

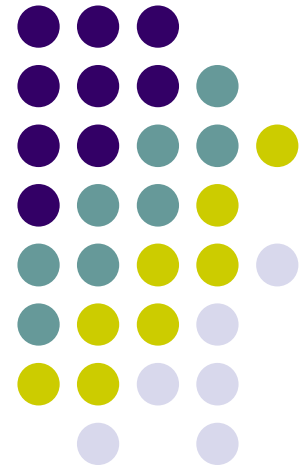
# Scottsdale Green Building and Solar Trends 2020



## City of Scottsdale Green Building Program

March 8, 2021

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Planning and Development



# Green Building Program Collaboration with other City Programs & Initiatives

1. General Plan and Sensitive Design Principles
2. Planning, Zoning Ordinances & Entitlements
3. Water Conservation Ordinances
4. Energy and Green Construction Codes
5. Capital Projects and Facility Management
6. Housing Rehab Program



SCOTTSDALE





# City of Scottsdale Green Building Program

- **Established in 1998**
  - Rating criteria based on Sonoran Desert region
- **Verification Process**
  - Building plan review, permits and inspections
- **Public Outreach**
  - Engagement with project owners, developers, architects, builders and interested citizens
  - Pre-application project meetings
  - Green building education series
- **Periodic Updates**
  - Green Home Rating Checklist for single family
  - International Green Construction Code (IgCC) for commercial and multifamily projects





# Program Incentives

- **Scottsdale Green Building Designation**
- **Streamlined Documentation & Verification Process**
- **Technical and Permit Process Assistance**
- **No Application and Certification Fee**
- **Enhanced Market Niche**
  - city designation and RE listings
- **Promotion Opportunities**
  - web site participant listing, green building certificates, logos, job site signs, building plaque, webinar series



# Scottsdale Green Building Trends

## 1998 – 2020

### ● Energy Efficiency

- Energy code updates with enhanced performance
- Cathedralized attics (insulation at underside of roof decks)
- Energy Star products, LED lighting and solar ready zones
- Third-party energy raters and building commissioning

### ● Indoor Environmental Quality

- Fresh air ventilation and bathroom exhaust fan auto controls

### ● Water Efficiency

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

### ● Heat Island Mitigation

- Recessed entrances and shaded outdoor living spaces

### ● Distributed Solar Energy Generation

- Significant increase in rooftop solar & battery storage systems



# Over 1400 Green Designated Homes from 1998-2020



Silversmith Residence - Tate Studio Architects



Eldorado on 1<sup>st</sup> Condos – Will Bruder Architects



Becker Residence – Perry Becker Architect



The Douglas Scottsdale – John Douglas Architects

# 2020 Green Building Projects

- **Single-Family**

- Green custom homes (4 building permits issued)
- Green rehabilitated homes (7 building permits issued)



Tate Studio Custom Home



# 2020 Green Building Projects

- **Townhomes and low-rise Apartments**
  - 70<sup>th</sup> Street Lofts (15 units) under construction
  - Monterey Villas (4 units) building permits issued and completed
  - SOHO townhomes (4 units) building permits issued



