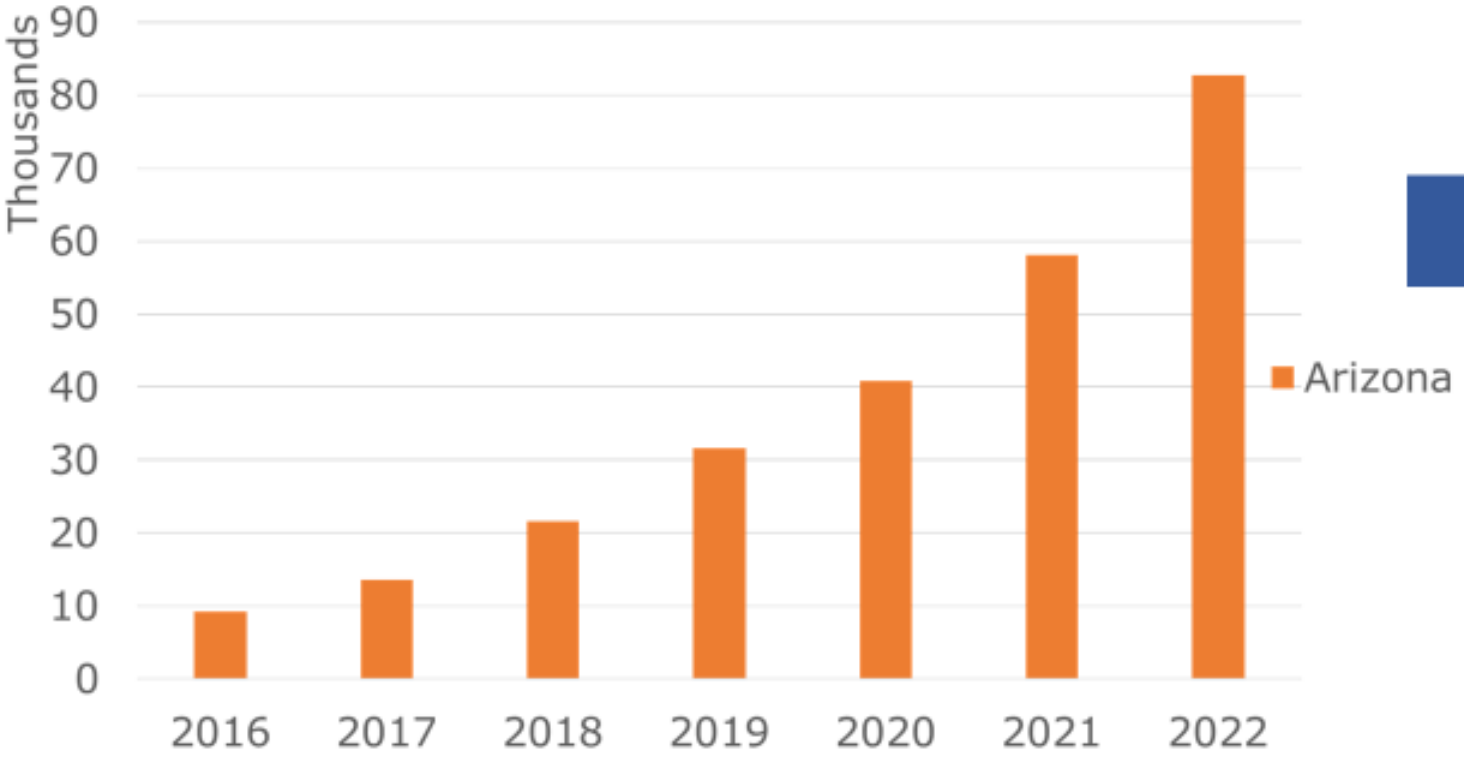
The Acceleration of Transportation Electrification in Arizona & How Your Entity Can Benefit

EV Adoption by the Numbers



Arizona	**82,762**

Chart adapted from APS TE Annual Progress Report, filed March 15, 2023. Reprinted by APS with permission of EPRI.

Electric Vehicles:

Significant Policies in Arizona

- Due to the federal Bipartisan Infrastructure Bill, over the next five years, Arizona is expected to receive $76.5 million to establish electric vehicle charging stations along our state's designated alternative fuel corridors. To gain input, ADOT has initiated a robust stakeholder process.
- The Arizona Corporation Commission adopted a Comprehensive Transportation Electrification Plan for Arizona, supporting a statewide goal of over 1 million electric vehicles on Arizona roads by 2030.
- Salt River Project adopted a policy to support the necessary infrastructure to enable at least 500,000 electric vehicles in their service territory & to manage 90% of charging by 2035.
- Municipalities across our state, including Phoenix, Tucson, & Mesa, have adopted electric vehicle roadmaps &/or Climate Action Plans.

