Proposed Adoption of 2021 Energy and Green Construction Codes

International Energy Conservation Code
International Green Construction Code

January 20, 2022

Anthony Floyd, FAIA, LEED BD+C, CEM
Office of Environmental Initiatives
Planning and Development
Community and Economic Development
City of Scottsdale

Scottsdale Energy and Green Building Trends 1998 – 2021

- **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 spaces
- **Distributed Solar Energy Generation**
  - Significant increase in rooftop solar & battery storage systems

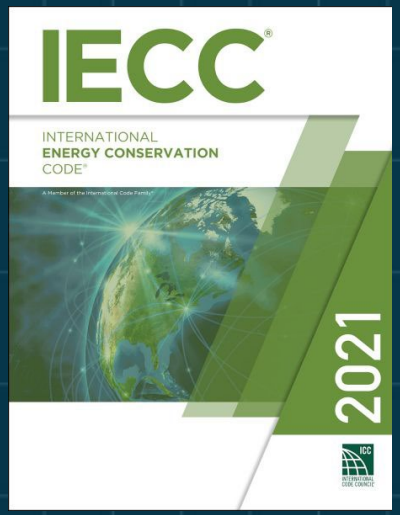
SCOTTSDALE GREEN BUILDING PROGRAM

WaterSense U.S. Environmental Protection Agency

energy ENERGY STAR

Efficiency Improvements of IECC: Historic and Projected

IECC - International Energy Conservation Code



Code Stringency

100
90
80
70
60
50
40
30
20
10
0

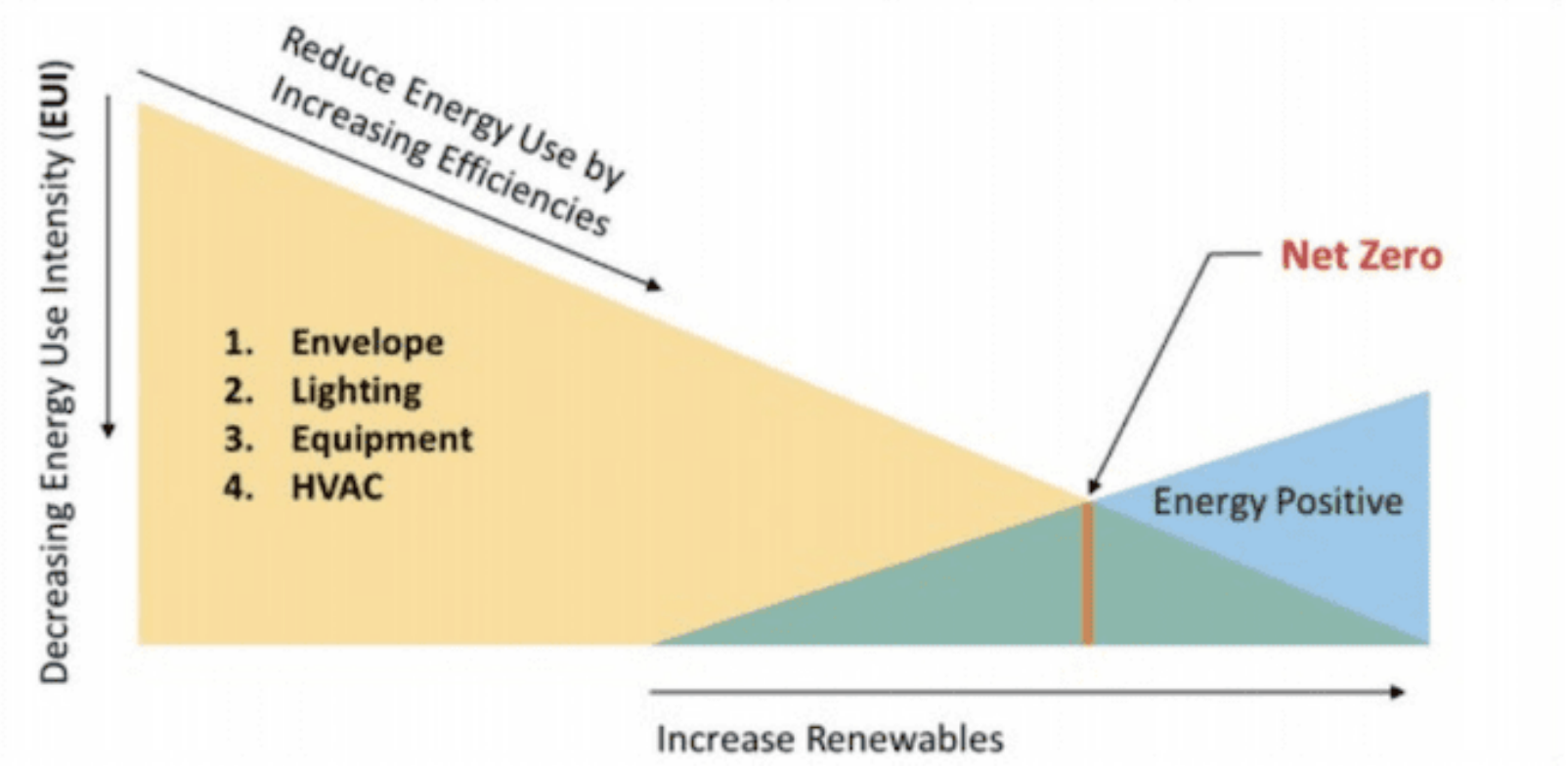
1977 1983 1989 1995 2001 2007 2013 2019 2025 2031 2037 2043 2049

