2021 Proposed Energy and Green Code Action Plan

Energy Efficiency, GHG Reduction, Water Efficiency, Indoor Air Quality and Material Resources

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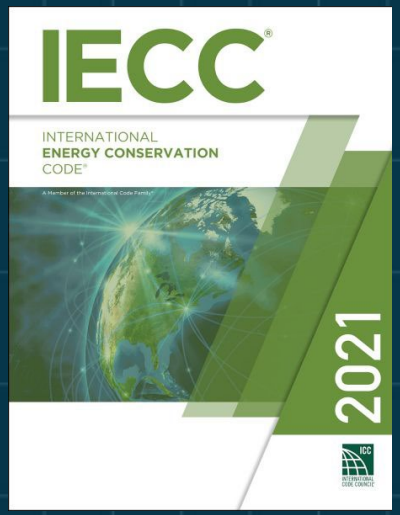
2021 Proposed Energy and Green Code Adoption – Alignment with the Scottsdale General Plan

- **Energy Efficiency and GHG Emission Reduction**
  - International Energy Conservation Code (IECC)
  - Solar-ready zones and Electric-ready (GHG reductions)
  - EV-ready and EV-capable charging infrastructure
  - Energy audit opportunities for existing buildings
- **Water Efficiency**
  - Water-efficient plumbing fixtures and hot water delivery
- **Indoor Environmental Quality**
  - Low-VOC (volatile organic compound) paints and finishes
- **Material Resources**
  - Construction waste and building recycling infrastructure

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

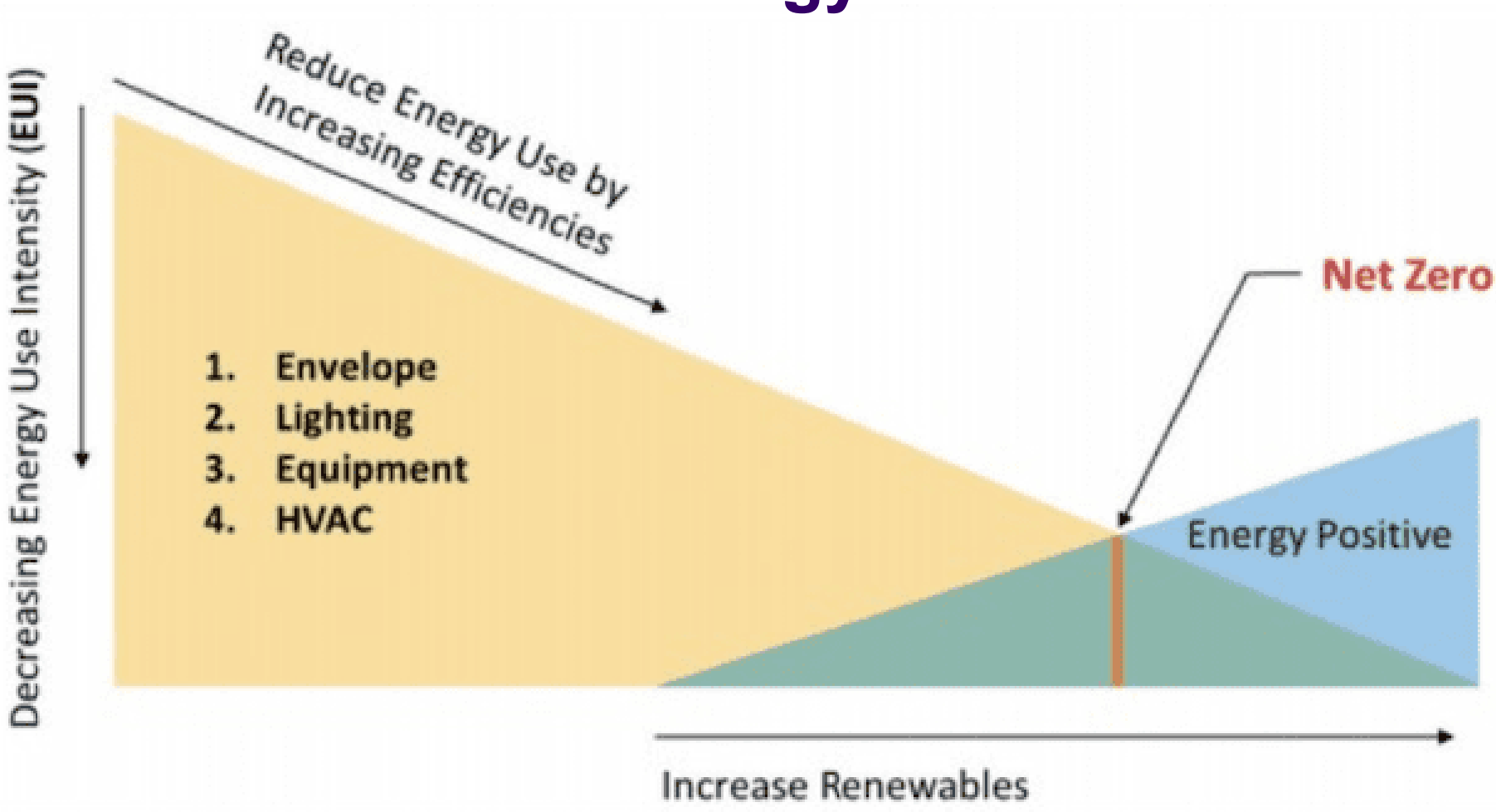
1977 1983 1989 1995 2001 2007 2013 2019 2025 2031 2037 2043 2049