70<sup>th</sup> Street Lofts - Modus Development

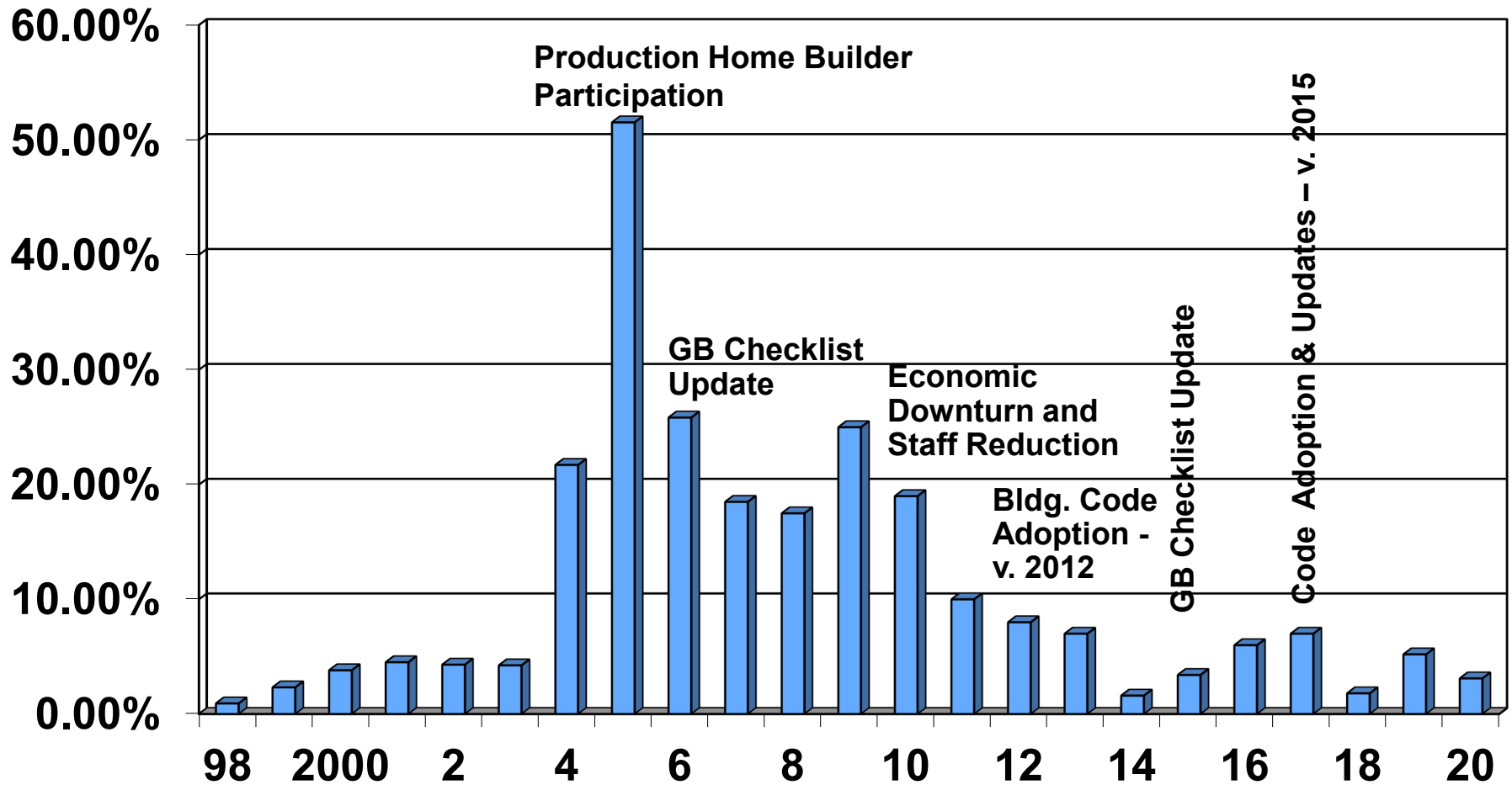


Monterey Villas – Moderna Architecture



# Percentage of Green Single Family and Townhome Permits

1998 - 2020



Source: Scottsdale CDS records

# Green Single Family & Townhome Permits (1998 - 2020)

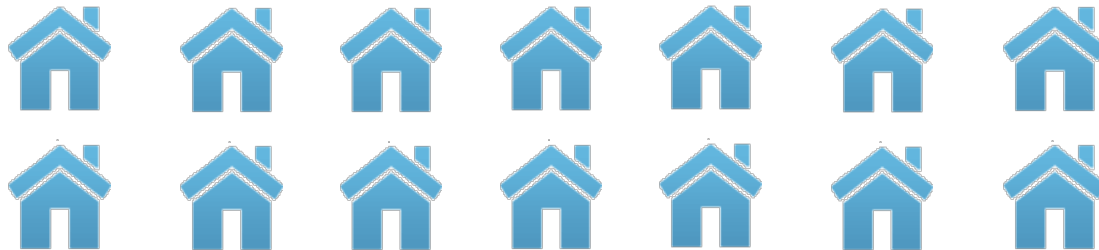
Year	Total Permits	Green Building Permits	Percentage of Total Permits
1998	2172	20	1%
1999	1554	36	2%
2000	1076	41	4%
2001	843	38	5%
2002	768	33	4%
2003	896	38	4%
2004	1137	247	22%
2005	852	439	52%
2006	685	177	26%
2007	573	106	19%
2008	200	35	18%
2009	121	30	25%
2010	149	28	19%
2011	155	15	10%
2012	265	21	8%
2013	400	26	7%
2014	440	7	1.6%
2015	438	15	3.4%
2016	525	29	6%
2017	560	38 (7 SFR; 31 townhomes)	7%
2018	569	10 (3 SFR; 7 rehab's)	1.8%
2019	593	31 (6 SFR; 15 townhomes; 10 rehab's)	5.2%
2020	488	19 (4 SFR; 8 townhomes; 7 rehab's)	3.9%
<b>Total</b>	<b>15,434</b>	<b>1,464</b>	<b>9.5%</b>

