/5 the annual emission of an average car</td>
<td>annual emission of 239 average cars</td>
</tr>
</tbody>
</table>