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

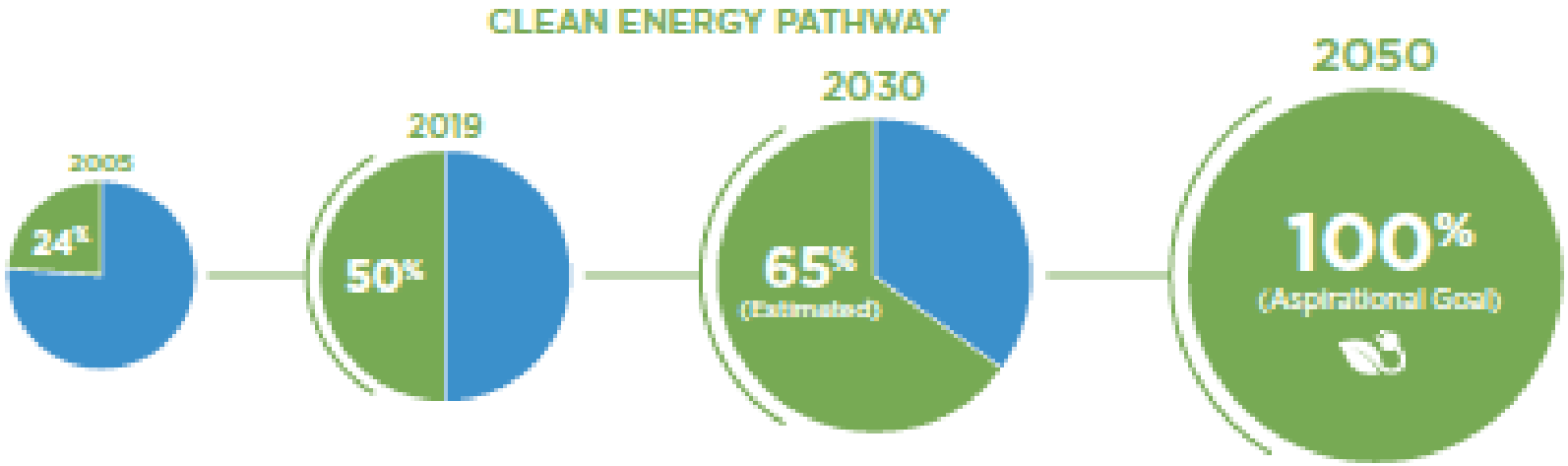
15% Savings
18%
<1%
<1%

Business as usual
Carbon Savings Potential
Glide path to Net Zero

Net Zero Energy is the balance between energy efficiency and renewable energy



APS Clean Energy Commitment

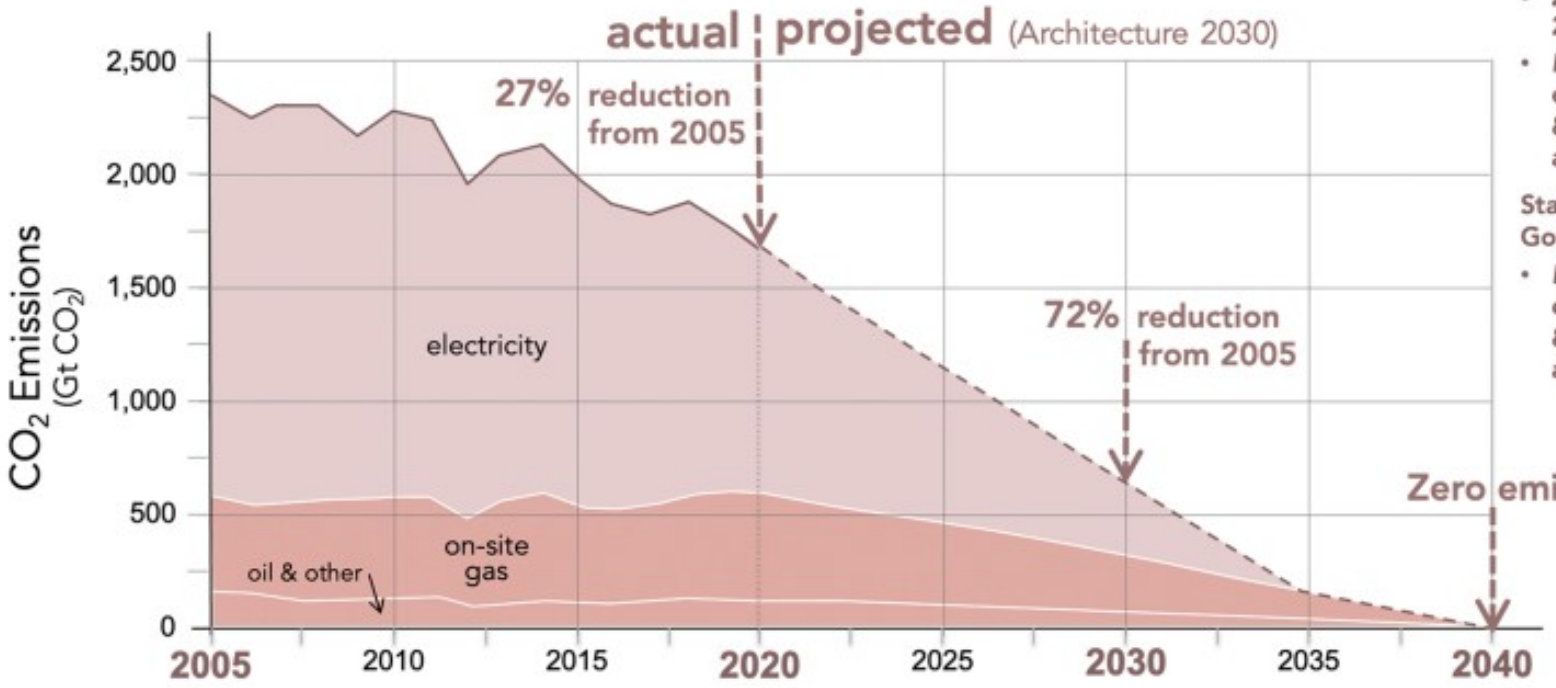


Clean Energy Commitments

- Starting from an energy mix that is 50% clean, including energy efficiency and carbon-free energy from Palo Verde Generating Station
- 65% clean energy by 2030 with 45% renewable energy
- Eliminate coal by the end of 2031
- 100% clean, carbon-free electricity by 2050
- Energy storage to take advantage of midday solar generation and better respond to peak demand
- Economy-wide electrification of industry, transportation and buildings

U.S. BUILDING SECTOR CO_2 EMISSIONS

2005 – 2040, building operations meeting the Paris Agreement's 1.5°C warming target



Biden Clean Energy Plan:

- Zero emissions grid by 2035
- *Incentives* for energy efficiency, electrification, & building code adoption

State and Local Government:

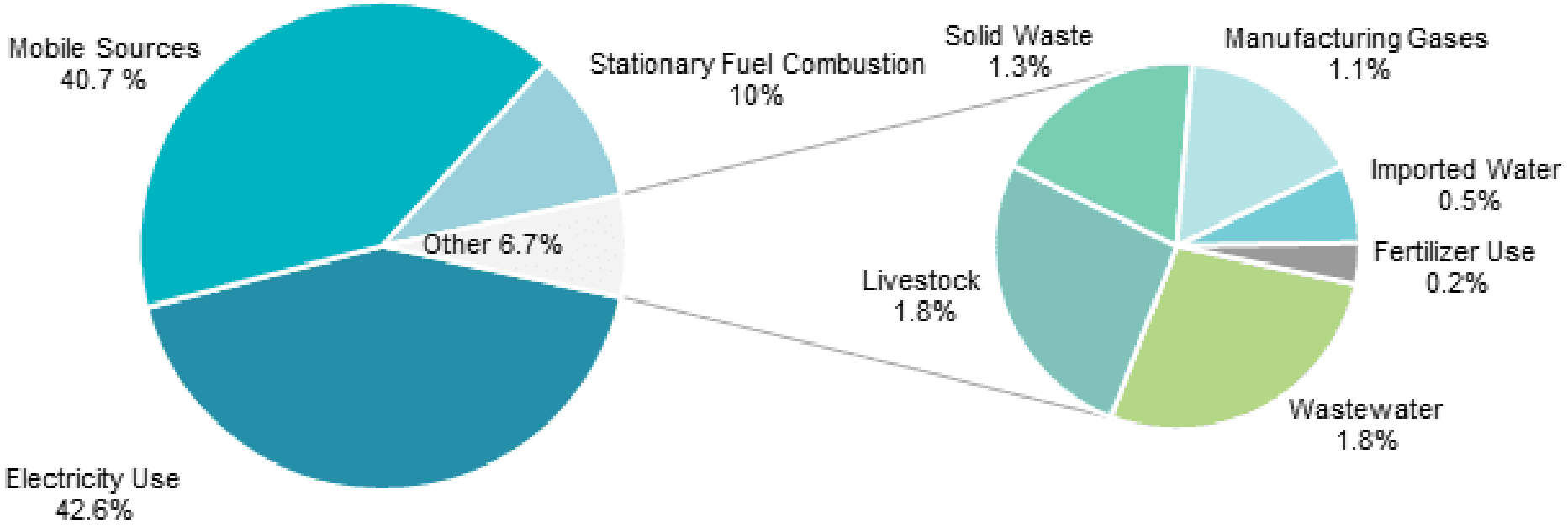
- *Policies* for energy efficiency, electrification, & building code adoption