2006 IECC
2009 IECC
2012 IECC
2015 IECC
2018 IECC
2021 IECC

15% Savings
18%
<1%
<1%

Business as usual
Carbon Savings Potential
Glide path to Net Zero

Reaching Net Zero

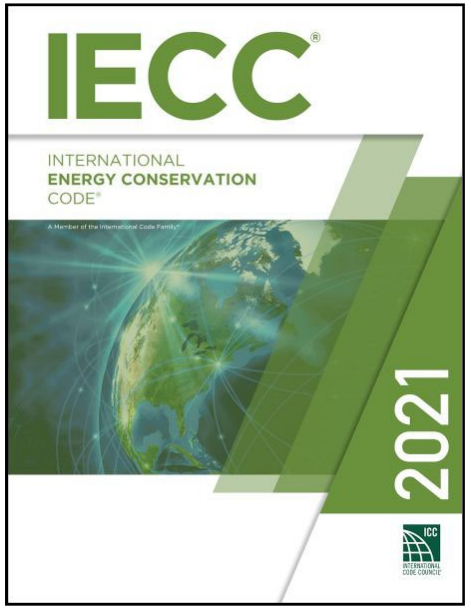


General Plan 2035 – Energy Element (Goal E1)

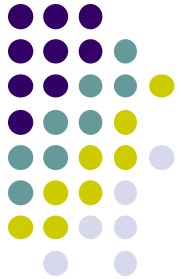
Work toward becoming a net-zero energy community that balances energy efficiency with renewable energy generation.

Scottsdale Energy Code Proposed Adoption & Updates

1. **2021 International Energy Conservation Code (IECC)**
   - **New and renovated residential and commercial buildings**
   - **Energy Components**
     - Thermal envelope
     - Mechanical heating and cooling systems
     - Service water heating
     - Lighting systems
     - Solar-ready zones
     - Electric-ready
     - EV-ready charging



