



CITY OF
TUCSON

PLANNING & DEVELOPMENT SERVICES

APRIL 2022

Electric Vehicle Readiness

City of Tucson Code Amendments
for EV Charging requirements in new
residential and commercial development



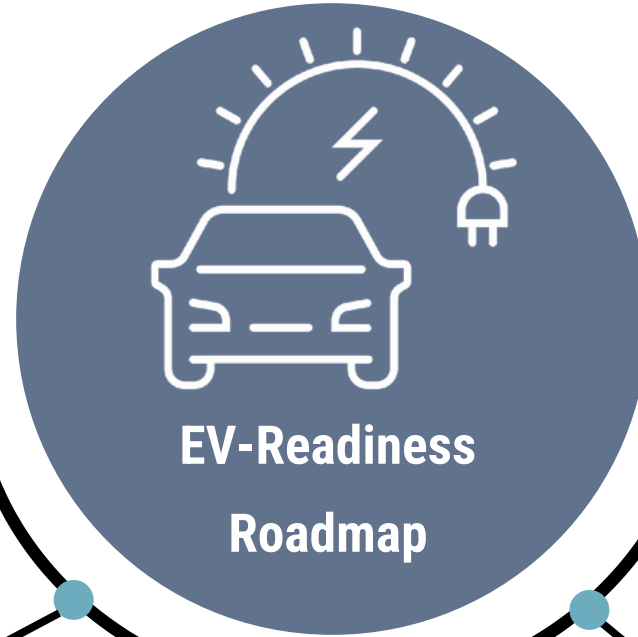
City of Tucson Electric Vehicle Readiness Roadmap



Guiding Principles

Promote clean air

Clean air that protects public health, our natural environment and sustainable economic growth.



EV-Readiness Roadmap

Ensure a healthier future

A process that values equity, access, and healthier communities and environment.



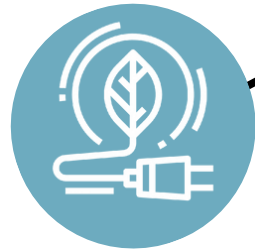
Benefit economy wide

Innovation in how we move, where we live and work, and how we power our economy while limiting adverse impacts in our communities.