Source: Architecture 2030; U.S. EIA Annual Energy Outlooks

Projection Assumptions: Zero carbon electricity by 2035; federal, state and local government incentives for efficiency renovations, electrification, and low to zero carbon building code adoption

Maricopa County
GHG Emissions by Source Category

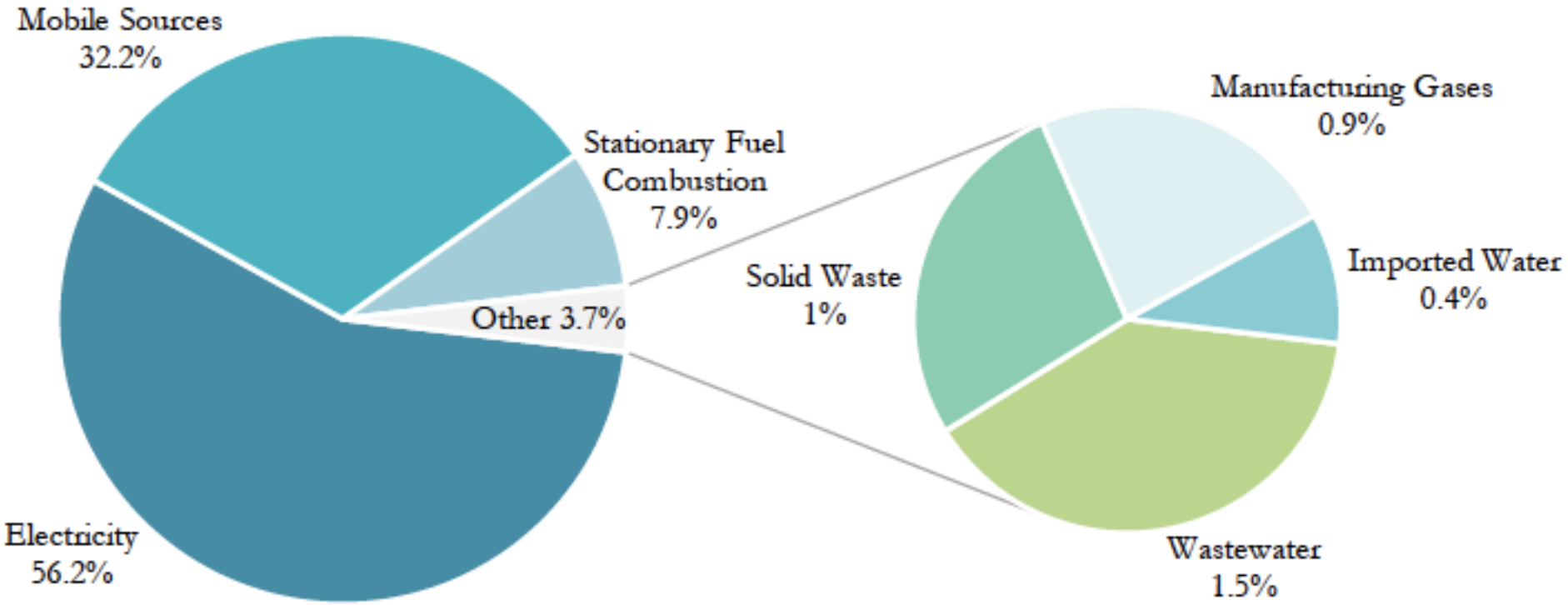
Source: Maricopa County 2018 Community Greenhouse Gas Emissions Inventory



The two largest sources of greenhouse gases (GHG) generated in Maricopa County are electricity generation (42.6%) and mobile Sources (40.7%). Projects related to building energy and fuel efficiency improvements, alternative fuel and electric vehicles will have a significant impact on greenhouse gas emissions in Maricopa County.

Scottsdale Community GHG Emissions by Source Category

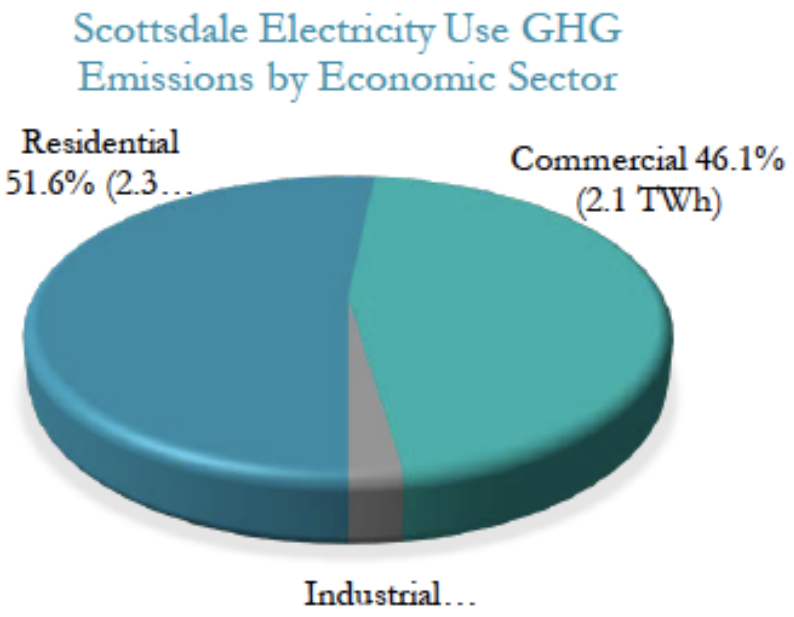
Source: Maricopa County 2018 Community Greenhouse Gas Emissions Inventory