Scottsdale Energy Code Proposed Adoption & Updates

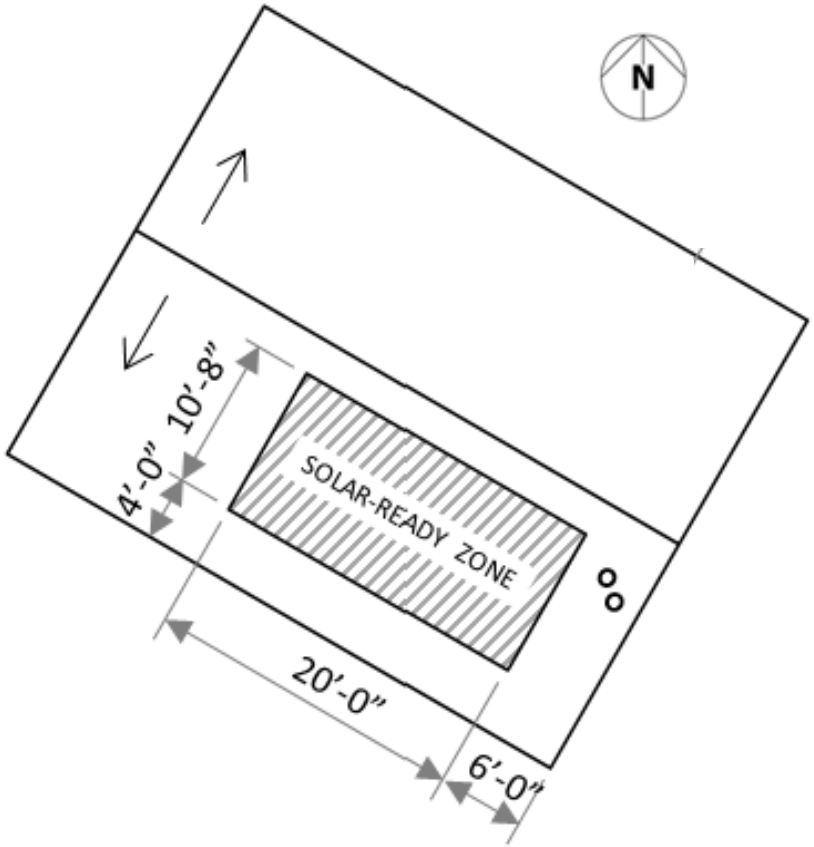


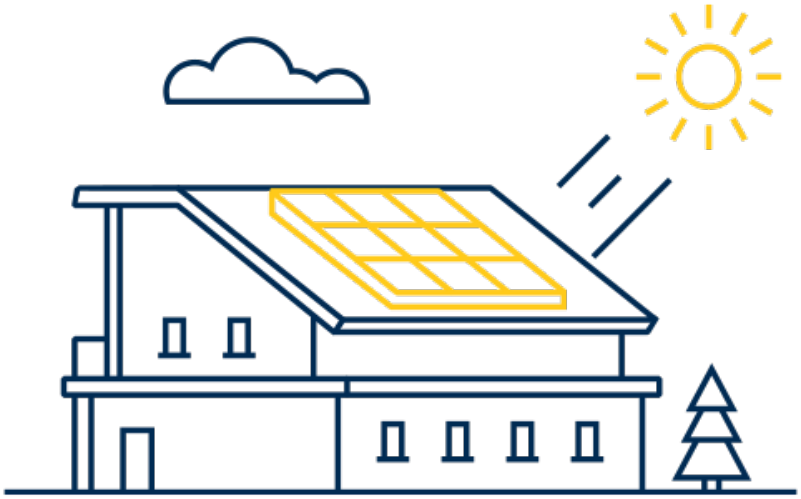
2. On-Site Renewable Energy

- **Solar-Ready Zones - Residential**
  - Allocate minimum 10% of roof area free from obstructions
  - Provide electrical pathway to electrical service panel with reserved space for dual pole circuit breaker
- **Solar-Ready Zones - Commercial**
  - Allocate minimum 30% of roof area free from obstructions
  - Provide electrical pathway to electrical service panel with reserved space for dual pole circuit breaker

Note: As of 2021, over 6,804 solar electric PV and hot water systems have been installed on existing homes and over 2,649 Scottsdale homes have been built with designated solar-ready zones. Average PV system size is 10 kW.