Source: Scottsdale CDS records

# Green House Gas Reduction as a result of 1,464 Green Homes



Annual reduction of **5,270 tons of carbon dioxide (CO<sub>2</sub>)**  
equivalent to removing **1,037 cars** from the streets



Source: [epa.gov/energy/greenhouse-gas-equivalencies-calculator](http://epa.gov/energy/greenhouse-gas-equivalencies-calculator)

# Energy Savings and Environmental Impact Reduction based on Average Size Green Homes

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

Green Home Energy Measures	Annual Energy Savings and Pollution Reduction	
	Per Home	Total Savings for 1,464 green homes in 2020
<b><u>Average</u> Size Home<sup>1</sup></b>	<b>2,700 square feet</b>	
<b>Average Annual Energy Reduction<sup>1</sup></b>	4,634 Kilowatt hours (kWh)	6,784,176 Kilowatt hours (kWh)
<b>Average Annual Energy Cost Savings</b>	<b>\$554.23 per year</b> (0.1196 per kWh) <sup>2</sup>	<b>\$811,392.72</b> (0.1196 per kWh) <sup>2</sup>
<b>Equivalent Annual Greenhouse Gas Reduction<sup>3</sup></b>	3.6 tons of carbon dioxide (CO <sub>2</sub> ) avoided	5,270 tons of carbon dioxide (CO <sub>2</sub> ) avoided
<b>Equivalent Passenger Vehicles removed from Street<sup>3</sup></b>	0.708 passenger vehicles	1,037 passenger vehicles
<b>Equivalent miles driven by an average passenger vehicle<sup>3</sup></b>	8,130 miles	11,902,320 miles

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

# Energy Savings and Environmental Impact Reduction of Average Custom Green Homes

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

Green Home Energy Measures	Annual Energy Savings and Pollution Reduction	
	Per Home	Total Savings for 1,464 green homes in 2020
<b><u>Average</u> Size Custom Home<sup>1</sup></b>	<b>5,500 square feet</b>	
<b>Average Annual Energy Reduction<sup>1</sup></b>	11,183 Kilowatt-hours (kWh)	16,371,912 Kilowatt-hours (kWh)
<b>Average Annual Energy Cost Savings</b>	<b>\$1,337.49 per year</b> (0.1196 per kWh) <sup>2</sup>	<b>\$1,958,085.36</b> (0.1196 per kWh) <sup>2</sup>
<b>Equivalent Annual Greenhouse Gas Reduction<sup>3</sup></b>	8.7 tons of carbon dioxide (CO <sub>2</sub> )	12,736.8 tons of carbon dioxide (CO <sub>2</sub> ) avoided
<b>Equivalent Passenger Vehicles removed from Street<sup>3</sup></b>	1.7 passenger vehicles	2,489 passenger vehicles
<b>Equivalent miles driven by an average passenger vehicle<sup>3</sup></b>	19,620 miles	28,723,680 miles

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 - 2019

- **Projects complying with Green Construction Code (IgCC) or LEED**
  - Vitri at Scottsdale Quarter (301 units) completed
  - Canopy Hotel by Hilton (177 rooms) completed