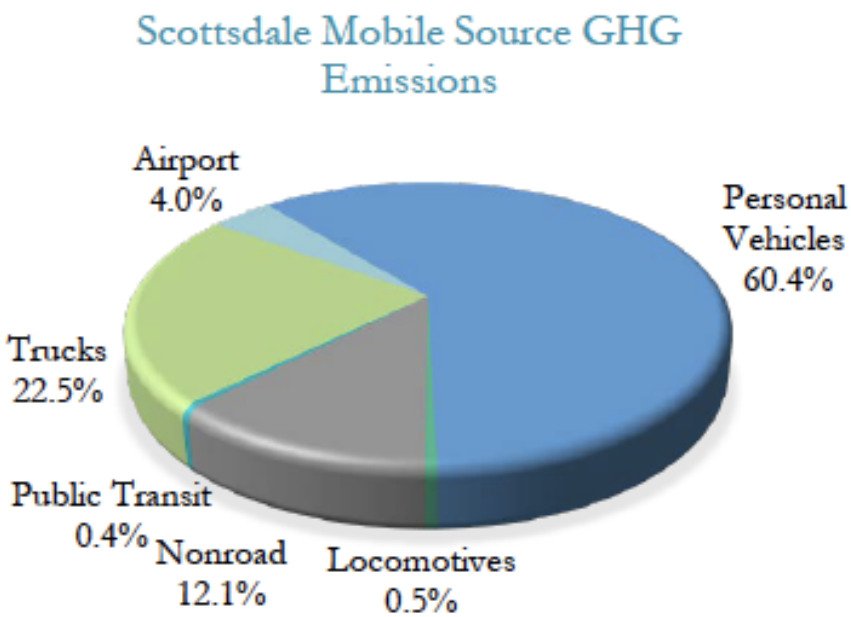


Findings suggest that building energy efficiency and vehicle fuel efficiency improvements, including electric vehicles will have a significant positive impact on GHG emission reductions.

Scottsdale Community GHG Emissions by Economic and Mobile Source

Source: Maricopa County 2018 Community Greenhouse Gas Emissions Inventory





Findings suggest that building energy efficiency and vehicle fuel efficiency improvements, including electric vehicles will have a significant positive impact on GHG emission reductions.

Buildings and communities are at the frontline of tackling climate change

Buildings are central to society, underlying the provision of essential needs, including housing, healthcare, education and business. When designed and constructed properly, they protect us from the elements of nature and allow us to withstand hazards. At the same time, buildings have an environmental impact. According to the International Energy Agency, buildings and construction consume 36 percent of global energy and, through the materials they use and their ongoing operations, buildings contribute almost 40 percent of all greenhouse gas emissions, all of which have a significant impact on the planet.

Learn more

Scottsdale Energy Reduction Targets
with adoption of 2021, 2024, 2027 Energy Codes (IECC)

Residential, Commercial and Municipal Buildings

New Buildings (2000 energy baseline)

- **55% energy reduction by 2021** (adopt 2021 energy code)
- 60% by 2025 (adopt 2014 IECC with 5% improved savings)
- **65% by 2030** (adopt 2027 IECC with 5% improved savings)

Existing Buildings (2000 energy baseline)

- **20% energy reduction by 2025** (lighting, equipment, controls, DSM)
- 30% by 2030 (lighting, equipment, controls, plug loads, DSM)
- **50% by 2040** (envelope improvements, controls, plug loads, DSM)

Carbon-Free Electricity from On- and Off-Site Sources

- **50% by 2020** (APS carbon-free energy – nuclear power plant & renewables)
- 60% by 2025 (increase in renewable energy)
- 70% by 2030 (phasing out of fossil fuel)
- **100% by 2040**

IECC - International Energy Conservation Code

Arizona Carbon Neutrality Targets

Jurisdiction	Energy Use Reduction	Carbon Neutrality	Renewable Energy (on-site and off-site)
Avondale	10% of municipal operations by 2025	25% of municipal operations by 2025	15% of municipal operations by 2025
Flagstaff	_____	100% citywide by 2030	100% citywide by 2050
Phoenix	20% of municipal operations by 2020	100% of municipal operations by 2040	15% citywide by 2025
Scottsdale	**65% of new buildings by 2030** (IECC)	**100% citywide by 2040**	**100% citywide by 2050**
Sedona	_____	100% citywide by 2045	_____
Tempe	_____	100% citywide by 2050	100% of municipal operations by 2035
Tucson	_____	100% of municipal operations by 2030	_____
AZ Corp. Commission	35% of served community by 2030	100% of state's electricity by 2050	50% of state's electricity by 2035

IECC - International Energy Conservation Code

National Carbon Neutrality Targets

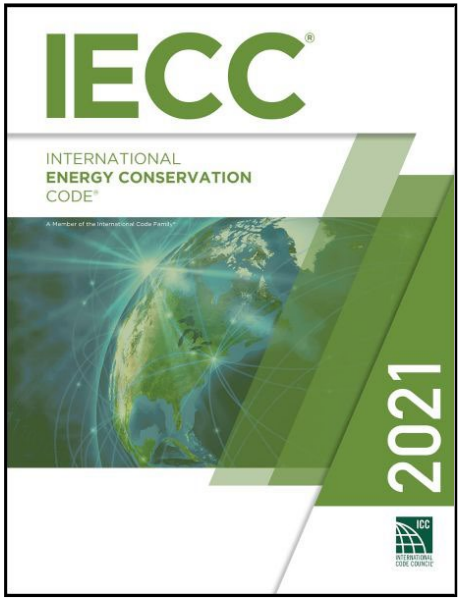
Jurisdiction	Energy Use Reduction	Carbon Neutrality	Renewable Energy (on-site and off-site)
Albuquerque	65% of municipal operations by 2025	80% citywide by 2050	100% of municipal operations by 2030
Austin	65% of community by 2020	100% of municipal operations by 2020	100% of municipal operations since 2011
Columbus	20% of municipal operations by 2020	100% citywide by 2050	100% of community by 2023
Denver	20% of municipal operations by 2025	80% citywide by 2050	100% of municipal operations by 2025
Las Vegas	30% of municipal operations by 2050	100% of municipal operations by 2050	100% of municipal operations since 2016
Park City	_____	100% citywide by 2030	_____
Salt Lake City	20% of municipal operations by 2025	50% of municipal operations by 2030	50% of municipal operations by 2020
Wash, DC	50% citywide by 2032	100% citywide by 2050	50% citywide by 2032

Source: ACEEE State/Local Energy Policy Database and city web sites

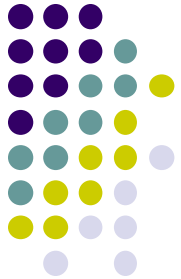
Scottsdale Energy Code Proposed Adoption & Update

1. Energy Efficiency and GHG Reduction

- Proposed adoption of 2021 International Energy Conservation Code (IECC) for new and renovated residential and commercial buildings
- Energy Components
  - Thermal envelope
  - Mechanical heating and cooling systems
  - Service water heating
  - Lighting systems
  - Solar-ready zones
  - EV-ready charging