Electric Vehicles:

Businesses in Arizona

- American Battery Company
- Ampcera
- Atlis Motor Vehicles
- Ecobat
- ElectraMeccanica
- EVelution
- Heritage Battery Recycling
- KORE Power
- LG Energy Solution
- LiCycle
- Lucid Motors
- Nikola Motor Co.
- Sion Power
- UACJ Whitehall
- Zero Electric Vehicles

AZEVPLAN

Electric Vehicle Infrastructure Deployment Plan

ADOT

What is NEVI?

- The National Electric Vehicle Infrastructure (NEVI) Formula Program is a $5 billion project managed by the Federal Highway Administration (FHWA) to fund a national network of EV Fast Charging stations along interstate highways
- This facilitates long-distance travel by reducing the ‘range anxiety’ of trips

U.S. Department of Transportation

Federal Highway Administration

NEVI and Arizona

- Arizona is eligible for up to $76.5 million in NEVI Formula Program funding across five years
- This federal funding can only be used as directed: the construction of EV fast charging stations along Alternative Fuels Corridors, currently the interstates

Targeted Benefits

- The NEVI program requires that at least 40% of the program's benefits are targeted towards disadvantaged communities, including rural and tribal areas
- Benefits include increased tourism, improved air quality and job opportunities in EV charger installation and maintenance

ADOT's Role in NEVI

- ADOT prepared a plan to establish the network of charging stations
- The plan was submitted in August and approved in September
- ADOT will administer implementation of the plan over the next five years
- State funding is **not** being used for the construction or upgrading of charging stations

Implementation Requirements

- Stations must be placed at least every 50 miles and within one mile of the interstate
- Stations must support simultaneous charging on at least four 150 kW DC Fast Chargers with J1772 CCS connectors
- Stations will be privately owned, operated, and maintained
- Build costs are split 80% federal, 20% private

Implementation Requirements, Continued

- ADOT is setting the goal of at least 97% reliability at each station
- Stations will not be located on ADOT right-of-way, including rest stops, due to restrictions on business use of these sites

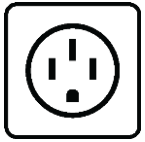
ADOT EV Plan Goals

- Build a resilient, equitable, accessible, reliable network
- Reduce ‘range anxiety’ by closing existing network gaps
- Engage stakeholders and the public in all phases
- Identify potential new AFCs during engagement
- Utilize efficient contracting and procurement
- Collect and apply data and metrics to future planning

EV Charging Basics

Charging Speeds

Level 1: Good for charging overnight and on weekends



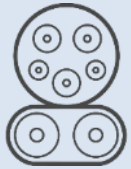
Level 2: Good for charging while at work or activities