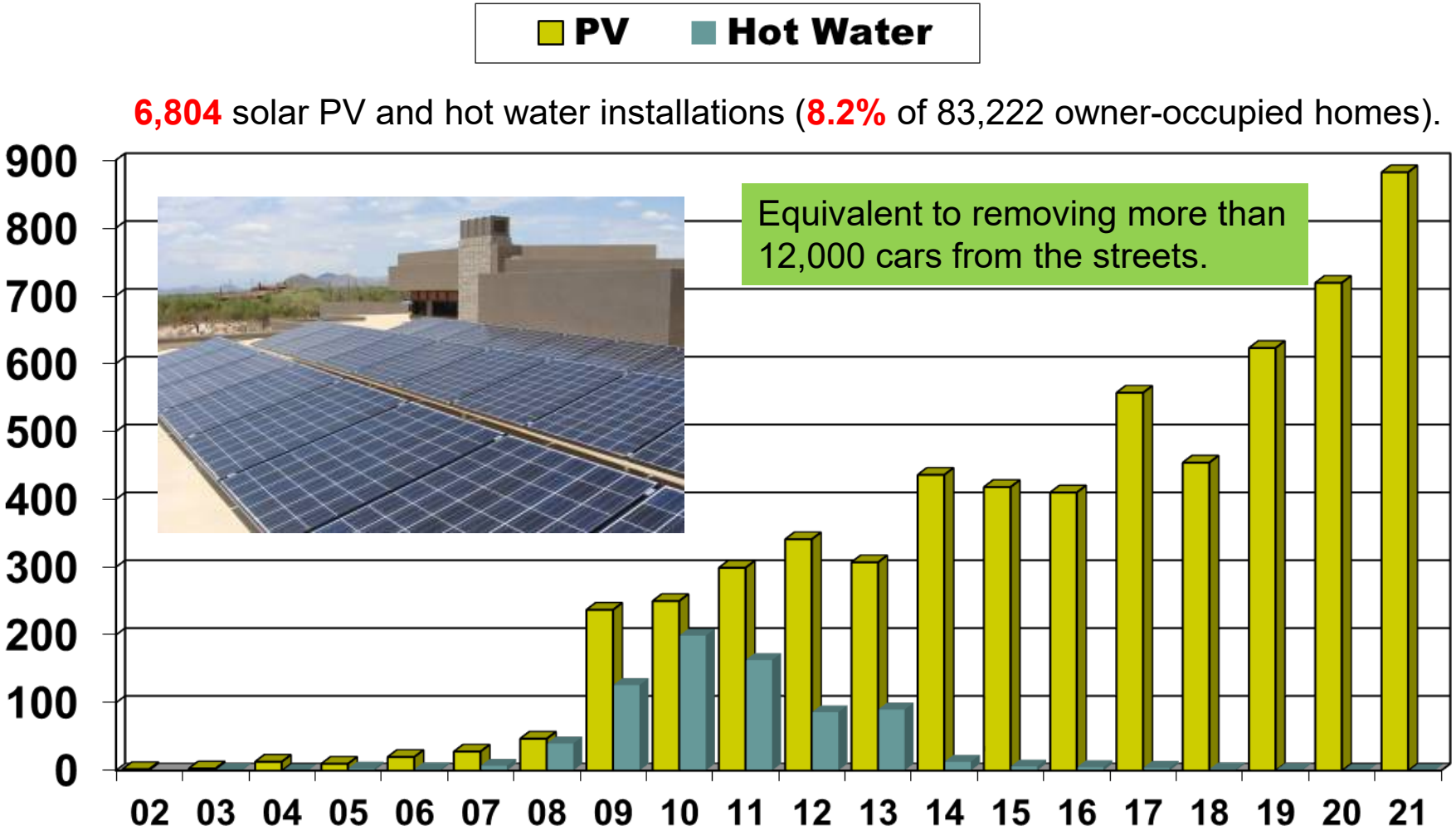
Residential Example of designated Solar-Ready Zone for new buildings