Prove effective

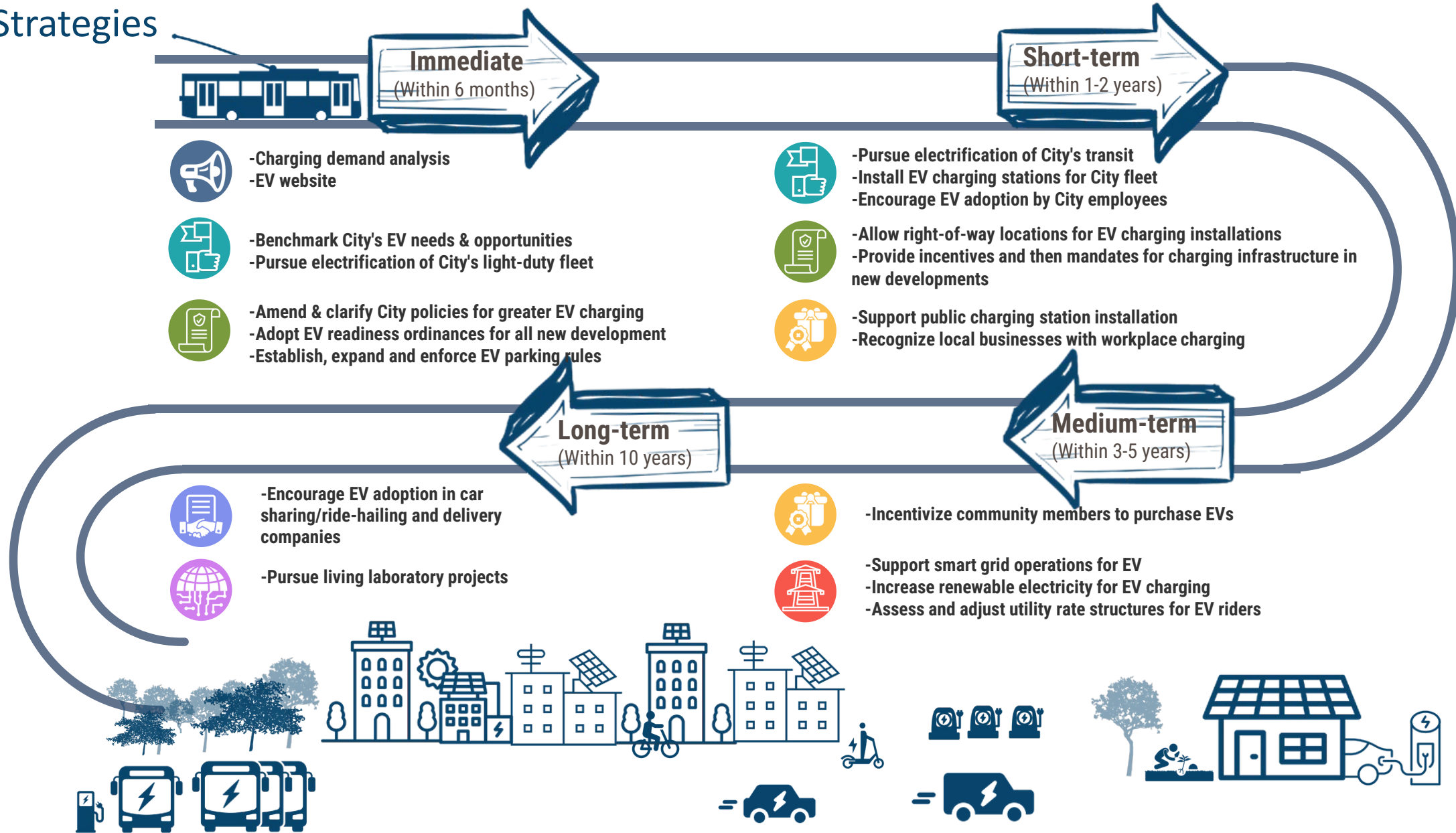
Solutions that are integrated, durable, credible, and actionable.



Accelerate clean energy

Energy that is affordable, reliable and carbon neutral.

City of Tucson Electric Vehicle Readiness Strategies



★ Ongoing



Outreach & Education



Leading by Example



Policies



Incentives



Utilities



City Planning & Regional Coordination



Emerging Technologies

Actions within 6 months



**Outreach &
Education**

- Charging demand analysis**
- EV website**



**Leading by
Example**

- Benchmark City's EV needs & opportunities**
- Pursue electrification of City's light-duty fleet**



Policies

- Amend & clarify City policies for greater EV charging**
- Adopt EV readiness ordinances for all new residential, multi-family and commercial developments**
- Establish, expand and enforce EV parking rules**



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Proposed Text Amendment

- 1 Require EV Readiness in **new** multifamily and commercial development and provide incentives for additional infrastructure beyond minimum standards.




Proposed MULTIFAMILY25%

 Stations	0%
 Outlets	10%
 Conduit	15%

Proposed COMMERCIAL20% Includes Office Uses

 Stations	0%
 Outlets	5%
 Conduit	15%

Proposed RETAIL10% Includes Food & Beverage Service Uses

 Stations	5%
 Outlets	5%
 Conduit	0%

Exception: Retail uses with less than 100 parking spaces exempt from EV Requirements

Requirements are for new construction or existing expansion thresholds in the UDC

- 2 Expand the use of the Individual Parking Plan (IPP) application by including affordable housing as a permitted type of development and removing the restaurant and bar exception.