Level 3: Good for charging during a meal or short break

Connectors

Tesla: Proproprietary connector for Tesla EVs only

CHAdeMO: Used in US by some Nissans and Mitsubishis

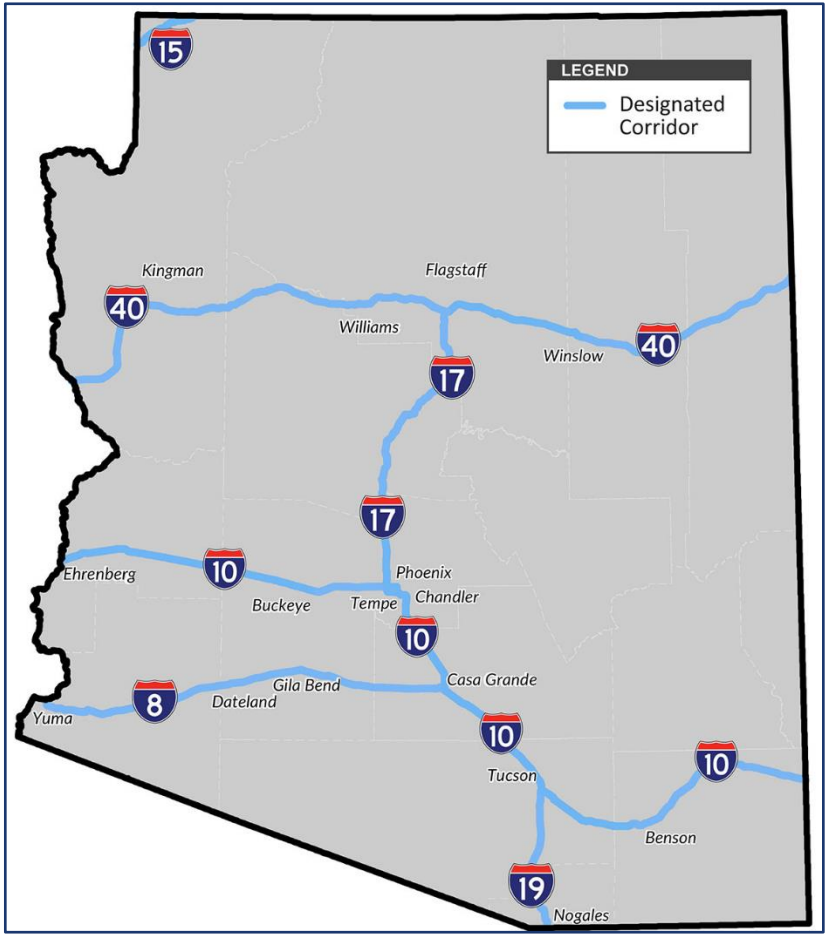


J1772 CCS: North American standard for most EV brands

For best compatibility and travel suitability,
NEVI uses Level 3 charging with CCS connectors

Alternative Fuel Corridors

- Alternative Fuel Corridors (AFCs) are the designated highway corridors for EV charging infrastructure
- NEVI charging stations must be placed along AFCs
- Currently, Arizona's AFCs are the interstate highways
- ADOT is seeking public input for choosing state highways to nominate as potential new AFCs



Existing Stations

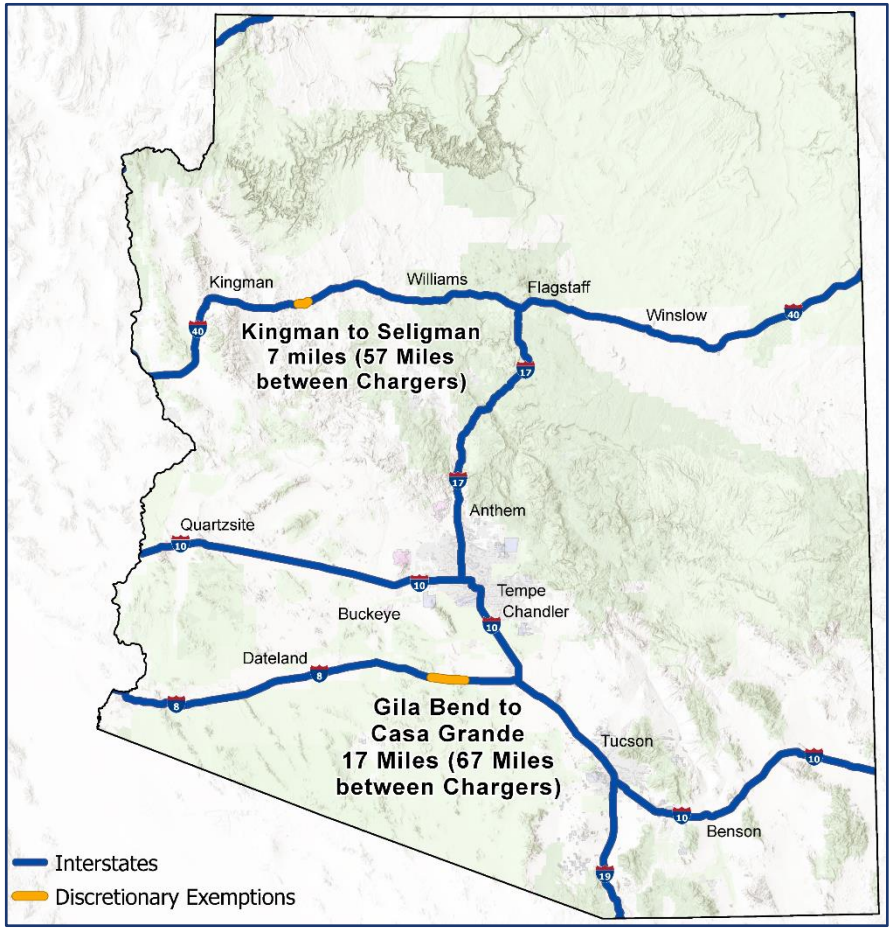
- This map shows existing stations that meet NEVI requirements
- The numbers printed in between each station is the distance in miles in between; the goal is to reduce gaps to 50 miles or less