Scottsdale Energy Code Proposed Adoption & Update

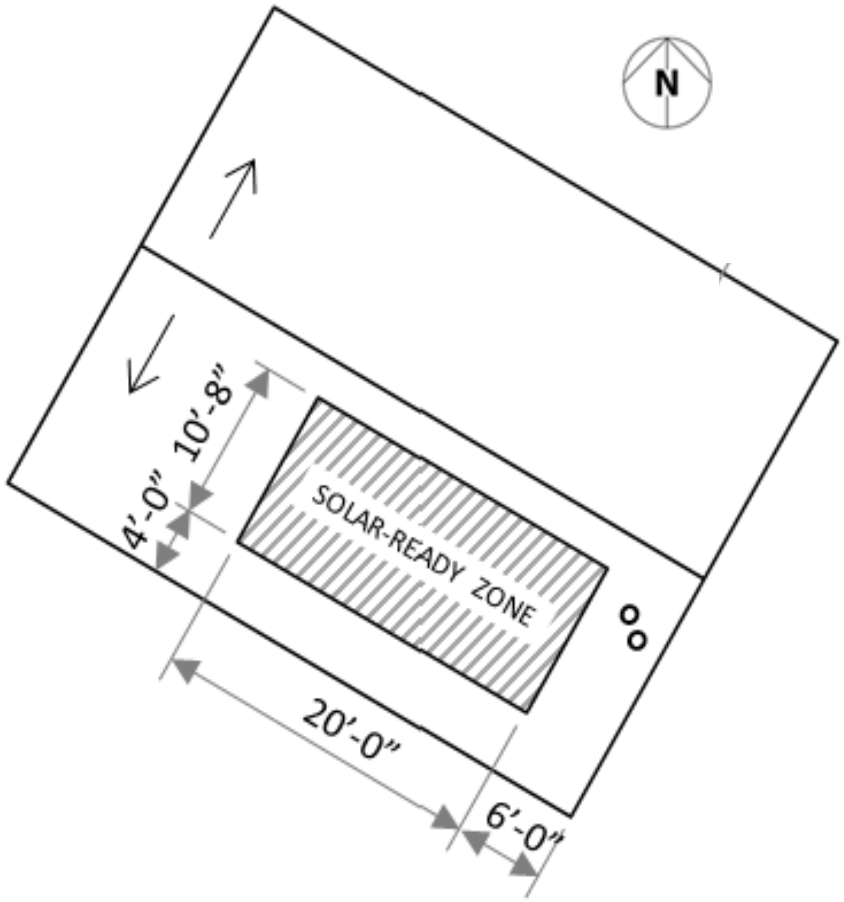


2. On-Site Renewable Energy

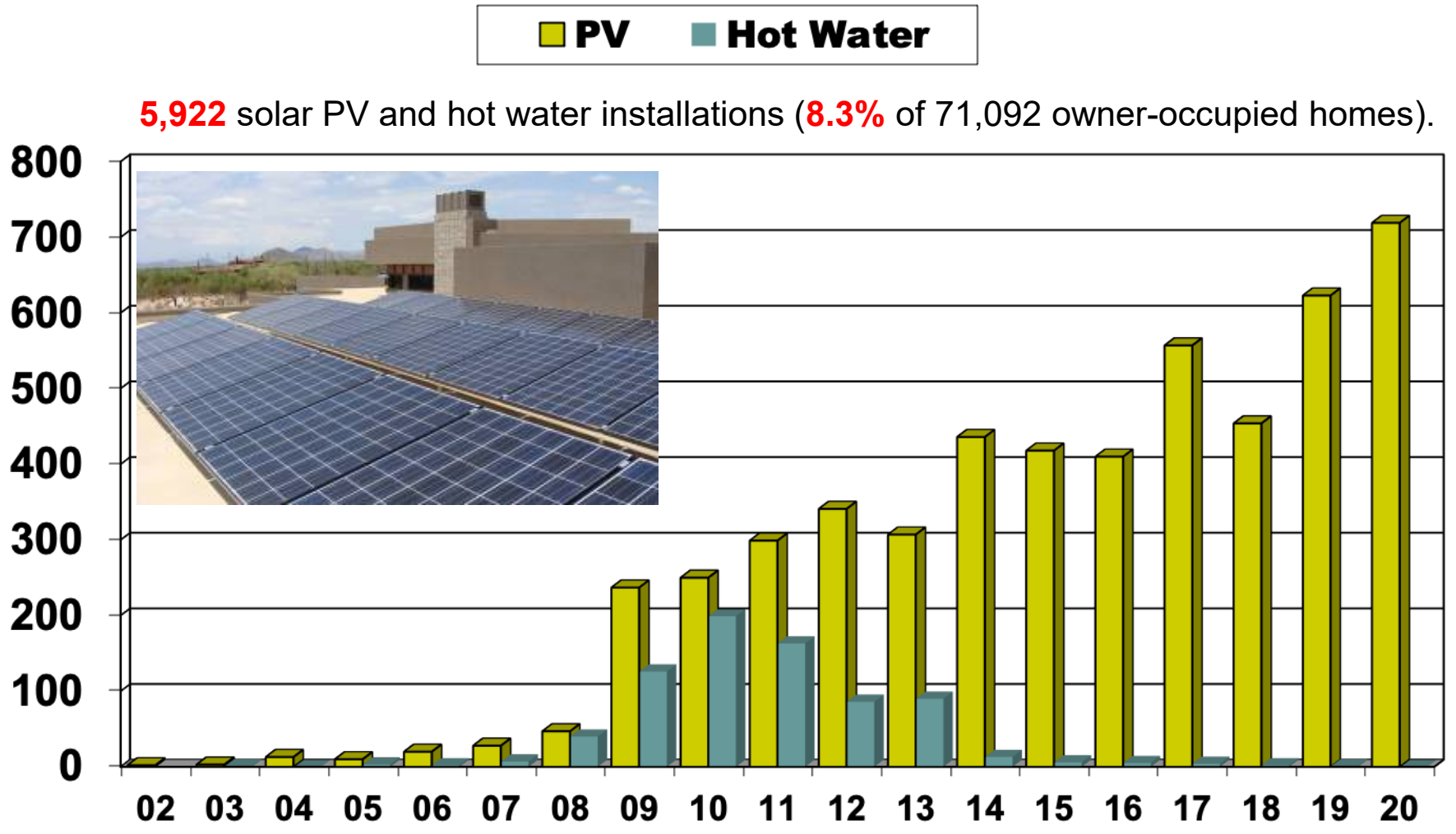
- Solar-Ready Zones - Residential
  - Allocate minimum 300 sq. ft. of unobstructed area
  - Provide electrical pathway to electrical service panel with reserved space for dual pole circuit breaker
- Solar-Ready Zones - Commercial
  - Allocate minimum 40 percent of the horizontally projected gross roof area for buildings 5 stories or less
  - Provide electrical pathway to electrical service panel with reserved space for dual pole circuit breaker

Note: As of 2020, over 5,200 solar electric PV and hot water systems have been installed on existing homes and over 1,855 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



Scottdale Solar installations 2002 to 2020



Source: Scottsdale CDS permit records

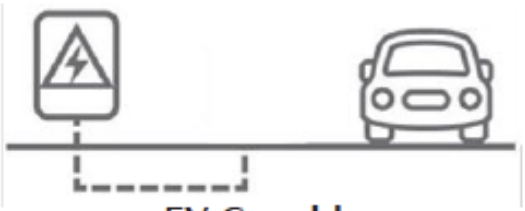
Scottsdale Energy Code Proposed Adoption & Update

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 50% of parking spaces with dedicated circuit and raceway – Level 2
- EV-capable for new commercial buildings
  - Provide charge capacity for 25% of parking spaces with dedicated circuit and raceway – Level 2

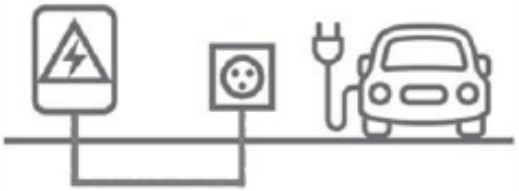
Source: Smart Charge America

What Are the Different EV Compliance Levels?



