AZEVPLAN

State of Arizona Electric Vehicle Infrastructure Deployment Plan

August 1, 2022
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Revision History

Version History	**Date**	**Revisions**
Version 1	8/01/2022	
Version 2	9/01/2022	Appendix E: Cyber Security Specifications added
Version 3	2/07/2023	Appendix C: Utility Capacity, Appendix D: EV Charging Costs, and Appendix F: Phase 2 Public Engagement Summary added

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List of Acronyms

AAA	American Automobile Association
AADT	average annual daily traffic
ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
AFC	alternative fuel corridor
AFV	alternative fuel vehicle
APS	Arizona Public Service
BIL	Bipartisan Infrastructure Law
CCS	combined charging system
CE	categorical exclusion
CHAdeMO	CHArge de MOve
CNG	compressed natural gas
DAC	disadvantaged communities
DBE	disadvantaged business enterprise
DCFC	direct current fast charging
DER	distributed energy resources
EJ	environmental justice
EV	electric vehicle
EVITP	Electric Vehicle Infrastructure Training Program
EVSE	electric vehicle supply equipment
FFY	federal fiscal year
FHWA	Federal Highway Administration
GHG	greenhouse gas
GWh	gigawatt hours
ICE	internal combustion engine
JATC	Joint Apprenticeship and Training Program

kW	kilowatt
kWh	kilowatt hour
LEP	limited English proficiency
LMI	low- to moderate-income
MOU	memorandum of understanding
NEHC	National Electric Highway Coalition
NEPA	National Environmental Policy Act
NEVI	National Electric Vehicle Infrastructure
O&M	operation and maintenance
PEV	plug-in electric vehicles
Plan	Arizona's EV Infrastructure Deployment Plan
Q&A	questions and answers
SP	special publication
SR	state route
SRP	Salt River Project
SWEEP	Southwest Energy Efficiency Project
TEP	Tucson Electric Power
UNSE	UNS Electric Inc.
USDOT	U.S. Department of Transportation
VMT	vehicle miles traveled

Introduction

Overview

Adopting electric vehicles (EVs) increases the resilience of the transportation system, improves air quality, and contributes to meeting state and federal carbon-reduction goals. Because more Arizonans and visitors to the state are driving EVs, the State is working to take advantage of federal funding opportunities to develop the infrastructure needed to support EV drivers. The Arizona Department of Transportation (ADOT), as tasked by the Bipartisan Infrastructure Law (BIL) and the National Electric Vehicle Infrastructure (NEVI) Formula Program, has developed Arizona's EV Infrastructure Deployment Plan ("Plan"), which seeks to increase the long-range mobility of EV drivers by reducing gaps in electric vehicle supply equipment infrastructure (EVSE; i.e., an EV charging station) and contributing to an equitable, reliable, resilient, and accessible national EVSE network.

Funding to support this work was secured in March 2022 and the analysis and development of the Plan commenced in May 2022.

Development Process

The Plan was developed in response to the provision of funding for EV adoption that was included in the BIL, which was enacted as the Infrastructure Investment Jobs Act, Public Law 117-58 (November 15, 2021). The NEVI Formula Program is a $5 billion program established in the BIL to serve as a catalyst for the construction and implementation of a national network of 500,000 EVSE by 2030.

State departments of transportation can nominate corridors along the national highway system within their states to become Alternative Fuel Corridors (AFCs) and be eligible for funding for EVSE installations and upgrades under the BIL.

Study Area

Currently, Arizona's designated AFCs are all part of the Interstate Highway System. In 2020, the Arizona State Highway System had 9,440 total centerline miles, including 1,168 centerline miles of interstate highway. Arizona's entire roadway network (including local roads) had 66,968 centerline miles. While interstate highways make up less than two percent of the state's total roadway network, they account for 21.3% of the vehicle miles traveled (VMT) on Arizona roads.[i] **Table 1** lists the VMT along each of the major interstates that have been designated as AFCs.

Table 1: AFCs VMT Data

Corridors	VMT per Day (million miles)
I-8	1.9
I-10	19.4
I-15	0.6
I-17	7.5
I-19	1.8

Plan Development

The Plan was developed in accordance with federal law, NEVI Formula Program guidance, Arizona law and ADOT Policies. ADOT has hosted and will continue to host public engagement activities with community-based organizations, transportation stakeholders, federal, state, local and tribal representatives, as well as other impacted groups, in order to refine a Plan that is equitable and beneficial to the entire state.

The Plan was developed in cooperation with the Arizona Department of Environmental Quality, Arizona Department of Commerce, Arizona Corporation Commission, Arizona Department of Administration, and Arizona Residential Utility Consumer Office.

ADOT based the Plan on the NEVI Formula Program Notice of Proposed Rulemaking which is currently open for public comment. It is anticipated that the proposed rule will change based on comments submitted to the Federal Highway Administration (FHWA). ADOT intends to comply with the final regulation and will amend this Plan to reflect the final rule when issued.

Plan Vision and Goals

The vision of the Plan is to aid in the deployment of a national EVSE network and make EV driving accessible and reliable in the state of Arizona.

ADOT has set six goals for an interconnected EVSE network:

- Reduce range anxiety by closing gaps in the EVSE network along Arizona's AFCs
- Support the development of an EVSE network that is resilient, equitable, accessible, and reliable
- Engage stakeholders and the public in the planning, development, and installation of EVSE
- Identify potential new AFC locations during the outreach process
- Utilize efficient contracting and procurement mechanisms to: maximize the amount of infrastructure that can be built; consider future needs; and reduce current risk(s) to support the EVSE network’s long-term viability
- Use data and performance metrics to evaluate charger installation and operations in order to inform the development of program improvements

Plan Milestones

Major milestones and anticipated dates of EVSE deployment include:

May 2022

- Began data collection and Plan research
- Began ongoing stakeholder outreach

June 2022

- Held State Agency coordination meeting
- Held online stakeholder workshop
- Conducted online stakeholder survey

July 2022

- Began ongoing public outreach
- Held online public meeting held
- Conducted online public survey

Federal Fiscal Year (FFY) 2022

- Complete and submit the final EV Infrastructure Deployment Plan

FFY 2023

- Continue public and stakeholder outreach.
- Solicit and award contracts to upgrade existing stations and begin upgrade installations
- Begin the solicitation process for new EVSE stations
- Nominate new AFCs through the federal process
- Update the EV Infrastructure Deployment Plan to include the new AFCs

FFY 2024

- Award contracts for new EVSE stations and begin installation
- Solicit and award installation and operation contracts for EVSE stations on new AFCs, up to the funding limit
- Update EV Infrastructure Deployment Plan, including stakeholder and public outreach

FFY 2025

- Solicit and award remaining funding for EVSE deployment
- Update EV Infrastructure Deployment Plan, including stakeholder and public outreach

FFY 2026

- Complete installation of remaining EVSE
- Evaluate the performance of NEVI Formula Program implementation

State Agency Coordination

Because the Plan has the potential to significantly impact all state residents, ADOT recognizes the importance of coordinating with other state agencies in developing and approving the Plan. Multiple state agencies were identified as key stakeholders, described in the *Public Engagement -Stakeholders Involved in Plan Development* section.

Coordination with these agencies was conducted throughout the Plan's development, including at a State Agency Partners Meeting held on June 16, 2022. The meeting's objective was to gather input to inform the development of the Plan. Participating agency partners were

- Arizona Department of Environmental Quality
- Arizona Department of Commerce
- Arizona Corporation Commission
- Arizona Department of Administration
- Arizona Residential Utility Consumer Office
- Arizona Governor's Office

Separate from this meeting, a stakeholder survey was circulated to these state agencies, and individual agencies were contacted as needed. They were also notified of public outreach activities, including virtual and in-person public meetings and public surveys. Ongoing meetings will continue to be held with state agencies as needed.

Plans to Utilize Domestic EVSE

ADOT will act in accordance with the final NEVI Formula Program rulemaking to maximize opportunities to utilize EVSE made in the United States. ADOT recognizes that the Buy America requirements of 23 U.S.C. 313 and the Build America, Buy America Act apply to the use of NEVI Formula Program funds, and that it is the intent of the FHWA to maximize, consistent with the law, the use of goods, products, and materials produced in the United States. ADOT will ensure that EVSE station owners comply with FHWA's final regulations. When appropriate, ADOT may seek waivers from these provisions as provided by law and Executive Order 14005 ("Ensuring the Future is Made in All of America by All of America's Workers"). ADOT will continue to monitor updated policy guidance and regulations and amend or supplement the Plan as needed.

Public Engagement

Stakeholder Engagement and Public Involvement Goals

A Public Involvement Plan was developed to identify public involvement goals, methods to inform and engage key stakeholders and the public in the Plan development and ensure equitable access for underserved and Disadvantaged Communities (DACs) in engagement activities. The Public Involvement Plan ensures equitable statewide reach and encourages participation through both virtual methods, as well as in-person methods at a local level. The Public Involvement Plan includes multiple methods for the general public and key stakeholders to learn about and provide input on the Plan before the initial August 2022 submission, and again before Plan implementation.

Modeled after the International Association for Public Participation's *Spectrum of Public Participation*[ii] process, ADOT's overall public participation goal is to consult the general public and key stakeholders in the Plan's development.

Throughout public engagement, ADOT will:

- Keep the public and stakeholders informed.
- Obtain feedback on the Plan analysis, alternatives and/or decisions.
- Listen to and acknowledge concerns and aspirations from the public and key stakeholders.
- Provide feedback on how public and key stakeholder input influenced the Plan recommendations.

Specific sub-goals include:

- Provide information about and facilitate informed public and stakeholder input on: Plan objectives; EVSE types and their charging speeds; federal requirements; guidelines for implementing the EVSE network; and the timeline for Plan submission and implementation.
- Secure participation from a broad cross-section of the community, as well as key stakeholders with an interest in EVSE development, with an emphasis on reaching DACs as identified in the Justice40 mapping tool.
- Raise awareness of ADOT's efforts to secure federal funding to improve infrastructure and transportation resiliency.
- Gain insight to supplement the data available on existing and future conditions.
- Gain insight into Arizona residents' propensity for, and barriers to, use of EVs.
- Understand the public's desires and priorities related to siting EVSE and prioritizing EVSE corridors, particularly in relation to how equity is evaluated and integrated into the prioritization process.
- Determine the community's perceptions and concerns regarding the EVSE network and inform future outreach efforts.

Stakeholder and Public Involvement Activities

Public involvement is critical in the Plan's development. ADOT has developed a multi-faceted strategy to engage the public and key stakeholders. **Table 2** provides a description and status of public involvement activities. Some of these engagements were held prior to the Plan's initial submission in August 2022, and the remaining events are scheduled to occur after submission to gather input in preparation for finalizing and implementing the 2022 Plan.