NEVI Station Sites

- This map shows proposed approximate station sites to address the gaps in the existing network
- White icons would be new stations
- Yellow icons are existing EV charging stations that could be upgraded

Needed Exemptions

- This map shows the two locations where ADOT was granted exemptions from the 50-mile station gap goal
- These areas lacked an interchange with appropriate infrastructure and amenities for locating a station



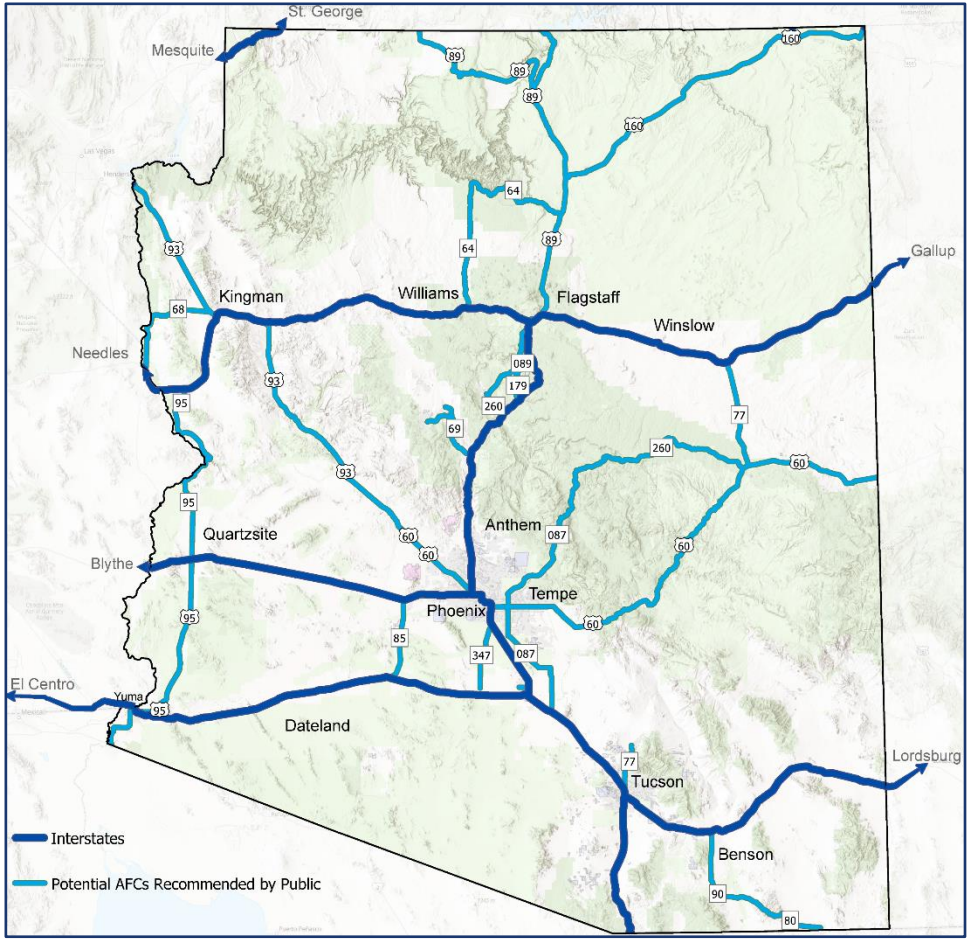
Complete Map

- This combines the previous maps into one
- This also shows the new distances between stations (the black numbers)
- In most cases, ADOT's plan exceeds requirements by leaving smaller gaps than the 50-mile gap goal

New AFC Eligibility

Eligibility for potential new AFCs:

- Must be part of the National Highway System (includes many State Routes and more)
- Should improve state and national connectivity, providing better routes to more places
- Should meet further criteria currently being established by ADOT with the help of public input in this round of outreach



Common Public Suggestions for New AFCs

- **US 60 –** Phoenix to Wickenburg and Globe, Show Low to NM
- **SR 64 –** I-40 to Grand Canyon National Park
- **SR 68 –** US 93 to Bullhead City
- **SR 69 –** I-17 to Prescott
- **SR 77 –** SR 260 to I-40, Tucson to Pinal County
- **SR 80 –** Bisbee to Douglas
- **SR 85 –** I-8 to I-10
- **SR 87 –** Phoenix to Payson
- **SR 89/89A –** SR 69/169 to north end of route