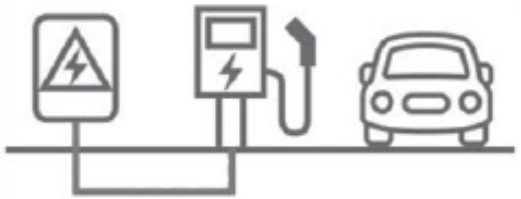
EV Capable

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).



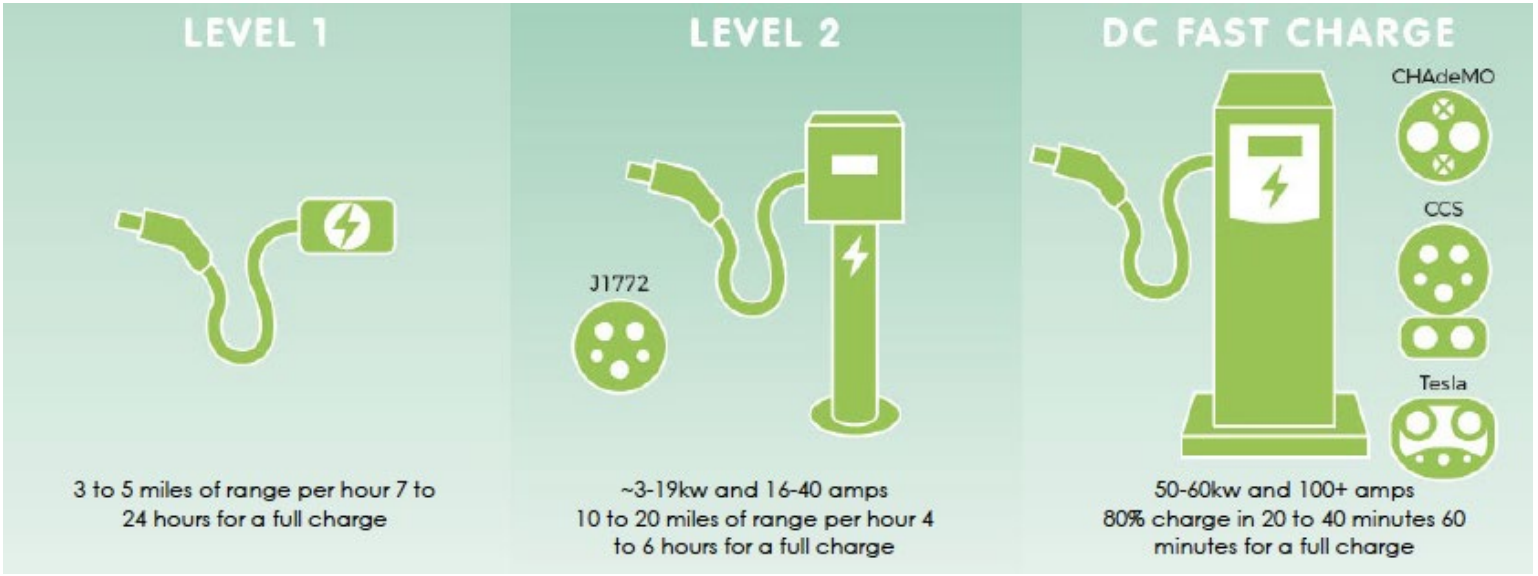
EV Ready

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.