Table 2: Public Involvement Activities

Activity	Status
Identification and notification of key stakeholders about the Plan. One-on-one meetings with key stakeholders.	April 2022 through Plan finalization
Tribal consultation and outreach with the six Arizona tribes, communities, and Native Nations with lands along AFCs (Navajo Nation, Gila River Indian Community, Colorado River Indian Tribes, Tohono O'odham Nation, Yavapai Apache Nation, Hopi Tribe).	April 2022 through Plan finalization
Development of a project email account azevplan@azdot.gov to receive and respond to public inquiries about the Plan.	May 2022 and throughout Plan
English/Spanish survey to sign up for the EV mailing list and ask questions.	May 2022 and throughout Plan
Establish EV Plan website to provide information, and for the public to ask questions and receive input.	May 2022 and throughout Plan
News releases, GovDelivery alerts, and social media were used to promote the Plan, announce the Plan's commencement, virtual and in-person public meetings, public survey(s), and the completion and posting of the Plan. For future engagement activities, ADOT will also place ads in print publications	May 2022 throughout Plan finalization
Development of frequently asked questions (FAQ) along with key messages to be used when responding to inquiries from the public and the media and addressing questions and answers (Q&A) at public meetings and workshops.	May 2022 and throughout Plan finalization
Development of a public project fact sheet.	June 2022
Virtual stakeholder workshop held (212 participants), which included a formal presentation, interactive discussion using real-time polling, and written and verbal Q&A.	June 30, 2022
Online stakeholder survey conducted (157 responses)	June 23 through July 8, 2022

Activity	Status
Virtual online statewide public meeting (302 attendees). The virtual meeting included live interpretation in Spanish, formal presentation, written and verbal Q&A, and additional comment options including an online form, email, phone, and mail.	July 14, 2022
Online public survey in English and Spanish (917 responses)	July 1 – July 21
Establish an English/Spanish project hotline for public questions/comments questions/comments.	July 2022 throughout Plan finalization
In-person public meetings held throughout the state. The meetings will provide open-house style engagement at the beginning and end of the meeting timeframe with a formal presentation and Q&A in the middle. Additional comment options will be provided including phone, mail, or email.	Anticipated Late 2022
Second online public survey in English and Spanish to seek input on the Plan recommendations and implementation.	Anticipated Late 2022

Stakeholder Engagement Notifications

Notifications for stakeholder engagement activities are provided via e-mail and ADOT's communication channels to encourage participation. Future events are discussed during all live events in order to spread awareness and maintain continuity and transparency. Each notification includes a phone number and email address that stakeholders can use to follow up with ADOT with questions and/or comments about future engagement events or the Plan development.

Public Involvement Notifications

To ensure equitable access of notification, ADOT is utilizing several channels to notify the public of engagement activities.

Notification Channels:

- Distribution of information by key stakeholders via their communication channels
- Circulation of a memo to elected officials and ADOT department leads
- Distribution of information via ADOT social media platforms
- Distribution of information via ADOT's GovDelivery email list. The Plan list was developed through an online survey inviting the public to sign up, a pop-up window on the Plan website, and email information provided in the public survey. To date, the email list has approximately 2,000 subscribers.
- Publication of information on the ADOT website
- Distribution of a news release to ADOT's statewide media list (TV, radio, and print; includes Spanish media)

For future public involvement activities seeking the public's input on the Plan, ADOT will continue to publicize opportunities for input via GovDelivery, social media, and the ADOT website, and will also develop and place ads in the following print publications:

- Arizona Republic
- Arizona Daily Star (Tucson)
- Arizona Daily Sun (Flagstaff)
- Prensa Hispana (Statewide Spanish)
- Relevant tribal publications

As presented in **Table 2**, a second survey will seek input from the public and stakeholders on the Plan recommendations and implementation. This survey will be available in hard copy form at the public meeting, as well as electronically via a customized survey link. It will be posted on the website and emailed to those on the project mailing list. ADOT will also distribute a news release, a GovDelivery notification, and social media posts to promote the survey.

Stakeholders Involved in Plan Development

An extensive and diverse list of key stakeholders for the Plan was developed by ADOT. It includes:

- City and county staff in communities along the AFCs
- Representatives from every Metropolitan Planning Organization/Council of Governments in Arizona
- Governor's office
- Various state agencies
- The six tribal communities with land along the AFCs
- EV industry representatives (including EVSE operators, EV automobile manufacturers, other EV suppliers, and EV advocacy organizations)
- Utility companies
- Chambers of commerce
- Other business or commerce organizations
- Large employers
- Others with interests in the Plan's development

Roadway users, including current EV users, are also stakeholders in the Plan.

Table 3 lists the organizations that were invited to participate in the Plan's development. Stakeholder organizations that address the goals of the Justice40 Initiative, identified in Executive Order 14008, are shown in bold text.

Table 3: Stakeholders Involved in Plan Development

Organization Category	Organizations Targeted for Engagement
Transportation planning organizations	• Central Arizona Governments • Central Yavapai Metropolitan Planning Organization • Lake Havasu Metropolitan Planning Organization • Maricopa Association of Governments • MetroPlan Metropolitan Planning Organization for Greater Flagstaff • Northern Arizona Council of Governments

Organization Category	Organizations Targeted for Engagement
	• Pima Association of Governments • Sierra Vista Metropolitan Planning Organization • Southeastern Arizona Governments Organization • Sun Corridor Metropolitan Planning Organization • Western Arizona Council of Governments • Yuma Metropolitan Planning Organization
Counties and cities	• Apache County • Coconino County • Gila County • Graham County • La Paz County • Maricopa County • Navajo County • Pima County • Pinal County • Santa Cruz County • Yavapai County • Yuma County • Arizona League of Cities and Towns • Avondale • Benson • Black Canyon City • Buckeye • Bowie • Camp Verde • Casa Grande • Chambers • Chandler • Cochise • Coolidge • Cordes Junction • Eloy • Flagstaff • Gila Bend • Holbrook • Joseph City • Kingman • Marana • Maricopa • Nogales • Phoenix • Quartzsite

Organization Category	Organizations Targeted for Engagement
	● Sahuarita ● San Luis ● San Simon ● Sanders ● Seligman ● Tempe ● Tucson ● Welton ● Willcox ● Williams ● Winslow ● Yuma
State Department of Energy (DOE)	● Arizona Department of Administration
Environmental protection agencies	● Arizona Department of Environmental Quality ● U.S. Environmental Protection Agency
State economic development agencies	● Arizona Commerce Authority ● Economics Collaborative of Northern Arizona ● Greater Phoenix Economic Council ● Mohave County Economic Department ● City of Sahuarita Economic Development Department
Public transportation agencies	● City of Phoenix Public Transit ● Arizona Transportation Authority ● METROPLAN
Tribal governments	● **Ak-chin Indian Community** ● **Cocopah Indian Tribe** ● **Colorado River Indian Tribes** ● **Fort McDowell Yavapai Nation** ● **Fort Mohave Indian Tribe** ● **Fort Yuma Quechan Tribe** ● **Gila River Indian Community** ● **Havasupai Tribe** ● **Hopi Tribe** ● **Hualapai Tribe** ● **Kaibab Band of Paiute Indians** ● **Navajo Nation** ● **Pascua Yaqui Tribe** ● **Pueblo of Zuni** ● **Salt River Pima-Maricopa Indian Community** ● **San Carlos Apache Tribe**

Organization Category	Organizations Targeted for Engagement
	● **San Juan Southern Paiute Tribe** ● **Tohono O'odham Nation** ● **Tonto Apache Indian Tribe** ● **White Mountain Apache Tribe** ● **Yavapai Apache Nation** ● **Yavapai-Prescott Indian Tribe**
Electric utilities; transmission and distribution owners and regulators	● Aha Macav Power Service ● Anza Electric Coop ● Arizona Corporation Commission ● Arizona Electric Power Co-op ● Arizona G&T Cooperatives ● Arizona Public Service ● Arizona Residential Utility Consumer Office ● CLEAResult ● Duncan Valley Electric Cooperative ● Garkane Energy Cooperative ● Graham County Electric Cooperative ● Grand Canyon State Cooperatives ● Mohave Electric Cooperative ● Pinnacle West ● Salt River Project ● Sierra Southwest Cooperative ● Southwestern Power Group ● Sulphur Springs Valley Electric Cooperative ● Trico Electric Cooperative ● Tucson Electric Power (TEP) and UniSource Energy Services
Community-based organizations, small business associations, chambers of commerce, labor organizations, and private entities	● Arizona Chamber of Commerce ● **Arizona Hispanic Chamber of Commerce** ● Arizona Small Business Association ● **Asian Corporate and Entrepreneur Leaders** ● **Black Chamber Arizona** ● **Chinese Chamber of Arizona** ● Economics Collaborative of Northern Arizona ● Flagstaff Chamber of Commerce ● Fortis Networks ● Greater Flagstaff Chamber of Commerce/Northern Arizona Chamber Organization ● Greater Phoenix Chamber ● Kingman Chamber of Commerce ● Phoenix Chamber of Commerce ● Tucson Metro Chamber

Organization Category	Organizations Targeted for Engagement
	• Valley Partnership
Private-sector EVSE owners and network operators	• Blink Charging • Charge Point • Charge Zero • Electrify America • EVgo
Vehicle manufacturers	• Atlis Motor Vehicles • Audi • BMW • Cruise • DeMenna (representing Avis) • FCA Group • General Motors • Goodyear • Lucid Motors • Nikola Motor / Nikola Defense • Toyota • Proterra • Tesla • Waymo
Minority- and women-based organizations	• **Arizona Minority Contractors Association** • **Chicanos Por La Causa** • **Greater Phoenix Urban League** • **NAACP Maricopa County Branch**
Freight industry	• Arizona Trucking Association
Environmental and other community advocacy organizations with an interest in EVSE	• **Arizona Forward** • **Ceres** • Southwest Energy Efficiency Project (SWEEP) • The Nature Conservancy • Valley of the Sun Clean Cities • Western Resource Advocates

Organization Category	Organizations Targeted for Engagement
EV industry organizations and EV advocacy groups	● Alliance for Automotive Innovation ● Alliance for Transportation Electrification ● Arizona Technology Council ● EV Noire ● EV Transportation Alliance ● Fourth Mobility ● Phoenix Electric Automotive Association ● Plug In America ● Tucson Electric Vehicle Association (TEVA) ● Zero EV
Gas station owners and operators	● Love's ● Shell Recharge Solutions
Ride-share drivers/taxi drivers	● Lyft ● Uber
Emergency management and public safety agencies	● Arizona Governor's Office
Other parties	● Atlas Public Policy ● Electric Power Research Institute ● Triadvocates ● Generation Seven Strategic Partners ● Phoenix IDA ● QCM Technologies ● Verdek

Preliminary Summary of Stakeholder Engagement Results and Input Received

At the time of this submission, not all stakeholder engagement and outreach events have been completed. This Plan will be updated as needed as results and feedback are received. Initial results, based on activities conducted through July 2022, are listed below.

Key Stakeholder Workshop

The key stakeholder virtual workshop was held on June 30, 2022, from 1:30 p.m. to 3:30 p.m. A total of 212 key stakeholders participated. The Plan team posed the series of questions to attendees listed below. Key input is noted after each question.

- What are the most important Justice40-related benefits the Plan could provide?
  - The two benefits rated most highly by participants were improved access to clean transportation and reducing exposure to fossil fuel emissions.

- What other benefits to DACs not mentioned previously do you think ADOT should consider or measure?
    - Responses primarily focused on access, job creation, environmental health, mobility, and energy resiliency.
- Overall, what does successful planning look like in this project? What should we consider as we develop and implement the Plan?
    - Responses primarily focused on utility and outside jurisdiction coordination, supply chain management, community support, and stakeholder inclusion/involvement.
- Overall, what does a successful outcome look like in this project? How can we measure that success?
    - Responses primarily focused on EVSE and EV usage rates, environmental health data, greenhouse gas (GHG) emission data, and EV public education level.
- In your organization's experience with EVs, what are some challenges you have encountered that we should be prepared to address?
    - Responses primarily focused on universal equipment and utility access, vandalism, cost, maintenance, and public understanding.
- In your organization's public-facing EV-related work, what are some obstacles and misconceptions you often need to address?
    - Responses primarily focused on cost, vehicle range, resistance to change, lack of knowledge, vehicle maintenance, and utility management.
- In your organization's public-facing EV-related work, what are some ideas and talking points that seem to resonate the best with the public?
    - Responses primarily focused on environmental benefits, affordability, range capacity per charge, tourism, and sustainability.
- What else should we be aware of that we might not already know as we approach planning and implementation?
    - Responses primarily focused on public safety, utility/infrastructure management, supply chain issues, public-private partnerships, expansion planning, Americans with Disabilities Act (ADA) capabilities, and the current supply of technicians, installers, and support personnel.