Vitri Apartments



Canopy Hotel

# Scottsdale Commercial Projects - 2020

- **Projects complying with Green Construction Code (IgCC) or LEED**
  - Broadstone Papago Marketplace (274 units) building permits issued
  - Gramercy Safari (160 units) under construction
  - Springhill Suites Hotel (117 guest rooms) pending



Springhill Suites Hotel



Gramercy Safari

# Scottsdale Commercial Projects - 2020

- **Projects complying with Green Construction Code (IgCC), LEED or Green Globes**
  - DC Hotel (169 guest rooms) building permits issued
  - Caesars Republic Hotel (265 rooms) pending construction



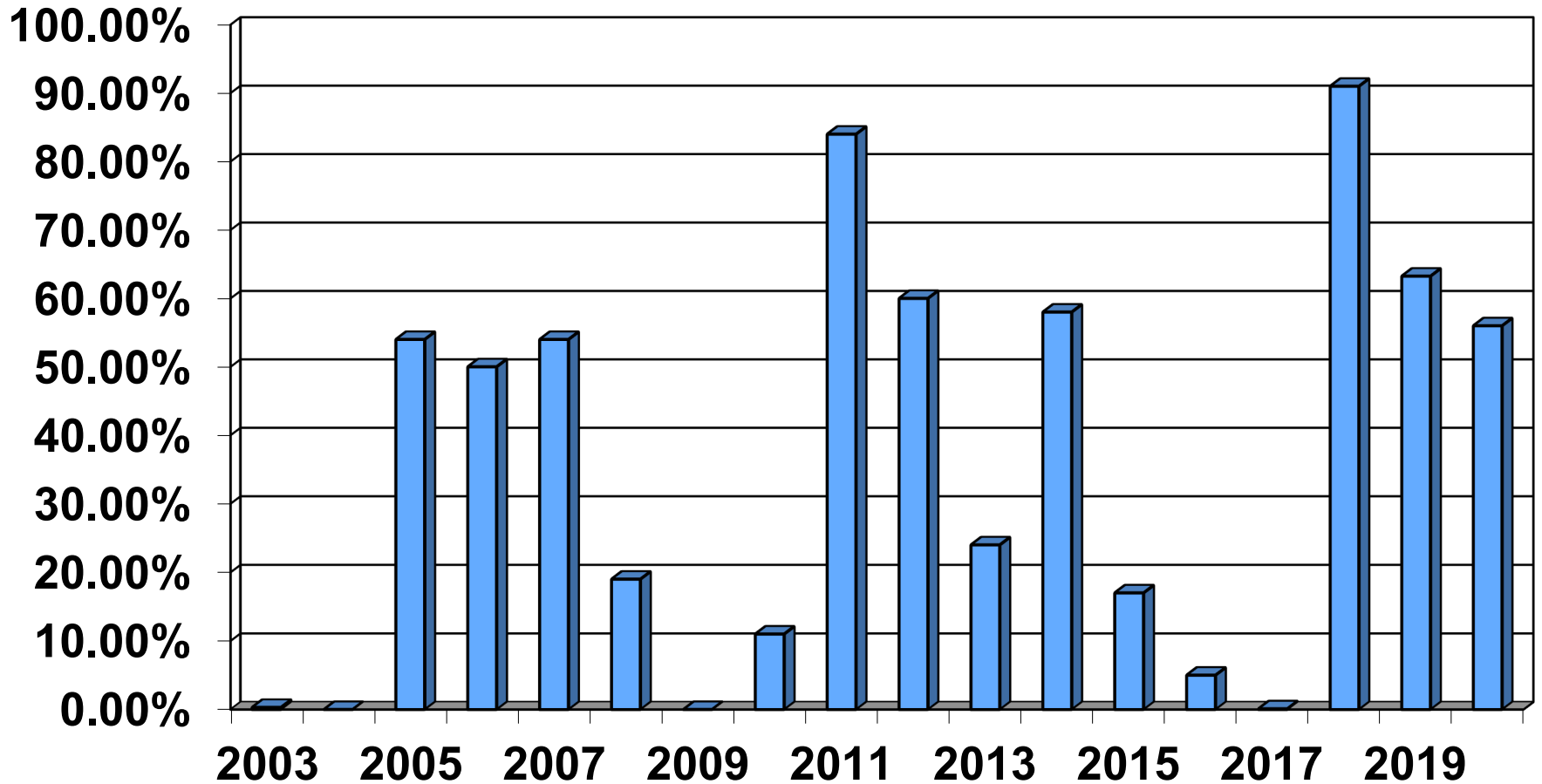
DC Hotel



Caesars Republic Hotel



# Percentage of Green Multifamily Dwelling Permits for Condos, Apartments and Hotel Buildings 2003 - 2020



Source: Scottsdale CDS records

# Green Multifamily Dwelling Unit and Hotel Permits (2003 - 2020)

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 Earl 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	758	130	<b>17%</b> - Includes 89 at Envy Condos; 41 at Equinox Apartments