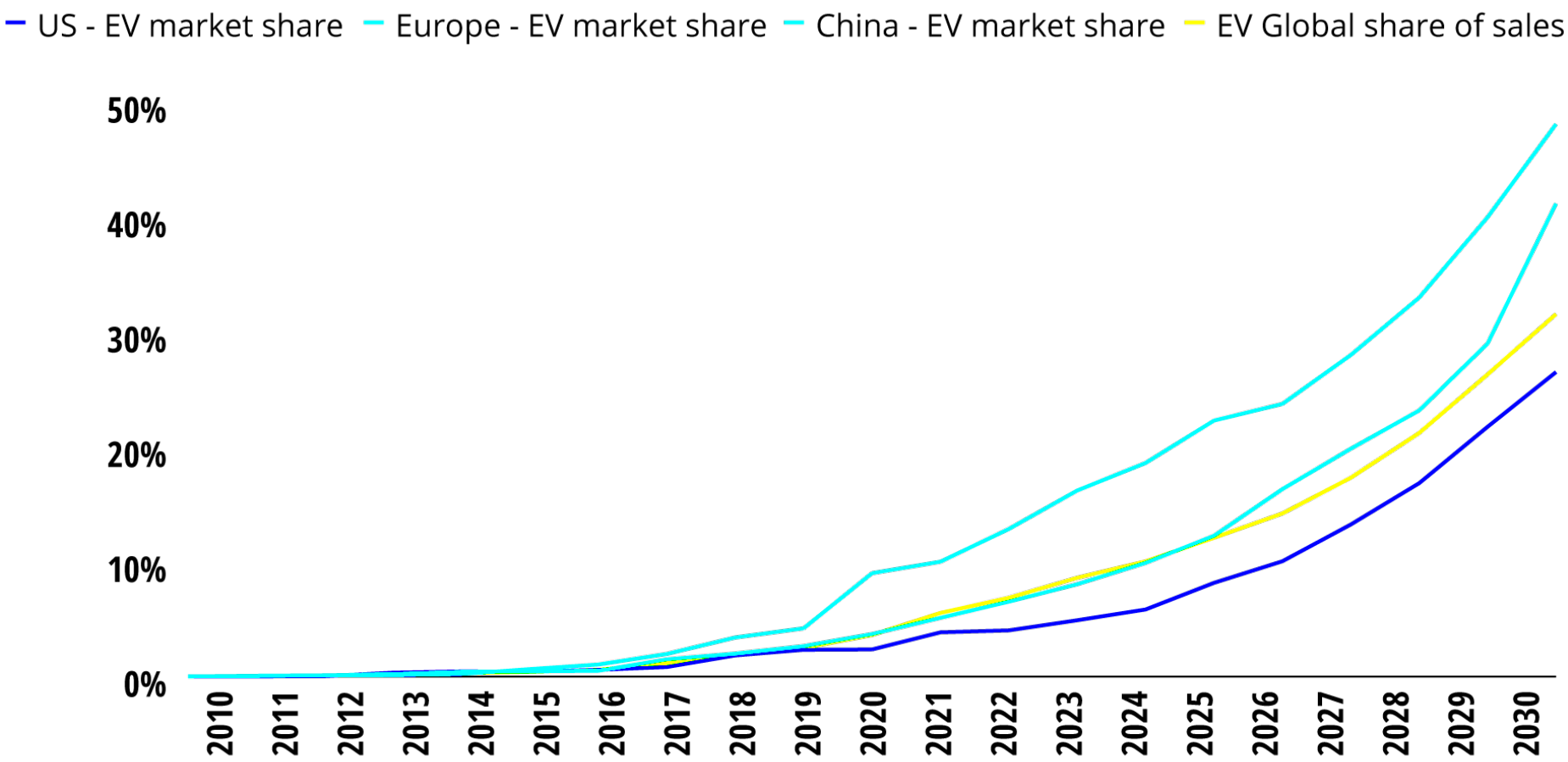


EV Installed

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

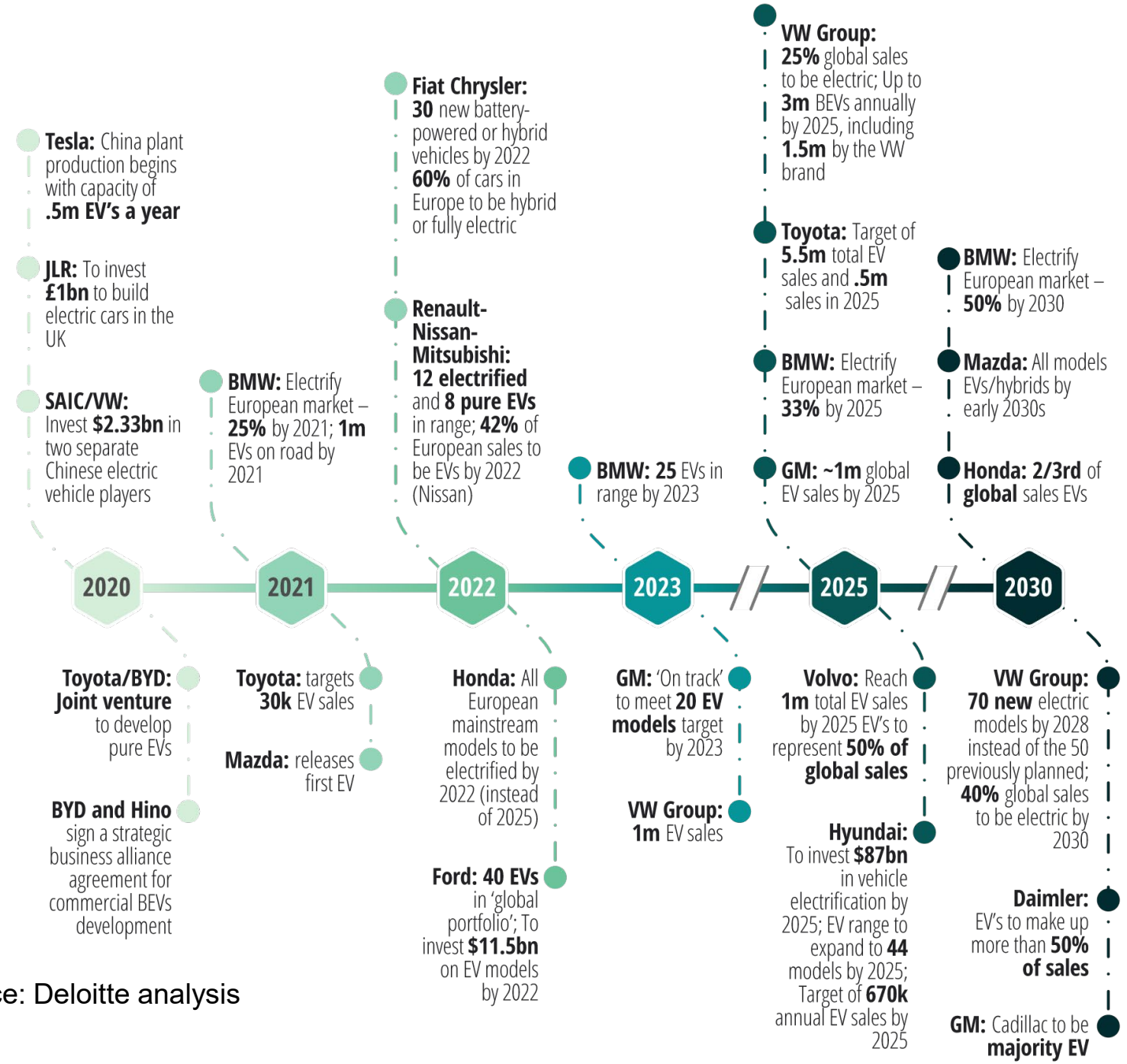


Projected EV Market Share by Region



Source: Deloitte analysis, IHS Markit, EV-Volumes.com[17]

EV Market Targets



Source: Deloitte analysis

Scottsdale Energy Code Proposed Adoption & Update

4. Energy Audit of Existing Buildings

- Energy assessment of existing residential and commercial buildings when a building undergoes improvements including alterations, renovations and additions
  - Utility assessment includes thermal envelope, air leakage, heating/cooling equipment, water heating and lighting
  - Utility rebates are available for energy audits/assessments and energy improvements including equipment upgrades

Green Building Advisor

Scottsdale Green Plumbing Code Amendments

5. Water Efficiency

a) High-efficiency plumbing fixtures and fittings

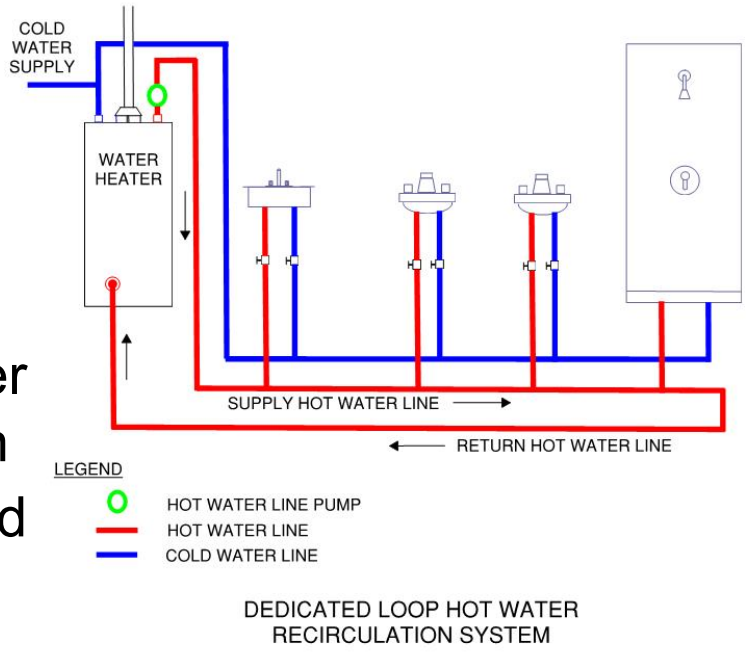
- Water closets, urinals, lavatory faucets, showerheads, kitchen faucets to meet WaterSense flush/flow rates

b) Efficient hot water delivery

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

c) Water metering

- Commercial cooling towers over 500 gpm for makeup/blowdown
- Evaporative coolers that exceed 0.6 gpm for makeup