Key Stakeholder Survey

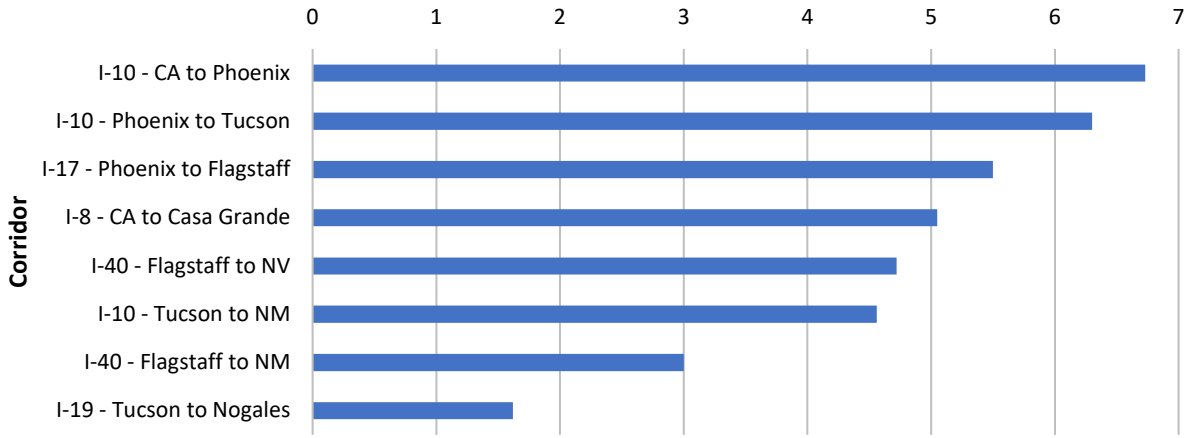
A key stakeholder survey was conducted from June 23 to July 8, 2022, using an online survey platform. The survey's questions were designed to engage government and public agencies, EV industry professionals, advocacy groups, and other organizations involved in the promotion and establishment of an EV charging network in the state. This differs from the public survey, which, while having some questions in common, was designed to engage a general public audience that may use or consider using EVs for transportation. All stakeholders who had been identified by that time, as shown in **Table 3**, were invited via email to participate in the survey. A total of 157 surveys were completed. Key input received through the stakeholder survey included:

- Respondents were asked to identify what type of organization they represent. The most common responses were government and public agencies (34%), utility companies (11%), EV infrastructure (8%), EV advocates (7%), and EV manufacturers (6%).

- 45% of respondents currently host EV charging stations; 86% of hosts are looking to upgrade and expand.
- In rating (on a scale of 1 to 5) the most important goals of the Plan's vision, the most highly rated goals were achieving a resilient, equitable, accessible, reliable network (4.5) and addressing range anxiety (4.2).
- The equity and Justice40 consideration most cited as "most important for achieving equity" was network access in rural, tribal, and other disadvantaged areas (79% of respondents).
- The most cited concern for infrastructure development was the feasibility of installation in areas without adequate utility infrastructure (60% of respondents).
- The charging station features most commonly cited as "most important" were upgraded utilities (64% of respondents), shade structures (59%), and additional chargers beyond the minimum required (54%).
- When asked to balance prioritizing additional EVSE stations versus additional features at EVSE stations, about 70% favored more EVSE.
- The location types that were most cited as best for EVSE were gas stations and truck stops (72% of respondents), and retail shopping centers, movie theaters, and restaurants (66%).

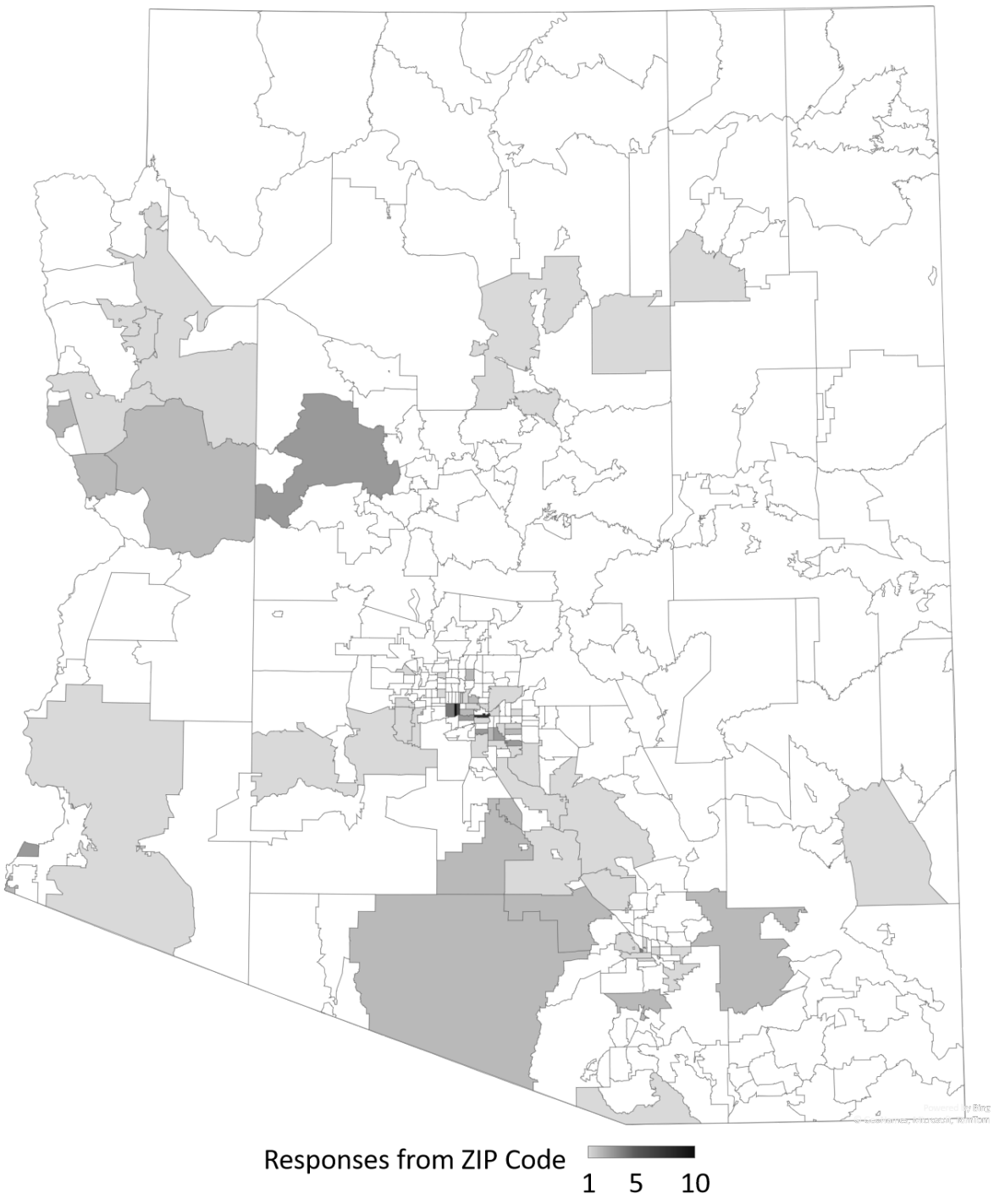
Respondents were also asked to prioritize which of the eight eligible corridors being evaluated in Plan should be built out with EVSE first. The results are shown in **Figure 1**.

Figure 1: Stakeholders Rankings of AFCs for EVSE Implementation



A total of 153 stakeholder survey respondents provided their organization's ZIP Code. **Figure 2** displays the locations of these ZIP Codes (over 70 different ZIP Codes in total). Responses that were invalid or not from within Arizona, 12.4%, are not included in **Figure 2**.

Figure 2: Stakeholder Survey Responses By ZIP Code



Key Stakeholder Questions and Comments

With both the stakeholder workshop and survey, participants and respondents were given the opportunity to provide questions and comments in an open format. The most commonly mentioned topics were:

- **Equity and Environmental Justice (EJ)**: Concern and encouragement to deploy as equitably as possible, particularly in reaching rural and tribal areas and other places that are likely to be overlooked by the private sector. Questions about the process for designating DACs, and how Justice40 benefits will be measured.
- **Corridors:** In addition to equity, support for reaching rural and tribal areas for completeness of network and access to parks. Desire for expanding beyond interstates to cover other state and federal roads.
- **Sites and Criteria:** Suggestions to prioritize existing fueling stations and rest areas. Concern that smaller businesses that can't support enough EVSE to meet requirements will be unable to participate. Mixed opinions about the one-mile requirement, finding the distance either too strict or too generous.
- **Fleets and Transit:** Support for designing the network to encourage the deployment of EV cargo, transit, and rideshare fleets.
- **Electrical Grid:** Concern for the impact of new stations on electrical demand, particularly in competing with air-conditioning systems during peak hours. Support for using solar energy and deploying on-site backups and storage.
- **Stations:** Concerns for security and maintenance at stations. Support for shade structures and other amenities. Support for installing higher-power stations now or planning for upgrades in the future.
- **Other Topics:** Concerns over the use of public funding for private investment. Support for a greater public role in the planning process. Questions about the role of local-level governments and agencies. Questions about the selection and procurement criteria and processes. Several organizations submitted reports and white papers covering EV-related topics.

Public Outreach Results

ADOT is committed to an inclusive public outreach process to achieve the goals of this Plan. **Table 2** details the process for obtaining public engagement.

Online Public Survey

An online public survey was conducted from July 1–21, 2022. This survey was designed to engage the general public in Arizona with questions related to everyday travel habits and the purchase, use, and charging of EVs that they may own or consider purchasing in the future. These questions differed from the key stakeholder survey, which focused on organizations with a role or direct interest in the development of an EV charging network in the state. This survey was promoted through several channels, including social media, email, and during the virtual public meeting. Separate surveys were conducted in English and Spanish. A total of 917 English surveys were completed; no Spanish survey responses were received. Key input received through the public survey included:

- 98.6% of respondents drive personal vehicles as one of their typical modes of transportation; only 2% of respondents ride buses, and 1% cited light rail as an unlisted response.

- In rating the importance (on a scale of 1 to 5) of different parameters in choosing how to 'get around on a daily basis,' the top two parameters were safety (4.2) and proximity to key services (4.1). The lowest-rated parameter was access to alternative modes of transportation, such as public transit and rideshare (2.4).
- 67% of respondents reported 'extensive knowledge' about EVs; only 1% have 'little to no knowledge.'
- 51% of respondents currently own an EV; 58% of those who do not own one say they are planning to buy one.
- The factors most commonly cited as 'holding [respondents] back from purchasing an EV' were the ability to travel long distances (74%), the purchase price (69%), and the time needed (64%) and convenience (59%) of charging an EV.

Table 4 compares where current EV owners typically charge their vehicles with where non-owners think they would likely charge an EV if they had one.

Table 4: EV Owners and Non-Owners Voted on Likely Charging Locations

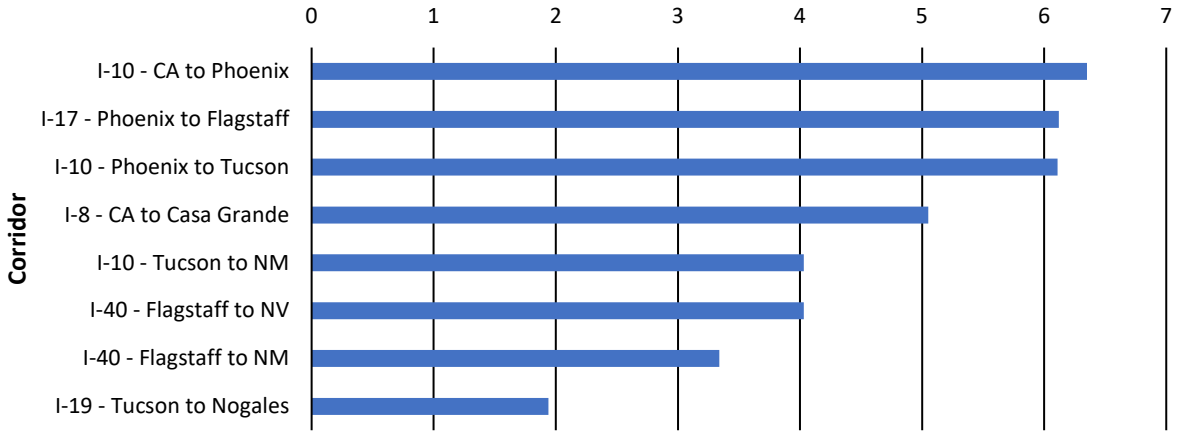
Charge Location (selected responses)	Where Current EV Owners Typically Charge	Where Non-Owners Think They Would Typically Charge
At my house	94%	84%
At my apartment / condo	2%	3%
Nearest Direct Current Fast Charging (DCFC) charger	49%	38%
Where I work	18%	30%
Business / retail centers	17% / 18%	26% / 14%

Other information obtained included:

- When asked about how long they typically charge their vehicles at public EVSE, 50% of EV owners said 20–39 minutes. Twenty percent typically use public EVSE for less than 20 minutes, and 30% for 40 minutes or longer.
- Among EV owners who use public EVSE, 73% say that they most often use it for long-distance traveling needs.
- Gas stations and truck stops were most frequently cited as the 'best' locations for EVSE (70%) followed by retail shopping centers, movie theaters, and restaurants (69%).