All existing IPP application requirements, protections, and approval procedures would remain and apply to these uses

Planning Commission voted 8 – 0 in support

with additional recommendations to the Mayor and Council

- review the amendment in 1-2 years, and
- consider reducing the minimum parking requirement for affordable housing



EV Roadmap

Adopted April 2021

Item for immediate action:

Adopt EV readiness ordinances for all new development



- Charging demand analysis
- EV website



- Benchmark City's EV needs & opportunities
- Pursue electrification of City's light-duty fleet



- Amend & clarify City policies for greater EV charging
- Adopt EV readiness ordinances for all new development
- Establish, expand and enforce EV parking rules



- Pursue electrification of City's transit
- Install EV charging stations for City fleet
- Encourage EV adoption by City employees



- Allow right-of-way locations for EV charging installations
- Provide incentives and then mandates for charging infrastructure in new developments



- Support public charging station installation
- Recognize local businesses with workplace charging



- Encourage EV adoption in car sharing/ride-hailing and delivery companies



- Pursue living laboratory projects



- Incentivize community members to purchase EVs



- Support smart grid operations for EV
- Increase renewable electricity for EV charging
- Assess and adjust utility rate structures for EV riders



EV Ready for new Single Family Residential

On June 22, 2021, The City of Tucson M&C adopted an amendment to the building code requiring EV Readiness in new single family residential. This amendment:

- Outreach conducted over a two-year period – recommended by code and climate committees
- Applied to one- and two-family dwellings
- Was based on code development by the International Code Council to align with future code amendments to other jurisdictions nationally
- Specified a 40 amp outlet to be universal to the majority of electric vehicles currently on the market
- When adopted, M&C directed staff to address multi-family and commercial



Stakeholder Engagement



<https://www.tucsonaz.gov/pdsd/commercial-parking-amendments>

* Adoption of EV Ready requirement for 1 and 2 family residential



National Trends

Market Availability

50 EV models available today

130 EV models expected by 2023

+5
years

According to one study, EVs should be cheaper to buy on average than combustion vehicles in about 5 years, without subsidies

+15
years

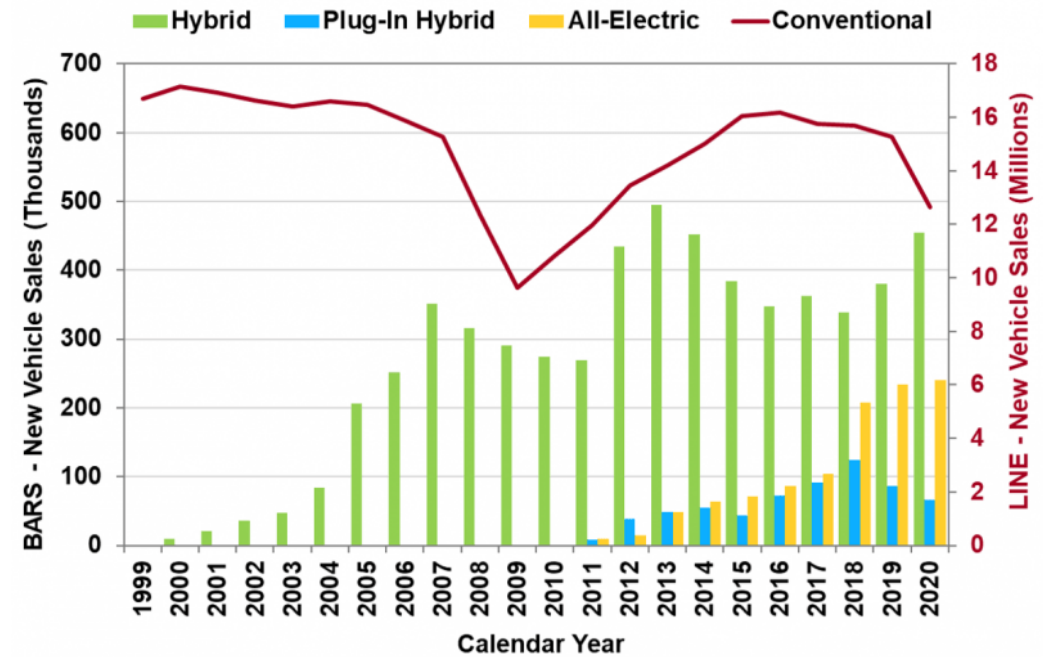
6 Major automakers (Ford, GM, Volvo) pledged to phase out new gas and diesel vehicles by 2035-2040