Common Public Suggestions for New AFCs

- **US 89 –** Flagstaff to UT
- **SR 90 –** I-10 to Bisbee
- **US 93 –** Wickenberg to I-40, Kingman to Hoover Dam
- **US 95/SR 95 –** San Luis to Bullhead City
- **US 160 –** US 89 to Four Corners
- **SR 179 –** I-17 to Sedona
- **SR 260 –** Payson to Show Low, Camp Verde to Sedona
- **SR 287 –** Casa Grande to I-10
- **SR 347 –** Maricopa to I-10

Project Milestones

2022

- **October and November** – Second round of public outreach
- **November 30** – Refine implementation strategy

2023 and Beyond

- Upgrade existing stations
- Begin work on new stations
- Nominate new AFCs
- Annual plan updates

We Want to Hear From You!

Visit our website to review the plan, sign up for email updates, watch recordings of previous events, and to share your feedback in a number of ways, **including our latest public input survey**!

azdot.gov/EVPlan

Take our brief Self ID questionnaire to help ADOT better understand how successful our outreach efforts are at reaching all Arizonans.

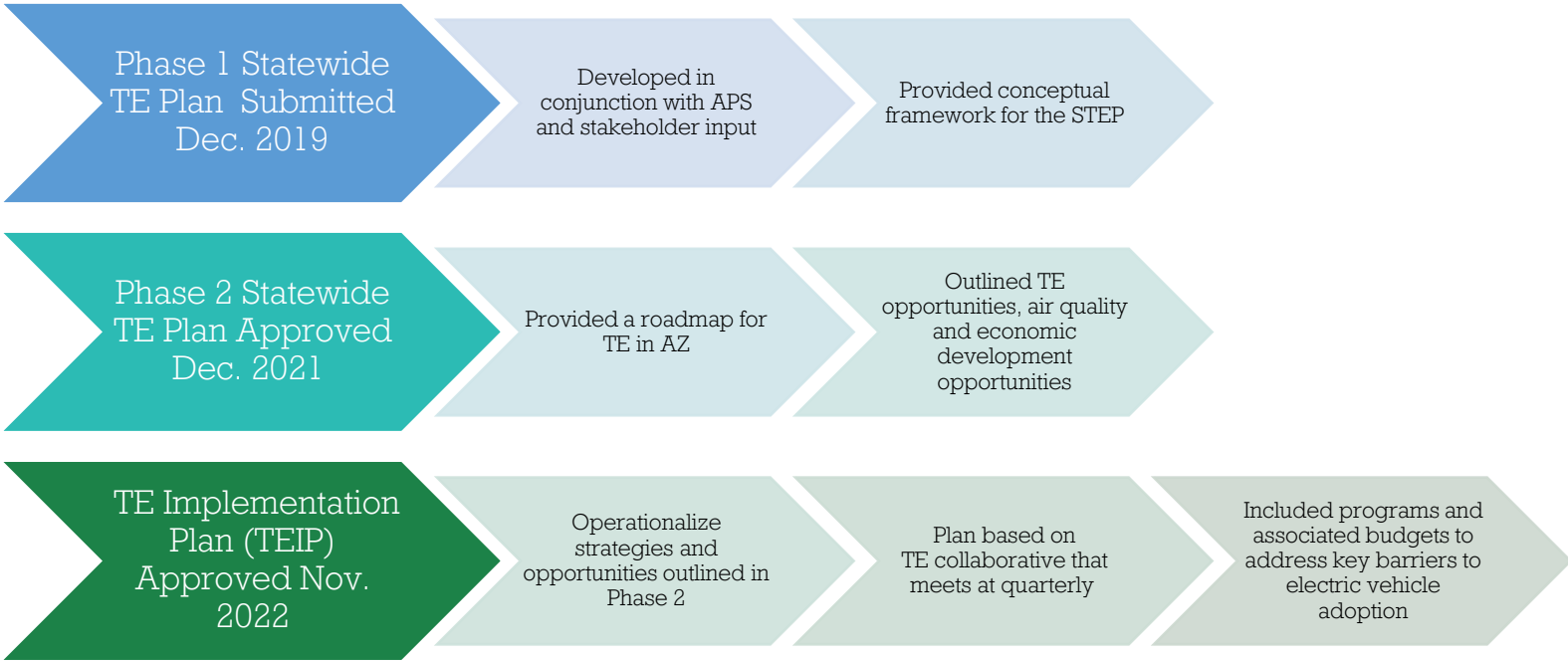
azdot.gov/EVopenhouse-SelfID

Partnering for Progress
Role of the Utility

Example from TEP

TEP
Tucson Electric Power

Background



TEP
Tucson Electric Power

Key Components

DIVERSE CUSTOMER OFFERINGS

PLANNING

TECHNICAL ASSISTANCE

OUTREACH AND EDUCATION

TEP
Tucson Electric Power

Our Engagement Approach

- Leverage existing key account relationships
- Develop working groups
- Provide access to information
- Site vetting for capacity
- Frequent and consistent communication through a single point of contact

Tucson Electric Power

Plan Highlights

Residential

Implementation years 1-3	
Rebates up to $500	Low-to-moderate income customers (LMI) • Rebates up to $800 • Allowance for panel upgrade - $300 Residential Managed Charging Program

School Bus

Implementation years 2-3
Incremental cost of e-bus purchase incentive – up to $250K for title 1 schools Charging infrastructure incentive • Title 1 Schools ($40K - $75K per port) • Standard Use Case ($35K - $70K per port) Fleet Phasing Plans Grid integration study

TEP
Tucson Electric Power

Plan Highlights

Retail, workplace, fleets

Implementation years 1-3

Standard Use Case
- $4,000/L2 port and $20,500/DCFC port up to 75% of project costs