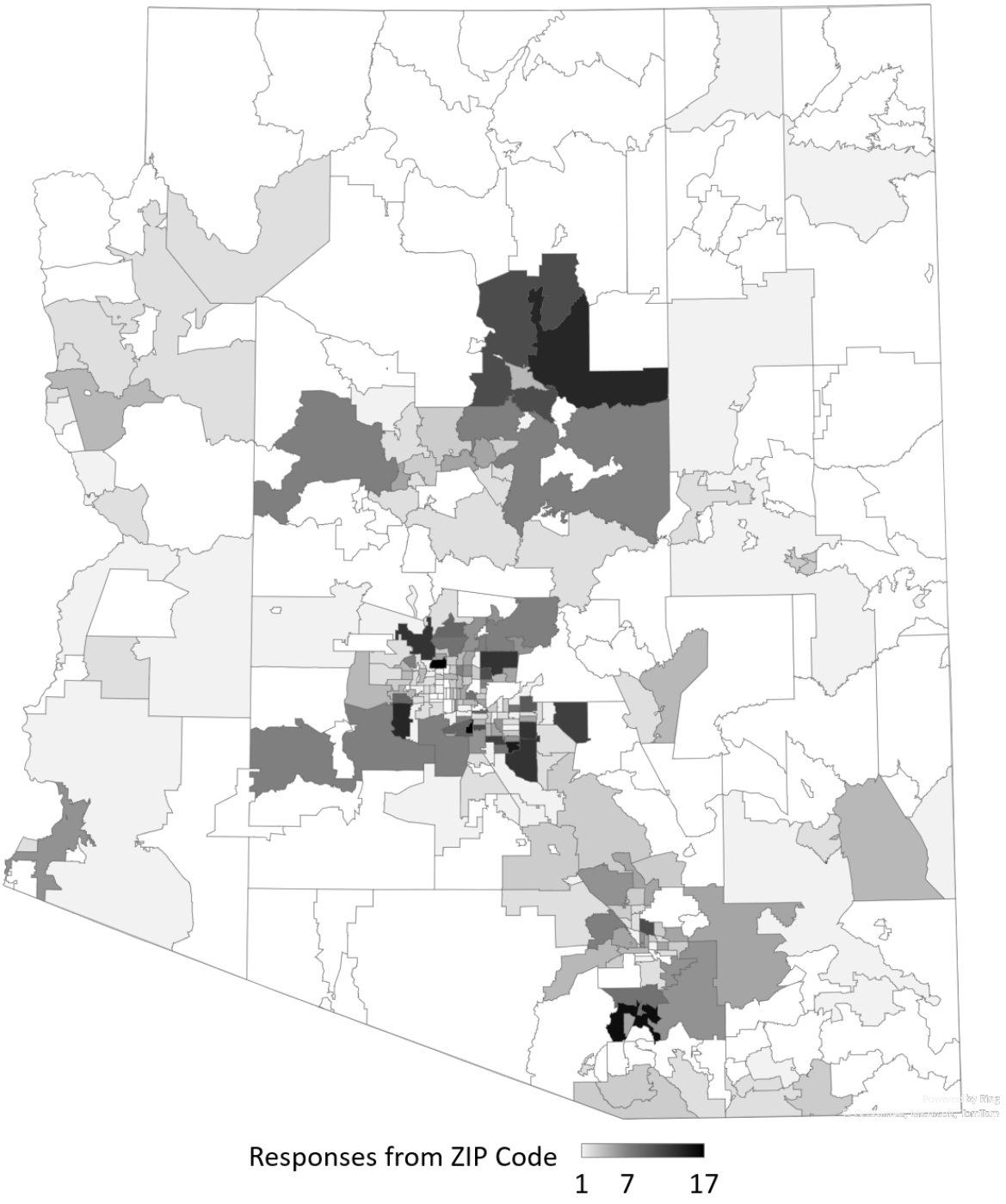
Respondents were also asked to rank the importance of the eight highway corridors being evaluated in the Plan. **Figure 3** shows the implied importance of each corridor based on these rankings.

Figure 3: Public Respondents' Ranking of AFCs for EVSE Implementation



A total of 904 public survey respondents provided their home ZIP Code. **Figure 4** displays the locations of these ZIP Codes (over 200 unique ZIP Codes in total). Note that 2.2% of responses were either invalid or arrived from outside of Arizona, and therefore are not included in the map.

Figure 4: Public Survey Responses by ZIP Code



Public Questions and Comments

A virtual public meeting was held on July 14, 2022, from 6:00 p.m. to 7:30 p.m. A total of 302 individuals participated. With both this virtual public meeting and the public survey, participants and respondents were given the opportunity to provide questions and comments in an open format. The most commonly mentioned topics were:

- **Corridors:** In addition to equity concerns, support for reaching rural and tribal areas for completeness of network and access to parks and tourist destinations. Desire for expanding EVSE network beyond interstates to cover other state and federal roads.
- **Chargers and Technology:** Questions about the role of hydrogen fueling in current and future networks. Support for CHAdeMO- and Tesla-compatible facilities. Support for charging at wattages higher than 150 kilowatt (kW) or providing infrastructure for future upgrades. Mixed opinions for including Level 2 charging options at stations.
- **Implementation and Operations:** Questions about timelines and requirements for both contracting and purchasing. Strong support for ensuring station maintenance and reliability. Support for time-limiting station use and enforcing charger parking spaces as EV-only. Suggestions to consult or partner with major national charging service providers. Desire to use an app or website to list locations with real-time pricing and availability.
- **Siting and Criteria:** Support for tighter station placement in hilly areas due to reduced range. Support for placement at gas stations and truck stops, hotels, small towns (to bolster commerce), and in rest areas (with some suggestions to seek exemptions to allow this).
- **Amenities:** Frequent requests for various amenities, particularly shade structures, adequate lighting, security cameras, wi-fi internet access, and wider pull-through stations for vehicles pulling trailers. Support for placement near always-open businesses for food, restrooms, and security/assistance.
- **Electrical Grid:** Strong concern regarding whether the grid and electrical supply can support EV charging, particularly during summer peak demand, and if brownouts or rolling blackouts will impact service. Substantial support for committing to renewable energy for charging, including deployment of solar panels and battery backups at stations.
- **Equity and EJ:** Concerns for lack of direct benefits to rural areas, non-interstate cities, and those who cannot afford EVs, and how Justice40 benefits will be quantified. Concerns for more public funding benefitting EV owners, who are thought of as already receiving subsidies for their vehicles and who may avoid paying certain taxes. Concerns that northern and eastern parts of the state are left out of the Plan. Encouragement for partnering with tribal governments to improve access.
- **Costs and Payments:** Requests for a variety of payment methods, including credit/debit cards, app-based, car-based, etc., without the need for accounts or subscriptions. Questions about pricing for using chargers and if prices can be regulated or capped.
- **Opportunities:** Questions about how businesses, local governments, and charities can support the network. Ideas for EV-supportive services and businesses.
- **Other Opposition:** Concerns for publicly funding private businesses, worries that stations that require public funding to build will be at unprofitable locations and will close. Concerns over environmental harm involved with encouraging EV use, particularly battery creation and disposal and the use of fossil fuel-generated electricity. Doubts over personal and societal need for and benefits of EVs. Concerns that the Plan is premature, and that government should wait until EV technology has improved and the market has expanded.

- **Other Topics:** General support for the Plan and EV promotion. Opinions that an EVSE network is vital to maintaining Arizona's desirability and tourism appeal. Mixed opinions on government's role in advocating for universal charging standards. Support for continued public involvement through Plan finalization and implementation. Concerns for EV adoption's impact on funding roadways. Desire for supporting charger installation at apartments and condominiums.

Other Comments

Through July 2022, ADOT received an additional 128 questions and comments from the public via email and telephone. Frequent questions and comments included suggestions for station locations, businesses inquiring about hosting or building EVSE sites, and individuals voicing their concerns for the Plan, particularly related to public investment in private business and concerns with potential impacts to the electric grid.

Measuring the Effectiveness of the Public Involvement Activities

To measure the overall participation levels for the project, the engagement metrics have been listed below. During engagement efforts, demographic data will be collected from participants to measure their effectiveness in conducting equitable, accessible engagement.

Engagement Metrics:

- **Webpage visits:** Through July 2022, the Plan website had 5,238 total page views.
- **GovDelivery email metrics** (total emails sent, open rate)**:** Through July 2022, 5,037 emails were sent with 3,111 emails opened, a rate of 62%.
- **Social media engagement** (impressions and comments)**:** Through July 2022, social media posts had 410,265 impressions and over 1,200 comments.
- **Public meeting and workshop attendance:** 212 people attended the key stakeholder workshop and 302 people attended the virtual public meeting.
- **Public and stakeholder surveys returned:** 157 key stakeholder surveys were returned, and 917 public surveys were returned.
- **Requests for accommodations** (language, mobility, accessibility, etc.)**:** Through July 2022, one request for accommodation was received.
- **Comments and questions** (submitted by email, phone, and mail)**:** Through July 2022, 128 comments and questions were received by email and telephone. No comments or questions have been received by mail.

Demographic Data

ADOT will continue to gather demographic data in conjunction with specific outreach activities. ADOT will gather the following demographic data to demonstrate the reach of engagement efforts.

- ZIP Code (method: stakeholder and public surveys)
- Race/ethnicity (methods: self-ID survey at public meetings, public survey, and website)
- Vehicle availability/ownership (method: public survey)

Information on ZIP Code, vehicle availability, and vehicle ownership was described previously in the *Key Stakeholder Survey and Public Online Survey* subsections. **Table 5** displays the results of self-identification surveys that were associated with the virtual public meeting, the key stakeholder meeting, and the public online survey.

Table 5: Self-Identification Survey Results Across Activities

Race/Ethnicity	Stakeholder Meeting	Public Meeting	Public Survey	State Population[iii]
White, Non-Hispanic/Latino	77.1%	75.0%	78.5%	53.2%
Hispanic/Latino	17.1%	10.0%	6.3%	32.3%
African American/Black	0.0%	3.8%	2.5%	5.4%
American Indian/Alaskan Native	2.9%	1.3%	1.7%	5.3%
Asian	2.9%	5.0%	3.9%	3.8%
Native Hawaiian/Other Pacific Islander	0.0%	1.3%	0.3%	0.3%
Two or More Races	0.0%	3.8%	6.8%	3.1%
Response Count	35	80	590	

Documentation

The final documentation of public involvement activities for the Plan will include compiling all materials related to public involvement activities, summarizing and analyzing comments, and describing how the comments are being addressed. The guidance provided in ADOT's *Public Involvement Plan*[iv] regarding documentation and comment management will be followed.

Evaluation includes the analysis of attendance numbers and attendee demographics, along with other trackable metrics, at the conclusion of each outreach event to gauge outreach effectiveness. ADOT will consider additional outreach methods should the planned methods fail to meet desired outcomes for participation and diversity. A final public involvement report will be prepared for the Plan, which will capture all public outreach efforts and participation.