Credit: Carlisle Roof Foam

Solar installations 2002 to 2021



Source: Scottsdale CDS permit records and US Census 2019 housing estimates

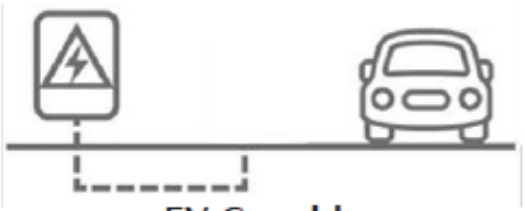
Scottsdale Energy Code Proposed Adoption & Updates

3. Electric Vehicle Ready Charging Capacity

- EV-ready for new single-family homes
  - Provide at least one dedicated 40-amp, 240-volt branch circuit with termination in receptacle or junction box in garage for future Level 2 EV charging
- EV-capable for new multifamily buildings
  - Provide charge capacity for 20% of parking spaces with dedicated circuit and raceway – Level 2
- EV-capable for new hotels and motels buildings
  - Provide charge capacity for 10% of parking spaces with dedicated circuit and raceway – Level 2

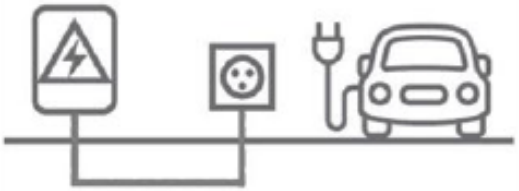
Source: Smart Charge America

What Are the Different EV Compliance Levels?



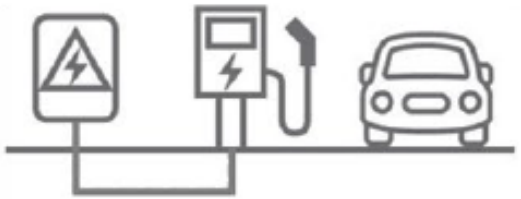
EV Capable

Installation of "raceway" (the enclosed conduit that forms the physical pathway for electrical wiring to protect it from damage) and adequate panel capacity to accommodate future installation of a dedicated branch circuit and charging station(s).