2016	741	33	<b>5%</b> - Includes 10 condo units at SOHO; 7 units at Eldorado on First; 16 units at Plaza Osborn Apartments
2017	1,000	1	<b>0.1%</b> - Final condo unit built-out at Envy Condos
2018	524	477	<b>91%</b> - Includes 176 condo units at Optima Sonoran Village; 301 apartment units for Vitri at Scottsdale Quarter
2019	2	2	<b>100%</b> - Includes Canopy Hotel and DC Hotel
2019	604	160	<b>26.5%</b> - Includes 160 dwelling units at Gramercy Safari Apartments
2020	1	1	<b>100%</b> - Includes DC Hotel
2020	2317	274	<b>11.9%</b> - Includes 274 units at Broadstone Papago Marketplace
<b>Total</b>	<b>13,942</b>	<b>4,289</b>	<b>31%</b>

Source: Scottsdale CDS records



# Scottsdale City Resolution for LEED Gold Certified City Buildings

14 LEED certified buildings including 4 Platinum (2005 – 2020)



Airport Operations Center – LEED Silver



Museum of the West – LEED Gold



Appaloosa Library – LEED Gold



Downtown Fire Station 2 – LEED Platinum



# Scottsdale City Resolution for LEED City Buildings completed in 2020

- Aviation Business Center (certified)
- Fire Stations 603 (pending certification)
- Fire Station 616 (under construction)