Public meeting summaries will be prepared and will document attendees, notification methods (including copies of email alerts, news releases, print ads, and social media posts), sign-in sheets, returned self-ID surveys, civil right materials provided, Plan materials (including presentation, exhibits, and handouts), comments received and the given responses, and any other pertinent information.

Survey reports will be prepared summarizing the number of participants, the demographic breakdown of participants, and the responses to each survey question with accompanying charts and graphics to illustrate data. Stakeholder and public outreach reports will include the cross-tabulation of data needed to identify preferences, concerns, or other issues or information for various stakeholder types, and other information that will help inform the technical analysis.

The report will also provide a table of comments and questions received through other methods (email, mail, phone, etc.) and the responses provided.

Plan Vision and Goals

To create a framework for the successful implementation of a statewide charging infrastructure network, ADOT has developed the following vision and goals for the Plan. These goals will provide a baseline for program evaluation that will monitor three key areas to determine success: data collection, equitable access, and network reliability.

Vision

The Plan seeks to increase long-range mobility for EV drivers by closing the current gaps in charging station infrastructure placement along Arizona's AFCs and supporting the development of an equitable national EVSE network.

Goals

ADOT has set six goals that an interconnected EVSE network must achieve to realize the agency's vision. ADOT's Plan and associated commitments will:

1. **Reduce range anxiety by closing gaps** in the EVSE network along Arizona's AFCs.
2. Support the development of an EVSE network that is **resilient, equitable, accessible, and reliable.**
3. **Engage stakeholders and the public** in the planning, development, and installation of EVSE.
4. Identify **potential new AFC locations** during the outreach process.
5. Utilize **efficient contracting and procurement mechanisms** to: maximize the amount of infrastructure that can be built, consider future needs, and reduce risk(s) in order to support the EVSE network's long-term viability.
6. **Use data and performance metrics** to evaluate EVSE installation and operations in order to inform the development of program improvements.

Annual Goals

The following five-year program identifies specific goals for each FFY through 2026:

FFY 2022

- Complete and submit the EV Infrastructure Deployment Plan
- Solicit public and stakeholder input on potential new AFCs to be considered for nomination

FFY 2023

- Solicit and award contracts to upgrade existing stations and begin upgrade installations
- Begin the solicitation process for new EVSE stations
- Nominate new AFCs through the federal process
- Update the EV Infrastructure Deployment Plan to include the new AFCs

FFY 2024

- Award contracts for new EVSE stations and begin installation
- Solicit and award installation and operation contracts for EVSE stations on new AFCs, up to the funding limit

FFY 2025

- Solicit and award remaining funding for EVSE deployment

FFY 2026

- Complete installation of remaining EVSE
- Evaluate the performance of NEVI Formula Program implementation

The Plan will be updated annually to reflect Arizona's funding plan for the upcoming fiscal year.

Five-Year Goal

The five-year program culminates in the following five-year goal:

- Utilize 100% of the NEVI funding on Arizona's AFCs by the end of FFY 2026.

Contracting

ADOT intends to issue competitive contracts to private entities to either upgrade existing stations or to acquire, install, operate, and maintain new stations identified in the Plan using NEVI Formula Program funds. If a charging station identified in the Plan is deployed on public land, such as a national park, funds may be awarded directly to public agencies to upgrade or install, own, operate and maintain new EV station locations. Awardees will provide the required non-federal matching funds. Notification of funding opportunities will be issued by ADOT. All awards will be reimbursement-based; no advances of funds will be provided.

ADOT is authorized to enter into agreements with public or private entities for the purposes of this program under Title 28, Chapter 2 of the Arizona Revised Statutes. All contracting and procurement activities will be subject to the applicable requirements of 2 CFR Section 200 et seq. and 2 CFR Section 1201 et seq. ADOT plans to upgrade eligible existing non-compliant DCFC stations first; then fill in remaining gaps with new stations.

Upgrade of Existing, Eligible, DCFC Stations

A solicitation will be issued seeking proposals to upgrade existing DCFC stations to NEVI standards. The solicitation will identify eligible locations, current owners, and the expected upgrade needs. At locations where two eligible DCFC stations are located at one interchange the applications will be competitively scored, and the best proposal selected.

Applications will be reviewed, and proposals selected, based upon a variety of factors. ADOT is considering factors including, among others, the applicant's:

- Eligibility
- Ability to further program goals
- Demonstrated record of providing reliable and safe EV charging services meeting industry standards
- Operations, security, emergency, and resilience plans
- Technical, managerial, and financial capacity
- Community engagement plan
- Budget/independent cost estimate

New EVSE Stations

After ADOT has identified locations where upgrades will occur, the agency will solicit for the installation of new EVSE stations to close gaps in the network.

The competitive solicitation may either:

- Solicit one entity to design, build, own, operate, and maintain all new EVSE stations statewide, or
- Be subdivided into regions or corridors of the state, and solicit one entity to build, operate, and maintain all stations in each, individual area.

Applications for new EVSE stations will be reviewed, and proposals selected based upon a variety of factors. ADOT is considering factors including, among others, the applicant's:

- Eligibility
- Ability to further program goals
- Experience and expertise in EVSE station installation, ownership, operation, and maintenance
- Demonstrated record of providing reliable and safe EV charging services meeting industry standards
- Security, cyber security, emergency, and resilience plans
- Operations and maintenance plans
- Technical, managerial, and financial capacity
- Community engagement plan
- Budget/independent cost estimate

Strategies Leading to Efficient and Effective Deployment Against Plan Goals

ADOT will consider using NEVI Formula Program funds for new EVSE station operations and maintenance costs during the first five-years of station operation, particularly in locations anticipated to have low utilization of EVSE. As a part of this process, ADOT will solicit private entities with experience, expertise, financial capacity, strong maintenance plans, and a demonstrated record of reliable operations to minimize the risk of stranded assets.

ADOT will require, via contract terms, that infrastructure be maintained and operated at the same location for a period of no less than five years from the installation date with the consideration of providing service beyond the use of NEVI Formula Program funds. Contract terms may require that awardees for new stations post a performance bond to guarantee that the EVSE remains operational for the five-year performance period.

Compliance with State and Federal Requirements

Solicitations will comply with all applicable Federal and State procurement requirements. They will be advertised and made available to potential awardees through outlets such as eCivis, eGrants, or other appropriate distribution channels. Notice of Funding Opportunities will be published as provided by federal or state regulations. ADOT will hold pre-proposal meetings or other meetings as appropriate with potential awardees to discuss program goals, requirements, considerations, and other topics.

Solicitation documents will provide detailed information on submittal requirements, eligibility, program goals, and standards for station upgrade, installation, operation, and maintenance, as applicable. Administrative and other applicable requirements including Federal cross-cutting requirements, NEVI Formula Program requirements, applicable State requirements, and applicant responsibilities relating thereto, and other relevant information will also be included.

ADOT will monitor the finalization of NEVI Formula Program rulemaking to ensure that its requirements are incorporated in the solicitation documents and in the contracts executed with all parties awarded NEVI Formula Program funding.

ADOT subject matter experts will evaluate agency precedents, best practices, and legal requirements to identify the best procurement and contracting solutions that will meet all applicable federal and state laws and NEVI program goals.

Contracts will contain provisions requiring that all applicable federal requirements are met by the awardee, and appropriate monitoring will be conducted to verify compliance.

Public Disclosure Requirements

ADOT intends to comply with FHWA final NEVI Formula Program rulemaking relating to contracting with private entities. The following strategies are based on proposed NEVI rules but may be amended to reflect the final rule when it is issued.

- ADOT will comply with the FHWA's public disclosure requirements, as published in the final NEVI Formula Program rulemaking, for the documents concerning the operations of EVSE including the procurement process used, price, the number of bids received, the identification of the awardee, the proposed contract with the awardee and, in accordance with State law, and the financial summary of contract payments. ADOT will ensure these items are made publicly available whether through an announcement, public comment period, or other means.
- Any agreements for the operation and maintenance (O&M) of an EV charging station will be subject to Arizona Revised Statutes (A.R.S) Title 41 (State Government), Chapter 24 (Solicitation and Awarding of Grants), 2 CFR 200 et seq. and 2 CFR 1200 et seq.

Additional Public Disclosure Considerations

- ADOT will encourage station owners to consider electricity rates in the surrounding community when setting a pricing structure to confirm users are being reasonably charged for use. The rate should offset the lifetime cost of the charging station, including:
  - Need to recover fixed operating costs
  - Need to recover usage-based or other variable operating costs
  - Management of vehicles left in EVSE parking spaces for extended periods or other misuse patterns
  - Incentivizing charging during lower-cost off-peak hours
  - Ability of targeted users to access or enable the EVSE
  - Ability of targeted users to pay for and afford charging rates
  - Need for networked versus non-network stations to apply charges and process payment
- Station owners will be encouraged to take advantage of offerings from local utilities to minimize upfront and operational costs. Additionally, electric utility providers may offer electricity rates that encourage the recharging of vehicles during off-peak, overnight times that may be much lower than on-peak, midday times.

Environmental Compliance

Projects that require federal approval and are funded by FHWA must meet the requirements of the National Environmental Policy Act (NEPA). Development of the statewide EV Plan qualifies as a Categorical Exclusion (CE) under 23 CFR 771.117(c)(1) because it is a planning activity that does not lead directly to construction. The installation of EV charging infrastructure is a separate activity that will require an additional environmental approval. The awardee for each site will be responsible for meeting

NEPA requirements and providing the appropriate documentation to ADOT for approval. ADOT can provide the vendor with a list of recommended environmental consultants with expertise in supporting the agency through the environmental review process, if needed.

A vast majority of federal-aid projects have no significant environmental impacts and can be determined to be a CE. It is anticipated that EV charging sites would meet the definition of a CE under 23 CFR 771.117(c)(21). Pursuant to 23 U.S.C. 326 the FHWA Arizona Division and ADOT have entered into a Memorandum of Understanding (MOU) for the State Assumption of Responsibility for CEs. The CE Assignment MOU (326 MOU) was signed by FHWA and ADOT on January 3, 2018. CEs listed under 23 CFR 771.117 paragraph (c) are approved by ADOT under the 326 MOU.

All CE determinations follow documentation requirements, proper CE determination under 23 CFR 771.117 (c) and (d), environmental analysis, re-evaluation under 23 CFR 771.129, evaluation of "unusual circumstances," inclusion of environmental commitments, and exercise of proper approval authority under the aforementioned 326 MOU. Utilizing an ADOT CE Checklist, supported by cultural, biology, hazardous materials, air quality, and noise, among other technical evaluation criteria, assesses project impacts. The environmental review and required documentation would be appropriate to the scope of each project and specific conditions at each site. Upgrade sites located at existing charging sites that require minimal or no ground disturbance may be covered by a CE type that reflects minimal cultural, biology, and hazardous materials investigations. Sites where new charging stations are installed may experience more ground disturbance and would require a higher level of environmental study and documentation. If project activities have the potential to impact cultural resources, these sites may require cultural resources investigations and consultation under Section 106 of the National Historic Preservation Act. Land ownership of the site will also be considered. Any sites on Tribal land may require additional approvals or outreach to the affected Native American Tribes.

The timeline for CE approval is dependent upon project-specific circumstances and approvals. CEs for upgrades to existing charging sites with minimal ground disturbance can be expected to take approximately three months to complete and obtain approval. CEs for new build sites with more ground-disturbing activities, or those requiring cultural resources survey and/or Section 106 consultation, may take up to six months to complete and obtain approval. In addition, certain technical studies such as hazardous materials or biological surveys may need to be updated if extensive time has transpired between conclusion of the environmental process and the start of construction. Any subsequent environmental field work is often completed prior to the start of construction and execution time should be considered in site location scheduling.