Low-to-Moderate Income Customers and Non-profits
- $6,000/L2 port and $40,000/ DCFC port up to 75% of project costs

Internal Fleet TCO

30% of budget set aside for LMI customers

Fleet Advisory Services
- Web-based TCO
- Fleet Phasing Plans

Multi-family

Implementation years 1-3

Standard use case
- $5,400/port up to 85% of project costs

LMI use case
- $9,000/port up to 85% project costs

New Construction
- Pre-wire upgrade incentive
  - $200 per EV parking space pre-wire incentive (only for jurisdictions without a code requirement)

Existing Complexes (LMI only)
- 100% coverage of project costs OR
- TEP ownership of chargers

TEP
Tucson Electric Power

Non-Profit Shared Mobility

- Eligible partners: non-profits that provide mobility services to senior and workforce development participants (up to 3)
- Provide vehicle purchase or incremental cost of EV
- EV charging incentive
- It's the right thing to do.
- Incremental cost to purchase EV and Infrastructure

E-Bikes

- Connect low-income and disadvantaged populations with clean energy transportation options
- Electric bikes can be a viable alternative to vehicles
- Reduce air pollutants compared to gas-powered cars
- Increase accessibility of TE to all customer segments

TEP
Tucson Electric Power

Utility Pole Chargers - Pilot

- Elevated (10 ft) EV chargers attached to wooden and metal utility poles
- Charger has a 25 ft. Cable which drops down once activated on app
- Level 2 charger (9.2kW)
- Pole mounted configuration reduces installation costs.

TEP
Tucson Electric Power

Partnering for Progress

Transit Electrification

Sun Tran

Local Government Fleet Electrification

Pima County

City of Tucson

National Forest Service

Sabino Canyon Tram

Infrastructure Deployment

Public Charging

Grants and Partnerships: Focus on Sun Tran

- City of Tucson – Climate Emergency Declaration
- Objectives into Action:
  - Pilot: 1 bus
  - Phase 1: 5 buses
  - Phase 2: 10 buses
  - Phase 3: 29 buses
- More than $18 million in FTA Grants
- Sustained commitment to long–term electric transportation transition

TEP
Tucson Electric Power

Municipal Electric Fleets

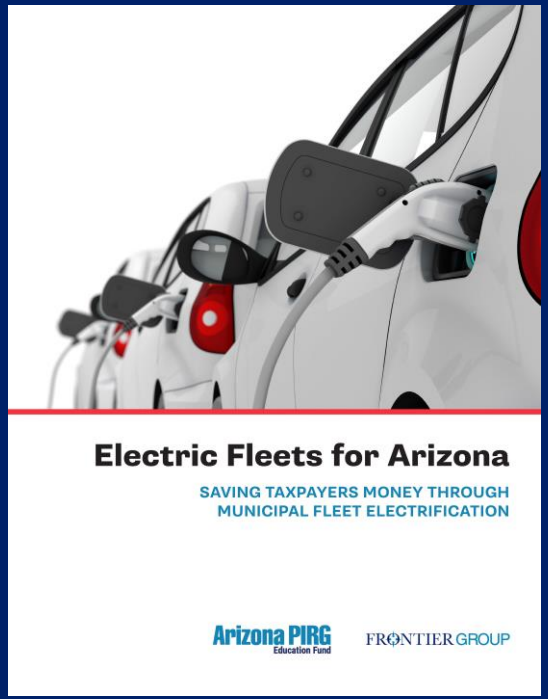
Save taxpayers money
Improve air quality
Protect public health