New building lifespan average starts at 30 years

Federal Priority

- 50% EV share by 2030
- Acceleration and deployment of EV tech, charging infrastructure, alternative fuel corridors, EV jobs prioritized in Electric Vehicle Charging Action Plan

New U.S. Vehicle Sales by Technology Type, 1999-2020



EV Ownership

National EV Share

2%

2018 – 2020

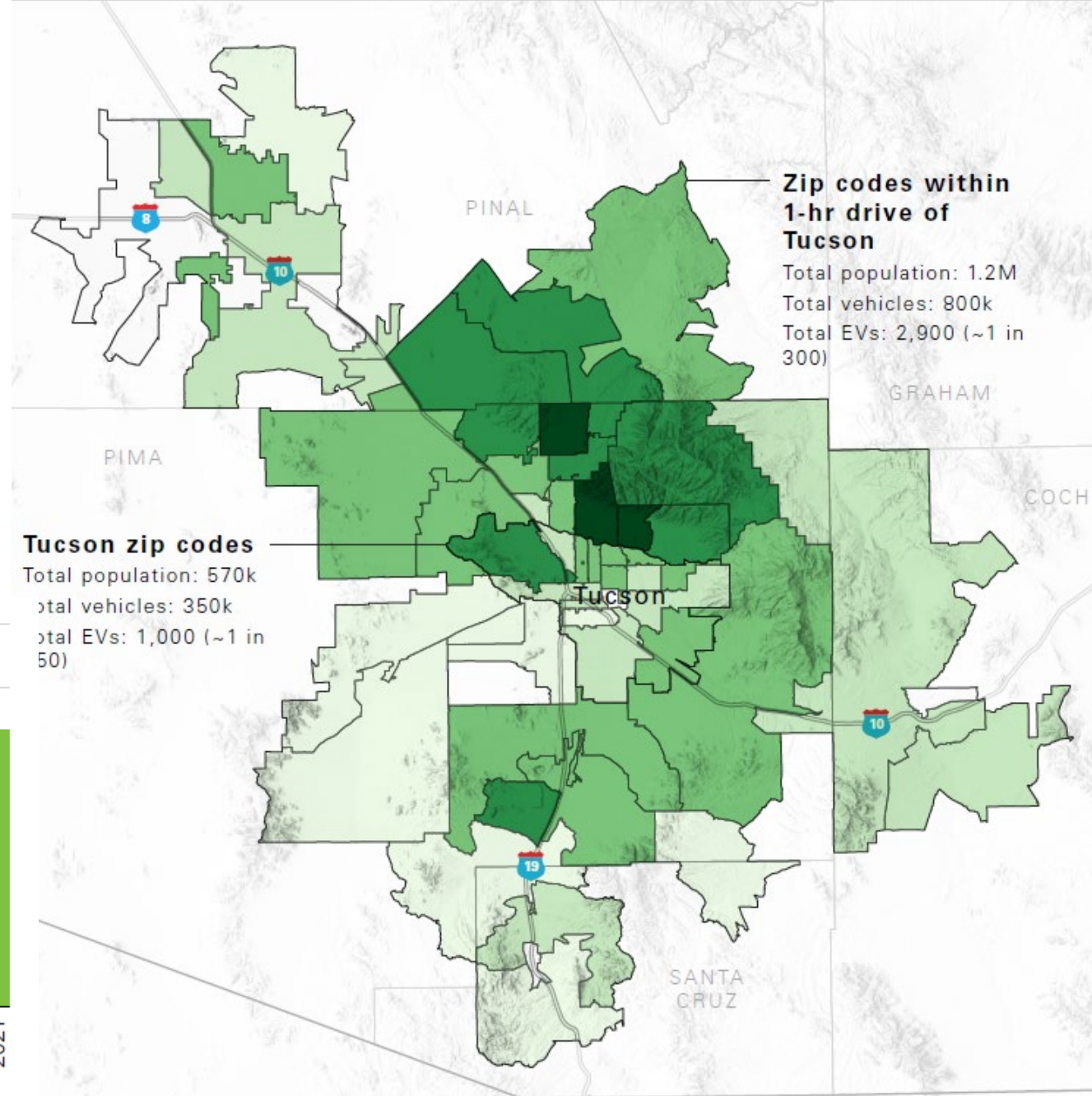
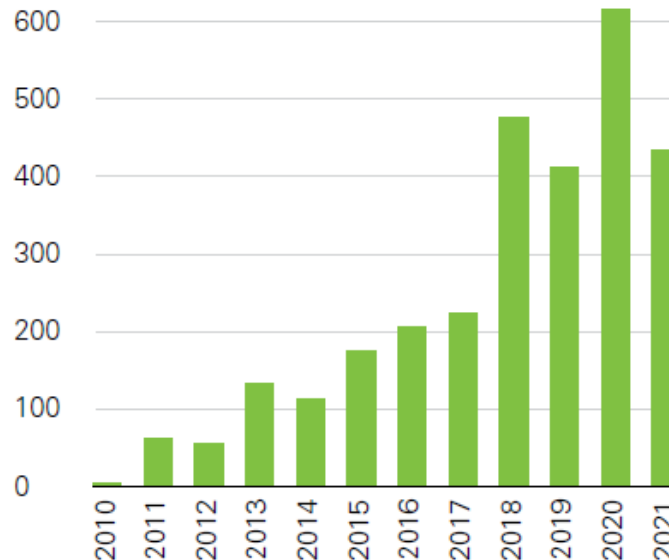
Newer models outnumber older ones, suggesting stronger EV sales in recent years