Participation of Small Businesses

ADOT will encourage the participation of small business enterprises and will also consider proximity of small businesses in the location of charging stations. ADOT has a disadvantaged business enterprise (DBE) program to ensure DBEs (which also must qualify as a small business) have an equal opportunity to receive and participate in USDOT (U.S. Department of Transportation)-assisted contracts. ADOT will require awardees to abide by these regulations when procuring contracts for installers and station hosts. See the *Implementation - Opportunities for the Participation of Small Businesses* section for more information on ADOT's efforts.

Community Engagement

It is important that third-party entities engage with the community where EVSE infrastructure will be installed to help ensure the locations are in line with the community's needs, barriers to implementation are identified upfront, and the station will ultimately be used by the community. ADOT will require that potential charging station owners describe their community engagement strategy as part of their application / proposal to ADOT, and the strength of their strategy will be considered during the selection process. Community engagement requirements shall comply with civil rights requirements, and the ADOT Public Involvement Plan. Community engagement requirements will be included in all contracts. Additionally, when required by law, public hearings will be held for projects prior to initiating the procurement process.

Existing and Future Conditions Analysis

This analysis summarizes the existing EV charger technologies, Arizona geography and travel patterns, existing and planned EVSE infrastructure in Arizona, a forecast of EV adoption, and a charging-demand analysis in Arizona through the year 2040.

Electric Vehicle Basics

EVs are powered by electric motors, while internal combustion engine (ICE) vehicles are powered by fossil fuels. Current specifications for a typical EV are shown in **Table 6**.

Table 6: Typical EV Technical Specifications

Specification	Description	Value
Vehicle Size	Types of EV available on the market.	Commonly sedans. Beginning to develop SUVs and trucks.
Range[v]	The distance that a battery in an EV vehicle can travel before needing to be recharged.	150-300 miles
Efficiency[vi]	The mileage of an EV per unit capacity of the battery.	2.78 mi/kilowatt hour (kWh)
Battery Size[vii]	The battery capacity of an EV.	54-108 kWh
Battery Pack Cost[viii]	The cost of an EV battery per unit capacity.	$157/kWh

Charger Types

EV chargers are manufactured in a variety of connector types and power outputs. Charger power output is directly related to vehicle charging time; the higher the power, the shorter the time needed to charge the vehicle. There are three charger power level classifications.

Level 1 chargers use standard 20 ampere, 120-volt outlets, which are those typically found in a home. Charging speeds are slow at a rate of 2-5 miles of range per hour and therefore only suitable for home and overnight charging locations.[ix] Level 1 charging is becoming less common as battery capacity continues to increase and Level 1 chargers are now generally used as emergency chargers.

Level 2 chargers use higher-voltage outlets: 220-volt, such as what is commonly used by clothes dryers. Higher voltage allows faster charging, at a rate of 10–20 miles of range per hour. This type of charger is typically found in EV charging stations at workplaces, curbside parking spots, hotels, parks, or other public destinations.

Level 3, or DCFC, allows for charging at higher speeds but requires commercial-grade power levels. Charging speed is at a rate of about 60–80 miles of range per hour, and power output levels vary between 50 kW and 350 kW. Close collaboration with the local electric utility is required when installing

Level 3 chargers. The owner of a charging site must ensure that proper power capacity and quality are provided to the site, as DCFC chargers require higher power demand than Levels 1 or 2.

The NEVI Formula Program only funds the deployment of Level 3 DCFC chargers, and this Plan covers only the installation of such chargers. Each charger type requires a specific connector that transfers power to the vehicle from the grid. **Table 7** displays the four connector types used in the United States, where each connector type refers to the shape of the charging inlet on the vehicle, which must be compatible with the EV charging station's port. For DCFC, as required under NEVI, the J1772 Combined Charging System (CCS) and CHArge de MOve (CHAdeMO) types are the only cross-compatible connectors; Tesla Combo plugs are proprietary to Tesla EV owners, even if they can be found at non-Tesla Super Chargers. Since CHAdeMO is being phased out in favor of CCS, the NEVI formula program only requires the installation of CCS connectors.[x]

Table 7: Common EV Connector Types

EV Charger	Charge Description
 J1772	The primary connector type used for Level 1 and Level 2 charging.
 J1772	A CCS is a J1772 connector with additional ports to enable DCFC.
 CHAdeMO	Used on some US cars for DCFC only. Vehicles with CHAdeMO will have a second inlet (usually J1772) for Level 1 or Level 2 charging.
 Tesla Combo	Used only by Tesla (for Level 1, Level 2, and DCFC)

Public Charging Infrastructure

To support widespread EV adoption, a publicly available charging network is crucial because it will:

- Provide alternatives to at-home EVSE: Many people face challenges when installing EVSEs at their residence (e.g., the prohibitive cost of installing EVSE, the complexity of installing at rental units and multi-family dwellings). Having an extensive public EVSE network may enable people to purchase an EV even without access to an EVSE at home.
- Reduce driver range anxiety: A major reason that drivers do not purchase EVs is the fear of running out of battery charge before reaching one's destination or charging location, sometimes referred to as range anxiety. A robust network of public EVSE infrastructure may mitigate this apprehension.
- Enable inter- and intra-state travel: To enable long-distance EV travel across the United States, developing an EVSE network along main highway corridors is required. USDOT has worked with the states to develop the AFCs[xi] program that will build a national network of EV chargers, fully available to the public and at sufficient density to support long-distance travel within states and across the country.

Existing State Characteristics

State Geography, Terrain, Climate and Land Use Patterns

Geography and Terrain

Arizona is in the Southwestern portion of the United States and is bordered by the states of California, Nevada, Utah, Colorado, and New Mexico; to the south, it shares an international border with Mexico. The western Arizona border is formed by the Colorado River, which flows from the Grand Canyon to the north, through Lake Mead, along the communities of Bullhead City, Lake Havasu City, Parker, and Yuma in the southwestern corner.

Arizona has large areas of arid desert land primarily throughout the central, southern, and western portions of the state, including the Sonoran, Chihuahuan, and Mohave deserts. While Arizona has a great deal of low-lying desert landscapes, more than half of the state lies above an elevation of 4,000 feet above sea level. Elevation increases moving north and east to more mountainous regions, characterized by the Mogollon Rim which cuts diagonally across the state's, higher-elevation mountain region, and the Colorado Plateau, which is home to the Navajo and Hopi Tribal lands. Arizona has some of the world's most recognizable natural landforms, including the Grand Canyon, Painted Desert, Petrified Forest, Chiricahua National Monument, and Monument Valley.

The state's geographic divisions can be summarized into three spaces: the Colorado Plateau, the Basin and Range Province, and the Central Highlands. The northeastern portion of the state is known as the Colorado Plateau, which is also made up of parts of Utah, Colorado, and New Mexico. The portion lying within the Arizona border largely consists of tablelands that are intermittently interrupted by mesas and plateaus, such as those found in Monument Valley.

At the southern extent of the Colorado Plateau sit the highest peaks in the state: Humphrey's Peak (12,633 feet) in the San Francisco Mountains and Baldy Mountain (11,403 feet) in the White Mountains. This area then transitions into the Central Highlands, known for plateaus, rugged mountain peaks, and rolling hills. The Basin and Range Province comprises much of the Sonoran Desert, where vast, open valleys create a suitable environment for the broad urban growth of the state's largest cities within the Phoenix and Tucson metropolitan areas.

Arizona has truly rich and diverse natural and built landscapes, including the large urban metropolitan areas, the high elevation and snow-capped volcanic peaks of the San Francisco Mountains, the sprawling Sonoran Desert, large contiguous areas of tribal lands, and the lush Coconino National Forest. This range of landscapes provides opportunities for, yet also imparts limitations to, the efficient movement of goods and people.

Most of Arizona's built environments were developed after World War II, and they were shaped by the development of faster transportation options—namely, interstate highways. The Phoenix metropolitan area, the fifth largest in the nation, is the primary center of development and economic opportunity. Growth has been accelerated, in part, by the efficient vehicular transportation systems throughout the area, including interstate highways, a modern freeway system, and a robust urban arterial grid-based network.

Climate

Arizona experiences a wide range of weather patterns that vary depending on season and the region of the state. Arizona weather can be generalized into two climates: In the southern and western portion of the state, including Maricopa, Yuma, Pima, La Paz, Mohave, Santa Cruz, Pinal, Cochise, and Graham Counties, there are mostly arid lands. However, the northern and eastern Coconino, Yavapai, Gila, Greenlee, Navajo, and Apache Counties have a more alpine climate.

Temperatures in the state generally peak in summer, with daytime high temperatures regularly reaching between 90° F and 110° F. The hottest areas of the state are in the Sonoran Desert in the south, central, and southwest. Nighttime summer temperatures regularly drop to between 50° F and 90° F.[xii] This fluctuation between high and low temperatures is accompanied by a high potential for dust storms, haboobs, and monsoon storms that, paired with dry terrain, can lead to flash-flooding events and unsafe travel conditions.

Winters across the state are more temperate than the summers, with average highs of 70° F in lower-elevation locations, but nighttime temperatures regularly reach or drop below freezing. The most severe winter conditions are experienced in the northern highlands, which include the largest city in northern Arizona, Flagstaff, having a yearly average low temperature of 32° F.[xiii]

Overall, statewide rainfall averages 13 inches annually, with most of it falling during late summer and fall. Extreme rainfall can be found in the northern high elevations, and may reach 20 inches, while the southern desert regions get less-frequent rainfall but experience late summer monsoon seasons, which result in a large percent of the total yearly rainfall. The areas with the highest annual rainfall across the state include Payson (20 inches), Coronado National Monument (21 inches), Flagstaff (21 inches), and Williams (22 inches). The lowest annual rainfall is concentrated in Western Arizona, including Parker (4.6 inches), Lake Havasu City (4.2 inches), and Yuma (3.3 inches).[xiv]

Snowfall is more concentrated to the north and east portions of the state and generally falls between November and March.[xv] Areas with the highest annual snowfall are Show Low (19 inches), Grand Canyon Village (43 inches), Williams (65 inches), and Flagstaff (90 inches).[xvi] While some of this snowfall is centralized in less populous areas, Arizona has many natural recreational areas that receive large amounts of traffic even in such adverse weather conditions.

Land Use

Land use and transportation are related to the development patterns found in Arizona. Early history of the state shows the initial development of towns around and near train stops. As time passed and technology advanced, land use continued to follow transportation trends, with Arizona's greatest period of growth concurring with the increased use of the automobile and, more importantly, the interstate highway system.