Instant Hot Water System

Scottsdale Green Building Code Proposed Adoption

6. Indoor Air Quality

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

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

Interior Paints, Coatings, Adhesives and Sealants	VOC Limits grams/liter
Wall and Ceiling Paints	Flat: 50 Nonflat: 100 Nonflat high-gloss: 150
Primers, Sealers & Undercoaters	100
Floor Coatings	100
Concrete and Masonry Sealers	100
Stains	250
Wood Coatings	275
Carpet and Carpet Pad Adhesives	50
Ceramic Tile Adhesives	65
Wood Flooring Adhesives	100
Drywall and Panel Adhesives	50
Structural Glazing Adhesives	100
Multipurpose Adhesives	70
Architectural Sealants	250

Scottsdale Green Building Code Proposed Adoption

7. Material Resources

a) Recycling facilities

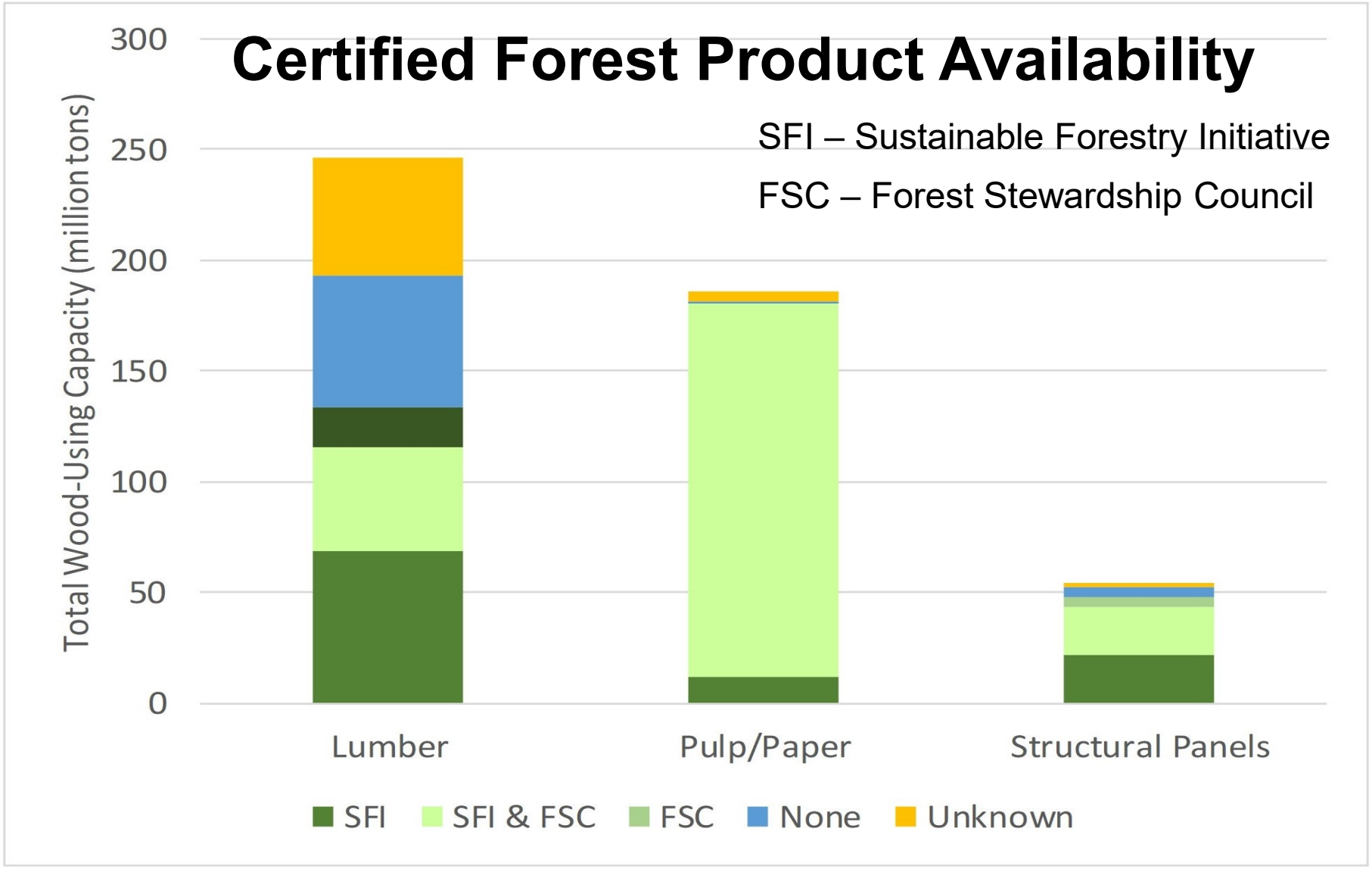
- Divert not less than 50% of construction waste from landfill for recycling and reuse
- Provide recycling/trash pull-out bins in kitchen cabinet of dwelling units of single- and multi-family buildings
- Provide recycling and trash chutes in multi-family buildings (≥ 3 stories) or provide recycling collection area on each floor
- Provide recycling collection in mailrooms, breakrooms and common kitchen areas of multi-family and commercial buildings

Scottsdale Green Building Code Proposed Adoption

7. Material Resources

b) Wood building components

- Framing, sheathing, flooring, doors, window frames, and millwork required to contain not less than 60% certified wood content
- Sustainable Forestry Initiative (**SFI**), Forest Stewardship Council (**FSC**) or other forest certification program



Forest Certification at Wood-Using Mills by Sector (2018)

(Sources: Forisk Consulting, Sustainable Forestry Initiative, Forest Stewardship Council)

Energy Code Action Plan
Post-Adoption Implementation

- **New Buildings (residential, commercial, municipal)**
  - 2021 Energy and Green Code
    - Community education and user-friendly compliance tools
- **Existing Buildings (utility energy improvement incentives)**
  - Residential buildings (triggered by additions and alterations)
    - Energy audit and improvements with utility incentives
  - Commercial buildings (triggered by additions and alterations)
    - Energy assessment and improvements with utility incentives
    - Identify energy opportunities with building use/occupancy changes, zoning/real estate classifications and market driven activities
  - Municipal buildings (continuous improvements)
    - Energy tracking and benchmarking targets
    - Energy Savings Performance Contracting
    - Energy improvements with capital improvements