More affordable models of EVs make up the majority, like the Model 3 Tesla and the Nissan Leaf.

About **one in 300** vehicles in the Tucson Metro Area is an EV











Around **1,000 EVs** are registered within the City of Tucson itself

Total Electric Vehicles by Model Year
Registered in Zip Codes within a 1-hour drive of Tucson





Peer City Research

 National 2% 2018 – 2020 EV Share		 Arizona Tucson 0% - >1%		<i>Incentive only:</i> Total parking spaces -1 for every 1 EV station, up to 25%		Phoenix 3% - 4%	EV Roadmap in development	Mesa Likely similar to Phoenix	<i>Incentive only:</i> Compact parking spaces +1% for every 2 EV stations, up to 25%	
EV Ownership		EV Requirements				 Stations	 Outlets	 Conduit	Incentives	
 Albuquerque New Mexico 2021	2%	All New Development 200+ spaces	2%			2%			1 EV Station = - 2 Spaces	
 Miami Dade Florida 2019	2%	Multi-family 9+ spaces	20%				20%	10% phase in 2019		
 Salt Lake City Utah 2018	2.5%	Multi-family	~25%			1:25	20%	4% All ADA Spaces EV Capable		
 San Jose California 2020	>20%	Non-residential	50%			10%		40%		
		Multi-family & Hotel	100%			10%	20%	70%		



Charging Habits & Patterns

Expanding the infrastructure network will help make EVs a viable option for all drivers, even those without garages



Charging at home

- More than 80% of EV drivers charge their cars at home
- It requires no (waking) time, no detours, and is gentler on the battery than high speed charging



Charging at multifamily buildings

- About half of Americans do not have access to a dedicated off-street parking space for overnight or low cost EV charging



Charging at workplaces

- Employers can help increase the convenience and affordability of driving electric for their employees