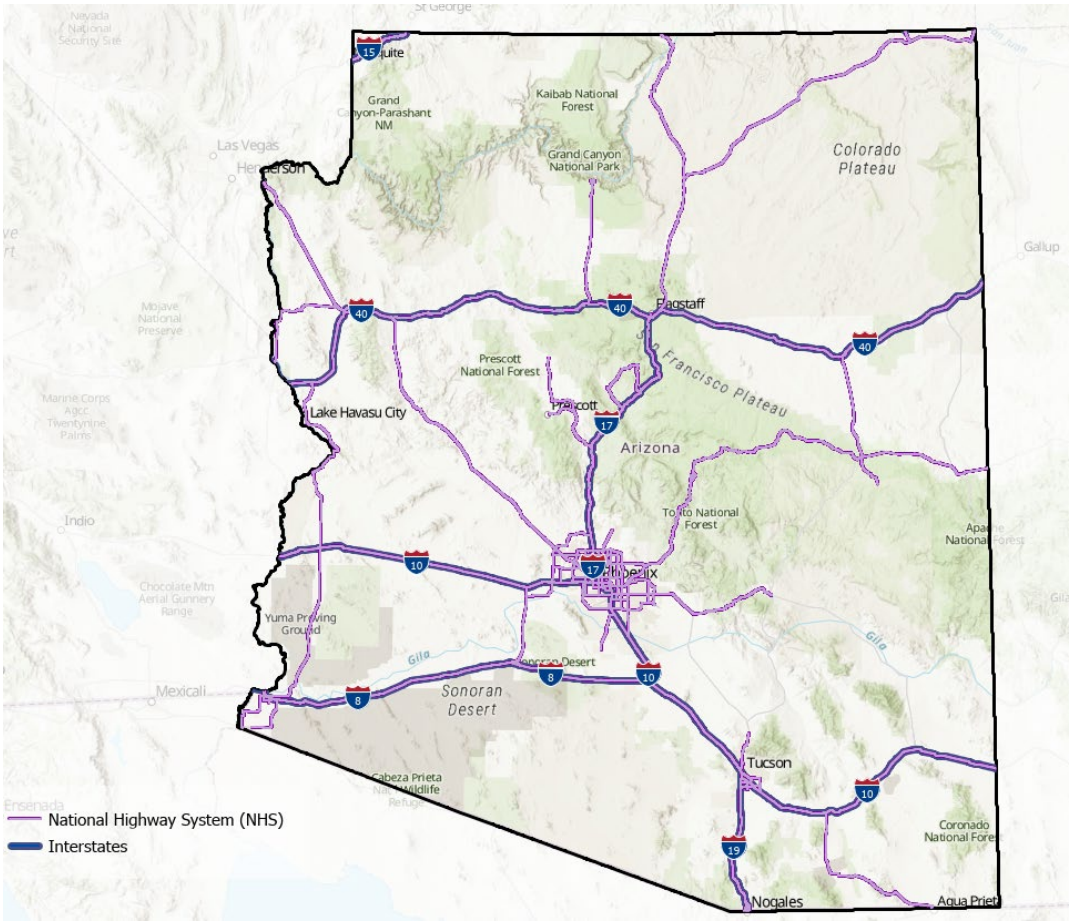
Arizona land use is divided between private, public, and state property. In Arizona, approximately 18% of land is privately held. By the numbers, Arizona has 42% (30.3 million of 72.9 million acres) owned by the federal government, split up mostly between the Forest Service, National Park Service, Fish and Wildlife Service, Bureau of Land Management, and the Department of Defense.[xvii] The State of Arizona then owns another 13% of land (9.6 million acres) in the state trust, making just over 51% of land in Arizona under government control.[xviii]

Arizona also has large tracts of tribal lands, with the largest being the Navajo Nation spanning 17.28-million acres across northeastern Arizona, Utah, and New Mexico. In total, 22 tribes reside on 27% of the land (or 20.1 million acres) in Arizona.[xix]

State Travel Patterns, Public Transportation Needs, Freight and Other Supply Chain Needs

In 2020, the Arizona State Highway System had 9,440 total centerline miles, including 1,168 centerline miles of interstate highway. A schematic of the National Highway System in Arizona is shown in **Figure 5**. Arizona's entire roadway network (including local roads) had 66,968 centerline miles.

Figure 5: Arizona National Highway System



While interstate highways make up less than two percent of the state's total roadway network, it accounts for 21.3% of the VMT on Arizona roads.[xx] **Table 8** shows the VMT along each of the major interstates that have been identified as AFCs.

Table 8: AFCs VMT Data

Corridors	VMT per Day (million miles)
I-8	1.9
I-10	19.4
I-15	0.6
I-17	7.5
I-19	1.8
I-40	6.5
Total	38.1

As EVs are being adopted for private use, they are also being adopted by public transit agencies. Many of the public transit agencies across the state have already begun to research the feasibility of adding EVs to their fleets-if they are not already actually incorporating them. The cities of Phoenix and Tempe

are converting their bus fleets to low-emission and zero-emission fuel sources, and are testing electric buses on some of their routes.[xxi] Additionally, the Phoenix Union High School District began using electric buses in 2020 and are continuing efforts to fully transition the fleet to EVs.[xxii] Using funds from the Federal Transit Administration's Low-No Emission Grant Program, the Sun Tran bus system and the City of Tucson have been introducing electric buses to their already 100% clean fuel fleet.[xxiii] Mountain Line, the transit agency in the Flagstaff area, has completed a Zero Emissions Bus Plan, and will transition their bus fleet by 2034.[xxiv]

Truck traffic accounts for approximately 14% of VMT in Arizona along the designated AFCs,[xxv] with large ports in California contributing to cross country traffic along interstate highways. Freight movements into and throughout Arizona presents another consideration for how EV trucking will be handled across the state and at charging stations along the AFCs as these trucks will also need to charge as truck fleets become more electrified. Data from 2018 shows that there were 98-billion ton-miles (i.e., one ton of freight shipped one mile) of freight flow in and out of the state.

Currently, the United States continues to experience the effects of supply chain shortages. These shortages have been caused by several factors, but one key factor has been the inability to move freight from major ports. In the long term, an increase in EV freight hauling may strengthen supply chains, as the dependency on moving fuel to ports and trucking centers would be reduced or eliminated.

Alternative Fuel Corridors

Since 2016, FHWA has accepted nominations from state departments of transportation, including ADOT, for AFCs. Those considered "corridor ready" contain enough fueling facilities to enable corridor travel with the designated alternative fuel; those considered "corridor pending" lack sufficient existing facilities to support alternative fuel vehicle (AFV) travel. **Table 9** lists Arizona's AFCs; they are depicted in map format in **Figure 6**.

Table 9: Arizona's EV AFCs

Status	Corridor Name	Location
EV Pending	I-19	Between the AZ/Mexico border and I-19/I-10 interchange in Tucson.
EV Ready	I-10	Between Buckeye and Benson
	I-17	Between West Anthem Way, Phoenix and Camelback Rd., Phoenix
	I-40	Between the I-40/I-17 interchange in Flagstaff and Winslow
EV Pending	I-8	Between the AZ/CA border and the I-8/1-10 interchange in Casa Grande
	I-10	Between the AZ/CA border and Buckeye; and between the AZ/NM border and Benson
	I-17	Between the I-17/I-10 interchange in Phoenix and Camelback Rd., Phoenix; and between Camelback Rd., Phoenix and the I-17/I-40 interchange in Flagstaff
	I-40	Between the AZ/CA border and I-40/I-17 interchange in Flagstaff; and between the AZ/NM border and Winslow
EV Ready	I-15	Between AZ/Nevada border and AZ/UT border
EV Ready	I-10	From Tucson, AZ to Phoenix, AZ
EV Pending	I-10	From the AZ/NM border to Tucson, AZ; and from the AZ/CA border to Phoenix, AZ
	I-17	From Phoenix, AZ to Flagstaff, AZ

Source: https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/

Figure 6: Arizona's EV AFCs

Existing Locations of Charging Infrastructure Along AFCs

Table 10 presents the existing locations of Level 2 and DCFC charging infrastructure along the AFCs, as of June 22, 2022. **Figure 7** displays interstate charging locations on a map of Arizona. Although the Plan is focused on the deployment of DCFC, Level 2 chargers are also listed in **Table 10** since they support the EV charging network.

Table 10: Existing Locations of Charging Infrastructure Along AFCs (as of 6/22/2022)

State EV Charging Location Unique ID	Charger Level (DCFC, L2)	Route	Location	Number of EV Connectors	EV Network
39853	Level 2	I-10	Avondale	1	Non-Networked
39861	Both	I-10/I-17	Phoenix	2 each (4 total)	Non-Networked
39863	Both	I-10	Tempe	1 each (2 total)	Non-Networked
61294	Level 2	I-10	Chandler	2	ChargePoint Network
61295	Level 2	I-10	Chandler	2	ChargePoint Network
66290	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
66794	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
76160	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
76161	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
76907	Level 2	I-10/I-40	Flagstaff	2	AmpUp
79956	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
80014	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
85633	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
95292	Level 2	I-10/I-17	Phoenix	4	Blink Network
95412	Level 2	I-10/I-17	Phoenix	1	Blink Network
95568	Level 2	I-10/I-17	Phoenix	2	Blink Network
95706	Level 2	I-10/I-17	Phoenix	7	Blink Network
95707	Level 2	I-10/I-17	Phoenix	2	Blink Network
95738	Level 2	I-10/I-17	Phoenix	1	Blink Network
95880	Level 2	I-10/I-19	Tucson	1	Blink Network
95964	Level 2	I-10/I-17	Phoenix	2	Blink Network
96019	Level 2	I-10/I-17	Phoenix	4	Blink Network
96059	Level 2	I-10/I-17	Phoenix	2	Blink Network
96060	Level 2	I-10/I-17	Phoenix	1	Blink Network
96100	Level 2	I-10/I-17	Phoenix	2	Blink Network
96383	Level 2	I-10	Tempe	1	Blink Network
101980	DCFC	I-10	Buckeye	8	Tesla

State EV Charging Location Unique ID	Charger Level (DCFC, L2)	Route	Location	Number of EV Connectors	EV Network
101981	DCFC	I-10/I-8	Casa Grande	6	Tesla
101982	DCFC	I-10/I-40	Flagstaff	12	Tesla
101984	DCFC	I-40	Holbrook	12	Tesla
101985	DCFC	I-40	Kingman	10	Tesla
101986	DCFC	I-17	Mayer	8	Tesla
101989	DCFC	I-10/I-17	Phoenix	16	Tesla
101990	DCFC	I-10	Quartzsite	36	Tesla
101994	DCFC	I-10/I-19	Tucson	10	Tesla
101996	DCFC	I-10	Willcox	8	Tesla
101997	DCFC	I-8	Yuma	8	Tesla
104200	Level 2	I-10/I-17	Phoenix	1	ChargePoint Network
112761	Level 2	I-10/I-40	Flagstaff	3	Tesla Destination
112762	Level 2	I-10/I-40	Flagstaff	1	Tesla Destination
112763	Level 2	I-10/I-40	Flagstaff	1	Tesla Destination
112764	Level 2	I-10/I-40	Flagstaff	3	Tesla Destination
112765	Level 2	I-10/I-40	Flagstaff	2	Tesla Destination
112770	Level 2	I-40	Kingman	2	Tesla Destination
112783	Level 2	I-10/I-17	Phoenix	2	Tesla Destination
112831	Level 2	I-10/I-19	Tucson	3	Tesla Destination
112832	Level 2	I-40	Winslow	1	Tesla Destination
114851	Level 2	I-15	Mesquite	3	Tesla Destination
118886	DCFC	I-10/I-40	Flagstaff	1	ChargePoint Network
121828	DCFC	I-10	Buckeye	4	Electrify America
121833	DCFC	I-8	Yuma	4	Electrify America
122218	Level 2	I-40	Petrified Forest	2	ChargePoint Network
122249	DCFC	I-8	Gila Bend	8	Tesla
122359	Level 2	I-10/I-17	Phoenix	6	Tesla Destination
123009	DCFC	I-40	Williams	1	Non-Networked
123483	DCFC	I-10	Benson	4	Electrify America
124348	DCFC	I-17	ANTHEM	4	Electrify America
127934	DCFC	I-10/I-40	Flagstaff	4	Electrify America
135874	DCFC	I-40	Winslow	4	Electrify America
145281	Level 2	I-10/I-17	Phoenix	2	Volta
145653	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
145749	DCFC	I-10/I-19	Tucson	10	Electrify America
146891	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
146892	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network