Frontier Group/Arizona PIRG Education Fund

April 2023

Outline

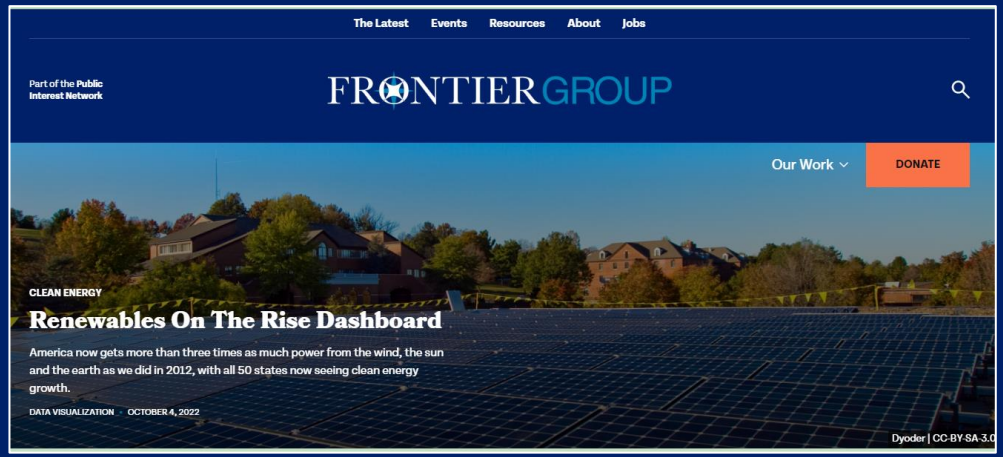
- Opportunities to electrify fleets
- Benefits for taxpayers and air quality
- New federal incentives
- A roadmap for fleet electrification



Frontier Group

Non-profit research and public policy organization that provides information and ideas to build a healthier and more sustainable America.

www.frontiergroup.org
@FrontierGroupUS



Municipalities own thousands of vehicles

- State & local governments in Arizona own a total of 48,000 registered motor vehicles. Ten of Arizona's largest municipalities* collectively own & operate more than **10,000** vehicles & pieces of equipment, from passenger sedans to dump trucks to fire engines to all-terrain vehicles.

- About **6,100** of the vehicles currently owned by surveyed Arizona cities & towns are light-duty vehicles, which provide the best near-term opportunities for electrification. About **70%** of those vehicles are pickup trucks & vans.

- There are very few electric vehicles currently in Arizona municipal fleets, with only 31 battery-electric vehicles & five plug-in hybrids in the light-duty fleets of the 10 municipalities studied at the time of the survey (late 2021).

*Chandler, Gilbert, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, Surprise, Tempe, Tucson

Ten of Arizona's largest municipalities spend more than $110 million annually to purchase, fuel & maintain their fleets

- Surveyed municipalities spent a total of $35.1 million to buy the model year 2020 & 2021 vehicles in their light- & medium-duty fleets, for an average of $34,511 per vehicle. Assuming these represent two years of vehicle purchases, the municipalities surveyed spend upwards of **$17.5 million** on light-duty vehicle purchases per year.

- Total fleet maintenance costs exceeded **$65 million** in the most recent year of data available.

- Fuel expenditures for the cities & towns totaled **$33.5 million** in the most recent year for which data were available.

Benefits to taxpayers and air quality: Assumptions

- Includes only vehicle categories for which electric models are currently available.
- Cost of ownership estimated using Argonne National Laboratory AFLEET tool.
- Includes commercial clean vehicle tax credit available under the Inflation Reduction Act.
- Does not include cost of one-time infrastructure upgrades needed to support electric fleets.
- Based on 2021 fuel and electricity prices & 2020 grid electricity mix.
- Assumes vehicles are purchased upfront, with 15-year lifetime.