Public charging

- Public charging stations can increase the daily useful range of EVs
- Public charging stations should typically be located where vehicle owners are highly concentrated and parked for long periods of time, such as shopping centers, airports, hotels, government offices, and other businesses

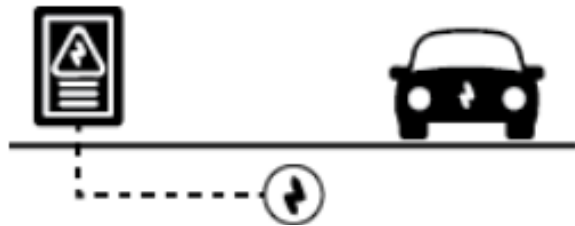
realpage.com/blog/multifamily-housing-and-ev-charging-stations/



EV Readiness

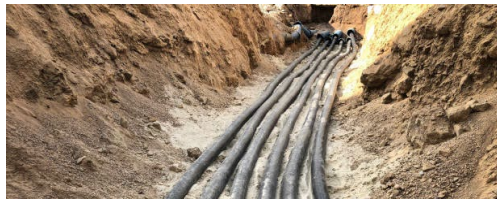
future

EV Capable Conduit



EV Capable Conduit

- + electric capacity
- + “pre-wired”
- = **future** EV parking space
- Includes hard to retrofit elements during new construction
- Minimizes upfront costs

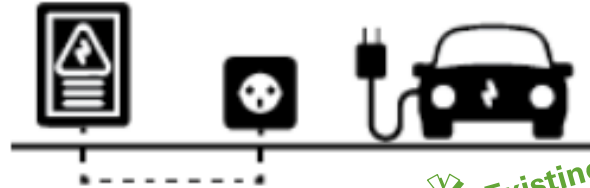


Trenching / conduit **\$20 – \$41** per linear ft
Electric upgrades **\$0 – \$27,500** per lot

Retrofits. **300% more on average**

ready to use

EVSE Ready Outlet



EVSE Ready Outlet

- + electric capacity
- + wiring
- + outlet
- = **ready to charge** EV parking space
- Ready to “plug in”
- Infrastructure can still be upgraded

Existing requirement for new 1 & 2 family residential in Tucson



NEMA 14 – 50 outlet **\$15 – \$50** per space
Trenching / conduit **\$20 – \$41** per linear ft
Electric upgrades **\$0 – \$27,500** per lot

EVSE Installed Station



EVSE Installed Station

- + electric capacity
- + wiring
- + charging station
- = **ready to charge with controlled access** EV parking space
- Most visible commitment to EV charging



Charging station. **\$500 – \$4,100** per space
Trenching / conduit **\$20 – \$41** per linear ft
Electric upgrades **\$0 – \$27,500** per lot



Proposal Goals

In addition to furthering the goals outlined in the EV Roadmap



Ensure equitable access to the benefits of advancing technology, cost savings, and environmental benefits of EV adoption



Provide significant cost savings by avoiding extensive future retrofits to add EV charging infrastructure in the future



Implement baseline requirements at various commercial locations, based on visitation frequency, parking time, and diverse users



Require the most usable readiness for the least cost in building lifetimes to span the next 30 years and beyond



Proposal

Requirements are for new construction or existing expansion thresholds in the UDC

Level of EV Readiness



Stations



Outlets



Conduit



Incentives

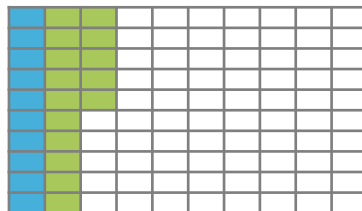
Summary



Multifamily

Total EV Requirement

25%



10%

15%

for each

or additional

= 1 less space

outlets & conduit required

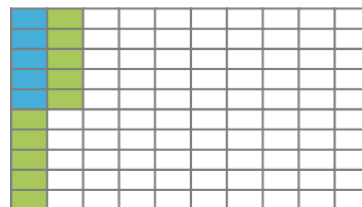
- EV drivers most likely to charge at home.
- Residents' regular use possible to manage without stations