Aviation Business Center

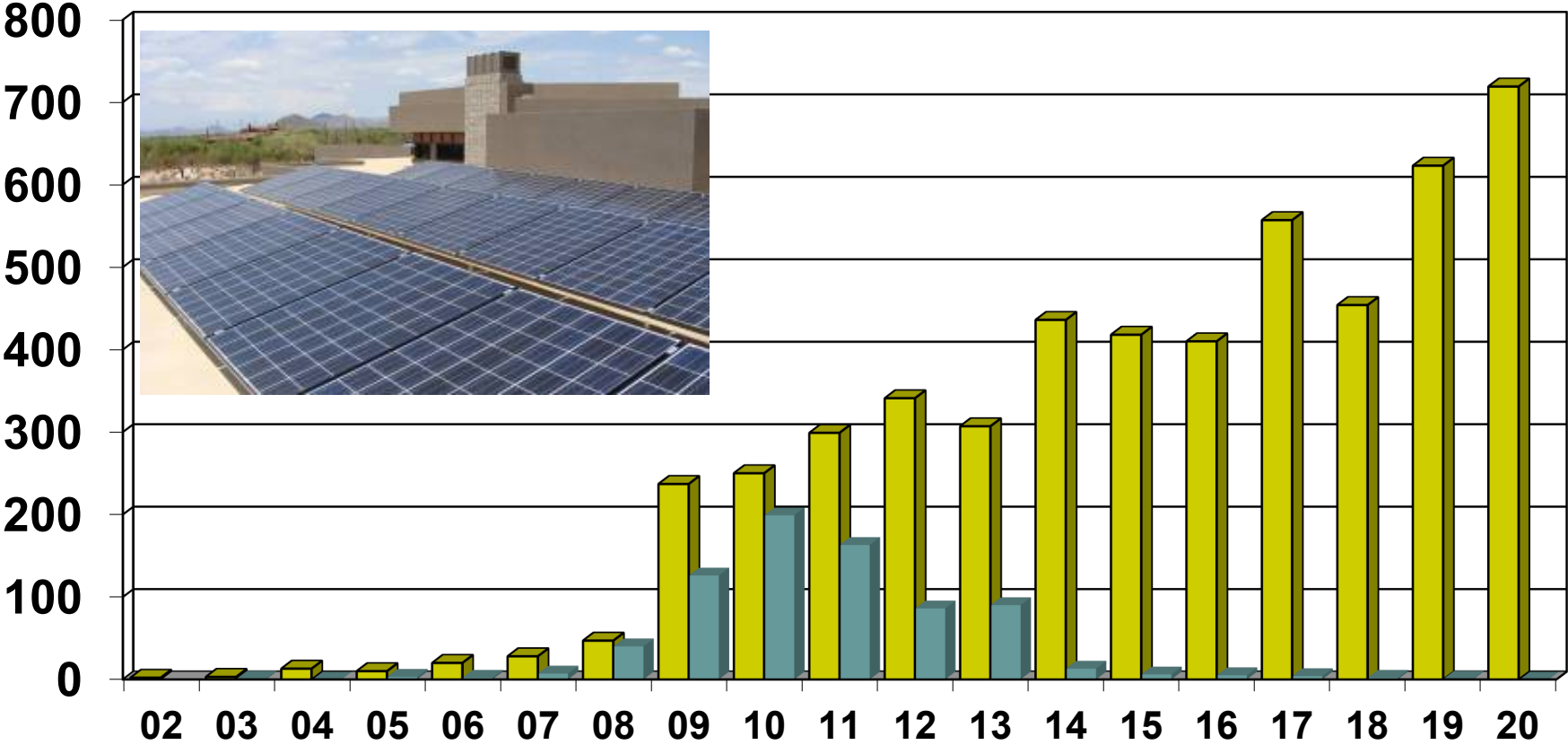


Fire Station 603

# Solar installations 2002 to 2020



**5,922** solar PV and hot water installations (**8.3%** of 71,092 owner-occupied homes).



Source: Scottsdale CDS permit records

# Solar Permits 2002 to 2020

## Solar Electric (PV)

5,174 solar PV permits issued

Year	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
No. of Permits	2	3	13	10	20	28	47	237	250	299	341	307	436	418	410	557	454	623	719

## Solar Hot Water

748 solar hot water permits issued

Year	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
No. of Permits	-	1	0	3	2	7	40	126	199	163	86	90	13	6	5	4	2	1	0

Note: Many early solar permits (2002 – 2008) were designated as minimum electrical, plumbing or water heater permits.

Source: Scottsdale CDS permit records

# On-Site Energy Generation and Environmental Impact Reduction of Solar Electric (PV) Systems

Estimated energy savings and equivalent greenhouse gas reduction resulting from installed roof top solar PV systems from **2002 to 2020**.

Green Home Energy Measures	Annual Energy Savings and Pollution Reduction	
	Per Home	Total Savings for <b><u>5,174</u></b> solar PV roof tops
<b>Average PV system size</b>	<b>8 kW</b>	<b>41.4 MW</b>
<b>Average Annual On-Site Energy Generation<sup>1</sup></b>	13,374 Kilowatt hours (kWh)	69,197,076 Kilowatt hours (kWh)
<b>Average Annual Energy Value<sup>1</sup></b>	<b>\$1,452</b>	<b>\$7,512,648</b>
<b>Equivalent Annual Greenhouse Gas Reduction<sup>2</sup></b>	10.4 tons of carbon dioxide (CO <sub>2</sub> ) avoided	53,810 tons of carbon dioxide (CO <sub>2</sub> ) avoided
<b>Equivalent Passenger Vehicles removed from Street<sup>2</sup></b>	2.1 cars	10,865 cars
<b>Equivalent miles driven by an average passenger vehicle<sup>2</sup></b>	23,820 miles	123,244,860 miles

Sources: <sup>1</sup>[pwwatts.nrel.gov](http://pwwatts.nrel.gov); <sup>2</sup>[epa.gov/energy/greenhouse-gas-equivalencies-calculator](http://epa.gov/energy/greenhouse-gas-equivalencies-calculator)



# Office of Environmental Initiatives

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