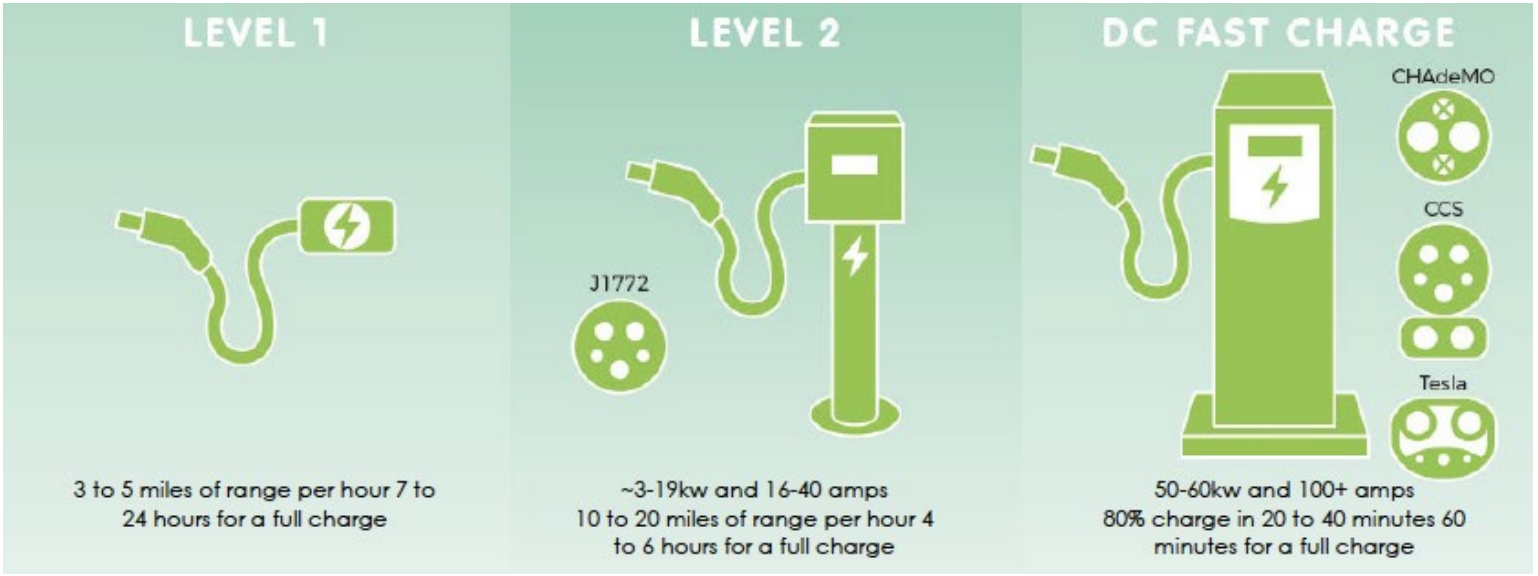
EV Ready

EV Capable plus installation of dedicated branch circuit(s) (electrical pre-wiring), circuit breakers, and other electrical components, including a receptacle (240-volt outlet) or blank cover needed to support future installation of one or more charging stations.