Commercial

Includes office use

20%



5%

15%

for each

or additional

= 1 less space

outlets & conduit required

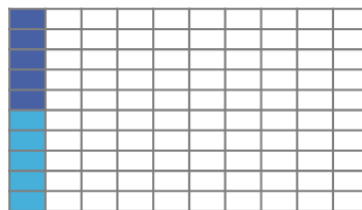
- The regularity and duration of a work shift is next preferred for charging.
- Employees' regular use possible to manage without stations



Retail

Includes food & beverage service use

10%



5%

5%

for each additional

= 2 less spaces

stations & outlets required

- Shorter dwell times than home or workplace
- Public charging stations can increase the daily useful range of EVs
- Stations are appropriate interface for varied EV drivers/visits

Exception: Retail uses with less than 100 motor vehicle parking spaces are exempt from required EVSE.

= 1 parking space

Reductions possible up to 30% reduction of required lot size



Cost Estimates

Requirements are for new construction or existing expansion thresholds in the UDC

EV Readiness Level	New Construction	Retrofit	Unit	Sources
Trenching	\$11 - \$19	\$100 - \$150	\$ / linear ft	afdc.energy.gov, wisercosts.com
Conduit	\$11 - \$23		\$ / linear ft	
NEMA 14-50 Outlet	\$15 - \$50		\$ / outlet	
Station	\$500 - \$4,100		\$ / station	afdc.energy.gov, online.ogs.ny.gov
Custom Signage and Striping	\$500 - \$1,500		\$ / project	futureenergy.com
Possible Electrical Upgrades				
Electrical Panel Upgrade	\$1,800 - \$2,500		\$ / project	afdc.energy.gov
Transformer Upgrade	\$10,000 - \$25,000		\$ / project	
Current Incentives (Rebates)				
TEP Workplace	\$4,500		\$ / station	www.tep.com/smart-ev-charging-program
TEP Multifamily and Non-Profit	\$6,000		\$ / station	www.tep.com/smart-ev-charging-program
Federal tax credit	\$30,000		\$ / project	afdc.energy.gov, irs.gov

Cost Estimates per space before electrical upgrades or rebates *(listed above)*

Multifamily



\$95 - \$960 per space
in parking lot sizes from 10 – 100 spaces
Project cost \$1,240 - \$25,800

Commercial



\$85 - \$930 per space
in parking lot sizes from 10 – 100 spaces
Project cost \$1,100 - \$23,800

Retail



\$180 - \$610 per space
in parking lot sizes of 100 spaces
Project cost \$18,000 - \$60,973



Further Considerations

Accessibility

- Four percent (e.g., 1 in 25 spaces) but no less than one of the EV charging spaces, in any given parking facility, must be accessible compliant.
- These spaces are accessible EV charging spaces, not ADA parking spaces.



Guidelines Recommended

Signage & markings

- Regulations
- Wayfinding

Lot design

- maximum EV visibility
- user ease and safety
- implementation cost savings





Feedback – EV Readiness




Issue	Proposal
<ul style="list-style-type: none">• Concern that affordable housing, small businesses will be cost burdened• Opinion that EV charging should be market driven	<ul style="list-style-type: none">• Guided by equitable distribution of EV access• Multifamily and commercial use requires lower cost EVSE• Exception for retail with less than 100 parking spaces (less than 10,000sqft)
<ul style="list-style-type: none">• Interest in increasing requirements in phases	<ul style="list-style-type: none">• Guided by aligning Tucson’s EV readiness with new building life cycles and EV trends. Phased requirements could miss that alignment opportunity
<ul style="list-style-type: none">• Concern that average Tucson income levels not comparable to EV adoption & requirements in California cities (50% - 100% San Jose)	<ul style="list-style-type: none">• The proposed requirements are most like those in Salt Lake City, UT, which has an estimated 2.5 percent EV adoption rate






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