COST SAVINGS FROM REPLACING RETIRING LIGHT-DUTY MUNICIPAL FLEET VEHICLES WITH EVS OVER NEXT 10 YEARS, 10 LARGE ARIZONA MUNICIPALITIES

Expense category	Lifetime savings (parentheses indicate increased expenses)
Vehicle cost (depreciation)	$(2,738,151)
Fuel	$52,607,048
Diesel exhaust fluid	$258,897
Maintenance and repair	$30,567,898
Insurance	$(718,447)
Total cost of ownership savings	**$79,977,245**

Cost savings by type of cost

TOTAL COST OF OWNERSHIP SAVINGS FROM REPLACING RETIRING LIGHT-DUTY MUNICIPAL FLEET VEHICLES WITH EVS OVER NEXT 10 YEARS, 10 LARGE ARIZONA MUNICIPALITIES

City or town	Total cost of ownership savings
Chandler	$4,993,319
Gilbert	$3,539,318
Goodyear	$2,087,907
Mesa	$9,665,629
Peoria	$3,791,741
Phoenix	$25,110,149
Scottsdale	$11,420,301
Surprise	$2,042,132
Tempe	$2,582,594
Tucson	$14,744,155

Cost savings by municipality

AIR QUALITY AND ENERGY BENEFITS FROM REPLACING RETIRING LIGHT-DUTY MUNICIPAL FLEET VEHICLES WITH EVS OVER NEXT 10 YEARS, 10 LARGE ARIZONA MUNICIPALITIES

Air quality and energy benefits	Total (parentheses indicate increased emissions)
Petroleum use (barrels)	367,888
Greenhouse gases (short tons)	144,464
CO (lbs.)	1,341,488
NO_x (lbs.)	65,855
PM_{10} (lbs.)	(874)
$PM_{2.5}$ (lbs.)	4,001
VOC (lbs.)	198,919
SO_x (lbs.)	(289,472)

Air quality & energy impacts

Inflation Reduction Act & Bipartisan Infrastructure Law

IRA Commercial Clean Vehicle Tax Credit

- Light-duty vehicles (<14,000 lbs. GWVR): 30% of cost (for pure EVs) or incremental cost of vehicle, up to $7,500.
- Heavy-duty vehicles (>14,000 lbs.): Same incentive, up to $40,000 per vehicle.
- No domestic content requirements.
- Available as “direct pay”.
- IRS developing procedure for accessing the credit.

Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law)

- Investment in public charging network (NEVI program & grants for public charging in rural/low-/moderate-income communities).

Issues & concerns

- Infrastructure
- Vehicle availability
- Buy-in & political support
- Battery recycling & environmental impact

Roadmap for fleet electrification

- Make bold commitments & stick to them.
- Develop an electrification plan.
- Collaborate with other municipalities in Arizona & beyond, as well as state government.

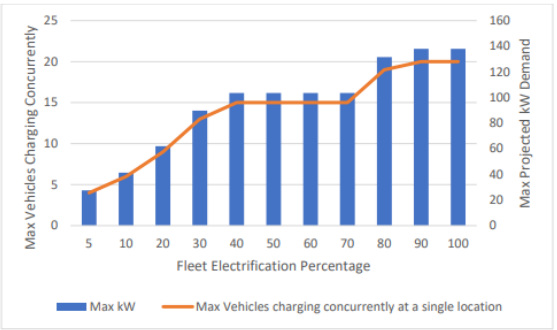


Figure A-1. Projected EV charging demand at increasing fleet electrification levels at the parking facility with the highest projected demand: Colorado[9]

Sarah Booth, et al., *Impacts of Increasing Electrification on State Fleet Operations and Charging Demand*, NREL, February 2022.

Roadmap for fleet electrification

- Work with utilities to accelerate deployment of electric vehicle infrastructure & implement EV-friendly rate structures.
- Take full advantage of government & utility incentives.
- Take full advantage of incentives in recent federal legislation.
  Commercial clean vehicle tax credit also available to businesses.

Contact:

Diane E. Brown, Arizona PIRG Education Fund
dbrown@arizonapirg.org, (602)318-2779 (c)

Dianne Kresich, Arizona Department of Transportation
dkresich@azdot.gov, (602)712-3134

Camila Martins-Bekat, CEcD, Tucson Electric Power & UNSE
CMartins-Bekat@tep.com, (520)237-8943 (c)

Tony Dutzik, Frontier Group
tony@frontiergroup.org, (617)747-4331