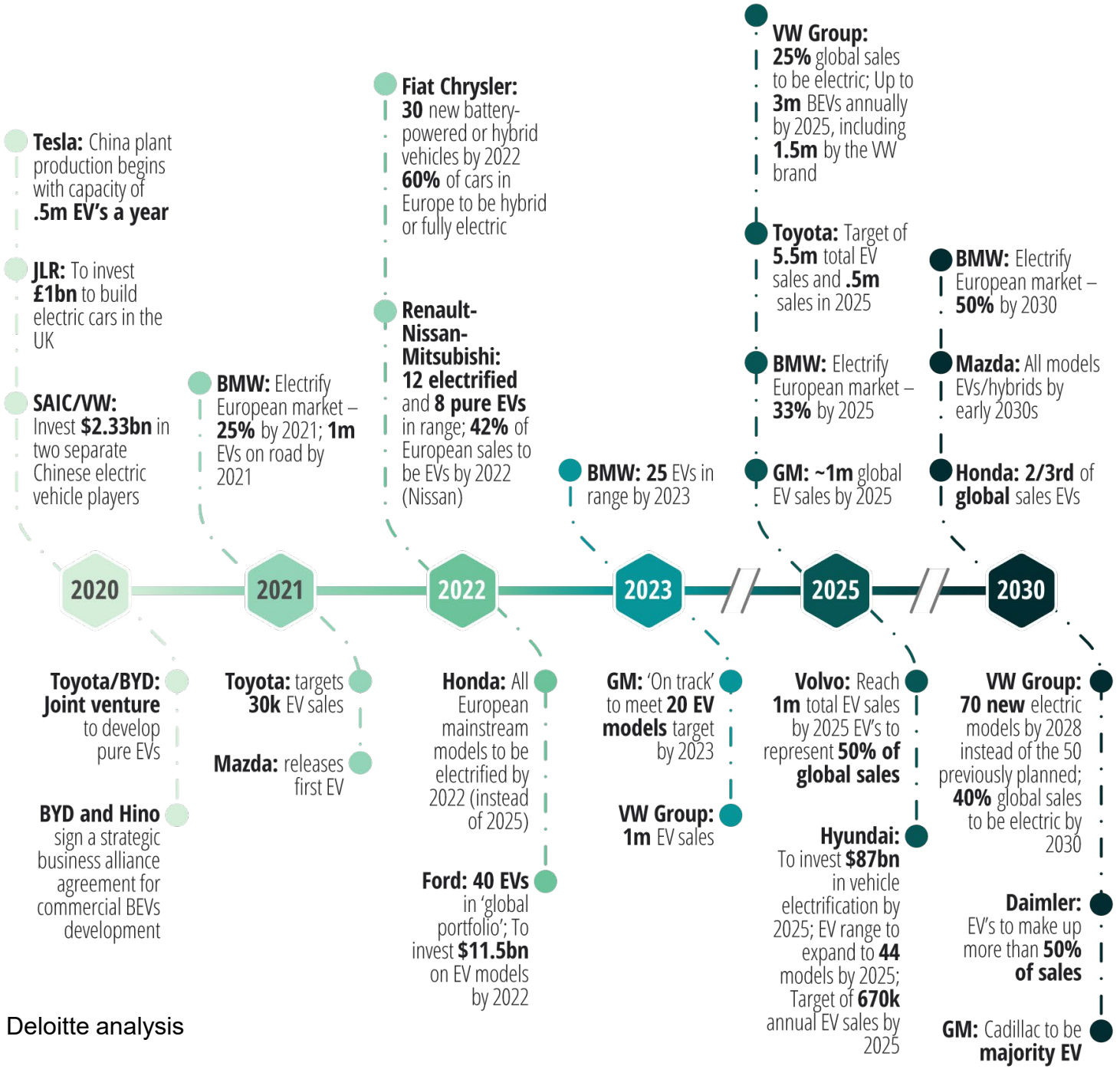


EV Installed

EV Ready plus installation of a minimum number of Level 2 electric vehicle supply equipment (EV chargers)



EV Market Targets



Source: Deloitte analysis

Scottsdale Energy Code Proposed Adoption & Updates

4. Electric Ready Appliances and Equipment

- Appliances/equipment using gas including water heater, dryers, cooking equipment in dwelling units
  - Provide min. 30-amp, 240 volt receptable for **clothes dryers and water heaters**
  - Provide min. 40-amp, 240-volt receptacle for **range and cooking equipment**

Scottsdale Plumbing Code Proposed Adoption & Updates

5. Water Efficiency

a) <u>High-efficiency plumbing fixtures and fittings</u>

- Water closets, urinals, lavatory faucets, showerheads, kitchen faucets

b) <u>Efficient hot water delivery</u>

- Demand-controlled recirc. pump for remotely located water heaters

c) <u>Water-bottle filling stations</u>

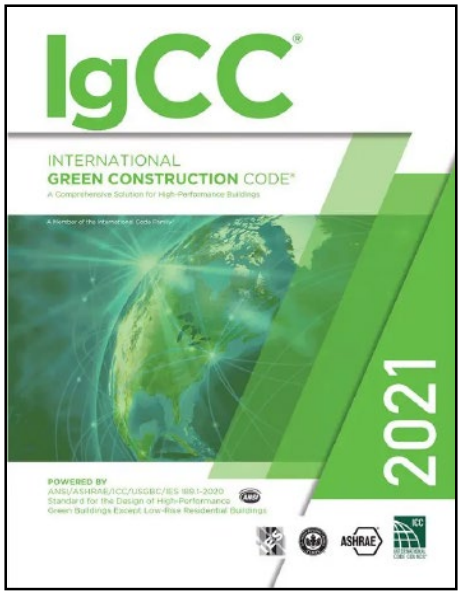
- Water-bottle filling stations for all drinking fountains

Scottsdale Green Code Proposed Adoption & Updates

1. **2021 International Green Construction Code (IgCC)**

   Exception: Buildings less than 50,000 sq. ft.

   - **Green Components**
     - Site Sustainability
       - Scottsdale Landscape Ord.
     - Water Use Efficiency
     - Energy Efficiency (IECC)
       - on-site renewable energy
     - Indoor Environmental Quality
     - Materials and Resources



Note: 28 IgCC projects approved under 2012 and 2015 IgCC in Scottsdale

Scottsdale Green Code Proposed Adoption & Updates

2. Site Sustainability

a) Heat island mitigation

- At least 50% of site hardscape (paved areas) must be shaded or of light color surface

3. Site Water Use Efficiency

a) Efficient irrigation system as part of new building construction

- WaterSense labeled controllers

Scottsdale Green Code Proposed Adoption & Updates

4. Energy Systems

- On-site solar PV system shall be provided with a total rated capacity of one of the following:
  1. Not less than 0.25 watts per square foot of conditioned floor area.
  2. Not less than 2 percent of the annual energy used within the building for building mechanical and service water-heating and lighting.

Scottsdale Green Code Proposed Adoption & Updates

5. Indoor Environmental Quality

a) At least 85% of interior finishes shall be low-VOC (volatile organic compound)

- Adhesives & sealants
- Paints and coatings
- Floor coverings
- Acoustical ceiling tiles and wall systems

CRI GREEN LABEL +PLUS Indoor Air Quality Testing Program carpet-rug.org

UL GREENGUARD PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS UL.COM/GG UL 2818

Scottsdale Green Code Proposed Adoption & Updates

6. Material Resources – Recycling Facilities

- Divert not less than 50% of construction waste from landfill for recycling and reuse
- Metal, wood, drywall, cardboard, foam, concrete, masonry
- Materials can be co-mingled and sorted off-site by waste management contractor

Scottsdale Green Code Proposed Adoption & Updates

6. Material Resources – Recycling Facilities

- Provide recycling/trash pull-out bins in kitchen cabinet of dwelling units of single and multifamily buildings
- Provide recycling and trash chutes in multifamily buildings (≥ 4 stories) or provide recycling collection area on each floor
- Provide recycling collection in mailrooms, breakrooms and common kitchen areas of multi-family and commercial buildings

Scottsdale Green Code Proposed Adoption & Updates

6. **Material Resources –** Comply with any two

   a) **Recycle content**

   - Not less than 10% of building materials shall have recycled content or salvaged material

   b) **Regional materials**

   - Not less than 15% of building materials or products shall be regionally extracted/harvested/ recovered or manufactured within a radius of 500 miles of the project site

Note: 28 IgCC projects approved under 2012 and 2015 IgCC in Scottsdale

Scottsdale Green Code Proposed Adoption & Updates

6. **Material Resources –** Comply with any two

   c) **Biobased and wood building components**

   - Not less than 5% of building materials shall be biobased and contain certified wood content

   d) **Multi-attribute product declaration or certification**

   - Not less than 5 building products shall have environmental product declarations or certifications

Note: 28 IgCC projects approved under 2012 and 2015 IgCC in Scottsdale

2021 Energy and Green Construction Code Adoption – Alignment with Scottsdale's General Plan 2035

- **Energy Efficiency and GHG Emission Reduction**
  - Reduce heat islands (EP7)
  - Solar-ready zones and Electric-ready (E1&2)
  - EV-ready & EV-capable charging infrastructure (EP3.1)
- **Water Efficiency** (WR2.7)
  - Water-efficient plumbing fixtures and hot water delivery
- **Indoor Environmental Quality** (H1.9)
  - Low-VOC (volatile organic compound) paints and finishes
- **Material Resource Recovery** (EP4)
  - Construction waste and building recycling infrastructure

Adoption Schedule
2021 Building, Energy, Green Codes

Code Review and Adoption Process	Dates
Staff Review and Recommended Amendments	March thru December 2021
Community Input - Building Advisory Board of Appeals and Environmental Advisory Commission	May 2021 thru January 2022
Industry Outreach – AZ American Institute of Architects, Central AZ Home Builders Association, SW Energy Efficiency Project, New Building Institute, architects, engineers, builders and consultants	June 2021 thru February 2022
City Council Agenda and Adoption	March/April 2022
Public Notice and Staff Preparation	April/May 2022
Tentative Effective Date	**May/June 2022**