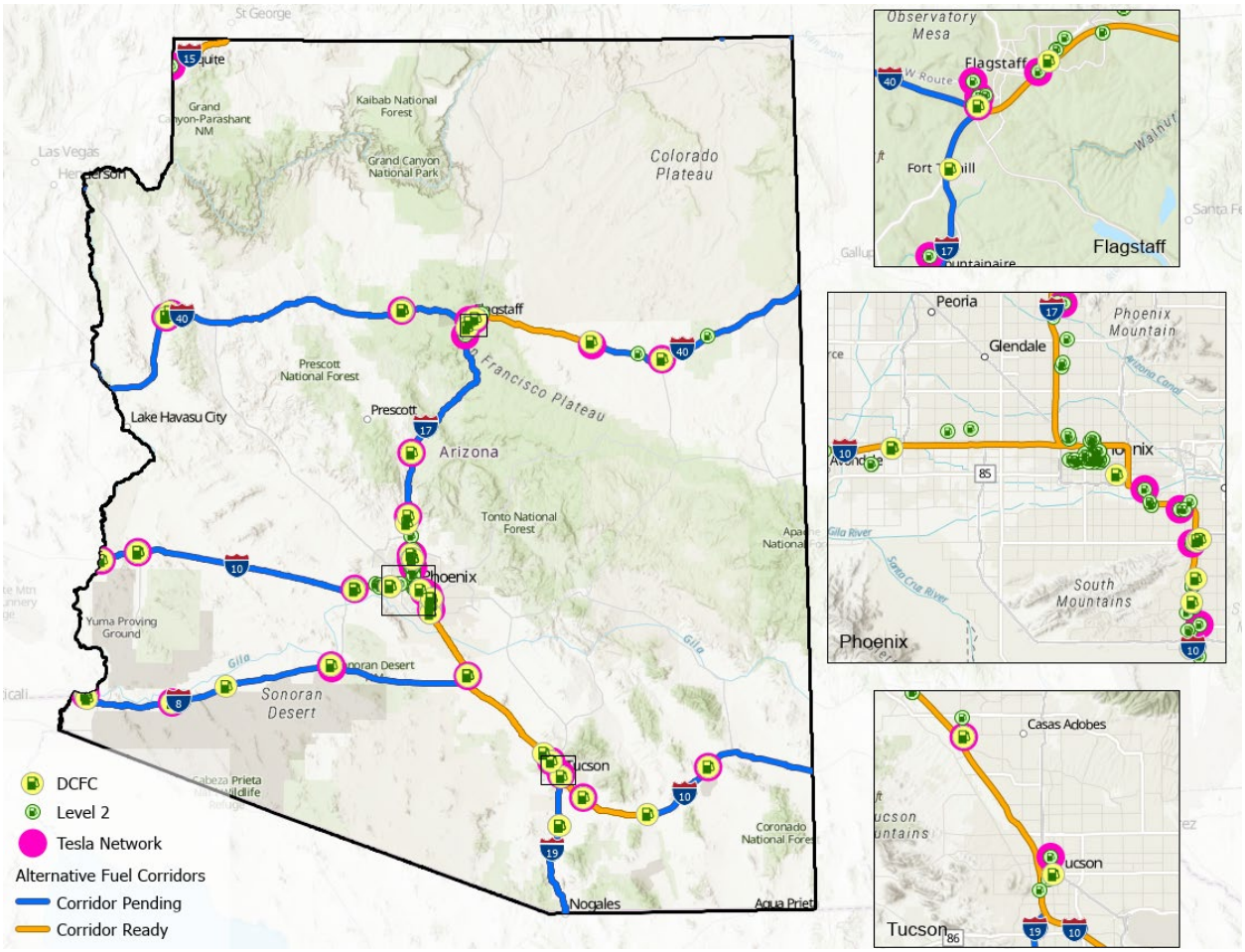
State EV Charging Location Unique ID	Charger Level (DCFC, L2)	Route	Location	Number of EV Connectors	EV Network
147040	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
147041	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
147083	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
147118	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
147121	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
147458	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
149194	DCFC	I-10	Tempe	8	Electrify America
150334	Both	I-10/I-17	Phoenix	2 each (4 total)	Blink Network
151953	DCFC	I-17	New River	10	Tesla
153411	DCFC	I-10	Ehrenberg	8	Tesla
154797	DCFC	I-8	Tacna	8	Tesla
156367	Level 2	I-10	Goodyear	2	ChargePoint Network
164142	Level 2	I-10	Chandler	2	SemaConnect Network
164254	Level 2	I-10/I-17	Phoenix	3	Blink Network
164351	Level 2	I-40	Williams	2	SemaConnect Network
164414	Level 2	I-10/I-19	Tucson	4	SemaConnect Network
164787	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
165214	Level 2	I-10	Buckeye	2	ChargePoint Network
166787	Level 2	I-10	Goodyear	2	ChargePoint Network
167342	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
167343	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
168622	Level 2	I-40	Kingman	2	Tesla Destination
168689	Level 2	I-10/I-17	Phoenix	4	Tesla Destination
168691	Level 2	I-10/I-40	Flagstaff	2	Tesla Destination
168702	Level 2	I-10	Chandler	2	Tesla Destination
168741	Level 2	I-8	Gila Bend	4	Tesla Destination
168852	Level 2	I-40	Williams	5	Tesla Destination
169028	Level 2	I-10/I-17	Phoenix	1	Tesla Destination
169228	Level 2	I-10/I-17	Phoenix	4	Tesla Destination
169240	Level 2	I-10/I-17	Phoenix	3	Tesla Destination
169411	DCFC	I-8	Dateland	4	Electrify America
170168	Level 2	I-10/I-17	Phoenix	3	Blink Network
171760	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
171771	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
171772	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
171839	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
171845	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network

State EV Charging Location Unique ID	Charger Level (DCFC, L2)	Route	Location	Number of EV Connectors	EV Network
171846	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
171928	Level 2	I-10/I-17	Phoenix	1	ChargePoint Network
173956	DCFC	I-10	Chandler	1	ChargePoint Network
174635	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
175685	Level 2	I-10	Goodyear	2	ChargePoint Network
182918	Level 2	I-10/I-19	Tucson	1	ChargePoint Network
182919	Level 2	I-10/I-19	Tucson	1	ChargePoint Network
182920	Level 2	I-10/I-19	Tucson	1	ChargePoint Network
182921	Level 2	I-10/I-19	Tucson	1	ChargePoint Network
184916	DCFC	I-40	Williams	4	Electrify America
185095	Level 2	I-10/I-40	Flagstaff	2	Non-Networked
185098	DCFC	I-10/I-17	Phoenix	1	Non-Networked
186033	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
186034	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
186193	Level 2	I-10	Goodyear	1	Non-Networked
186198	Level 2	I-10/I-17	Phoenix	2	Non-Networked
186348	Level 2	I-10/I-17	Phoenix	3	Non-Networked
186349	Level 2	I-10	Tempe	1	Non-Networked
186350	Level 2	I-10	Chandler	2	Non-Networked
186351	Level 2	I-10	Chandler	1	Non-Networked
187569	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
187879	DCFC	I-40	Kingman	4	Electrify America
187884	Level 2	I-10/I-17	Phoenix	4	Blink Network
187948	DCFC	I-10	Quartzsite	4	Electrify America
189037	Level 2	I-10/I-19	Tucson	2	Blink Network
189311	Level 2	I-8	Yuma	2	Blink Network
189658	Both	I-10/I-17	Phoenix	1 each (2 total)	Blink Network
189685	DCFC	I-10/I-19	Tucson	4	Non-Networked
190647	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
191561	DCFC	I-10	Chandler	4	Electrify America
193276	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
193277	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
193278	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
193279	Level 2	I-10/I-17	Phoenix	2	ChargePoint Network
195717	Level 2	I-10/I-17	Phoenix	2	Blink Network
195718	Level 2	I-10/I-17	Phoenix	4	Blink Network
195719	Level 2	I-10/I-17	Phoenix	2	Blink Network

State EV Charging Location Unique ID	Charger Level (DCFC, L2)	Route	Location	Number of EV Connectors	EV Network
195724	Level 2	I-10/I-17	Phoenix	2	Blink Network
195733	Level 2	I-10/I-19	Tucson	2	ChargePoint Network
195734	Level 2	I-10/I-19	Tucson	2	ChargePoint Network
196011	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
196012	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
198039	Level 2	I-10/I-19	Tucson	2	SemaConnect Network
198261	DCFC	I-10	Tempe	1	EVgo Network
198884	DCFC	I-10/I-8	Casa Grande	1	EVgo Network
201449	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
201450	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
201865	Level 2	I-40	Holbrook	2	Blink Network
202355	Level 2	I-8	Yuma	4	Non-Networked
202359	Level 2	I-10/I-17	Phoenix	4	Non-Networked
202365	Level 2	I-10/I-40	Flagstaff	4	Non-Networked
202369	Level 2	I-40	Holbrook	4	Non-Networked
202371	Level 2	I-10	Goodyear	4	Non-Networked
202372	Level 2	I-10/I-17	Phoenix	4	Non-Networked
202374	Level 2	I-10/I-17	Phoenix	4	Non-Networked
202383	Level 2	I-10/I-17	Phoenix	4	Non-Networked
202395	Level 2	I-10/I-8	Casa Grande	2	Volta
205051	Level 2	I-10	Avondale	2	ChargePoint Network
205372	DCFC	I-19	Green Valley	1	ChargePoint Network
205566	DCFC	I-40	Kingman	14	Tesla
205762	Level 2	I-10	Avondale	2	ChargePoint Network
206318	Level 2	I-8	Yuma	2	ChargePoint Network
206319	Level 2	I-8	Yuma	2	ChargePoint Network
206479	Level 2	I-10/I-19	Tucson	2	ChargePoint Network
206610	DCFC	I-10/I-19	Tucson	16	Tesla
207198	DCFC	I-10	Avondale	1	ChargePoint Network
207199	DCFC	I-10	Avondale	1	ChargePoint Network
207804	Level 2	I-10	Tempe	1	ChargePoint Network
207805	Level 2	I-10	Tempe	1	ChargePoint Network
207806	Level 2	I-10	Tempe	1	ChargePoint Network
207807	Level 2	I-10	Tempe	1	ChargePoint Network
211831	Level 2	I-19	Green Valley	1	ChargePoint Network
211832	DCFC	I-19	Green Valley	1	ChargePoint Network
212779	Level 2	I-40	Winslow	4	Non-Networked
212782	Level 2	I-10	Goodyear	4	Non-Networked

State EV Charging Location Unique ID	Charger Level (DCFC, L2)	Route	Location	Number of EV Connectors	EV Network
213154	Level 2	I-10/I-17	Phoenix	8	Non-Networked
217183	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network
217184	Level 2	I-10/I-40	Flagstaff	2	ChargePoint Network

Figure 7: Map of Existing Interstate Charging Stations in Arizona



Current Grid Capacity

The high-power output of DCFC requires adequate capacity on the electrical grid and specific electrical service conditions such as three-phase power. An understanding of where three-phase service and adequate electrical capacity exists will play a critical role in identifying sites for proposed charging stations. Sites that do not have adequate electrical conditions will need to be upgraded, adding to the cost and timeline of deployment. ADOT currently lacks data on available grid capacity but plans to collaborate with electric utilities (e.g., APS, TEP, Salt River Project, Navopache Electric Co-op, Mohave Electric Cooperative, UNS Electric, Sulphur Springs Valley Electric Co-op) to understand grid conditions at the proposed sites. Following engagement, ADOT may revise the proposed sites if constraints are identified.

Known Risks and Challenges

Table 11 lists the risks and challenges identified in Arizona regarding the deployment of EV charging infrastructure.

Table 11: Known Risks and Challenges

Risk/Challenge	Description	Mitigation
Staffing	The Plan implementation will require a significant number of ADOT staff, including environmental, cybersecurity, contracts, legal, and project management, as well as staff to monitor, collect data, and prepare federal reports. NEVI funds cannot be used to hire new staff positions and ADOT is unlikely to have the resources to create new positions specifically for this program.	Select a contracting mechanism that enables effective implementation of the Plan with existing staff.
Stranded Assets	To close gaps and help to meet needs of underserved communities, some stations will be placed in rural, tribal, and low-income communities; these areas might initially have low station utilization and may be unprofitable for some time, but their installation is required for sufficient infrastructure coverage. Private businesses may build and operate a station if a grant pays for the first five years of operations and maintenance, but the private business could find it unprofitable to continue operation after the grant funds are exhausted and, as a result, abandon the station.	Develop contracting mechanisms that encourage well-established EV firms to own the stations and that offer an incentive to keep them running long-term.

Risk/Challenge	Description	Mitigation
Equity	The most profitable and easiest to develop EV charging station locations have already been built. Proposed EV station locations are in rural, tribal, and underserved areas that may not attract developers.	Bundle several stations, entire corridors, and/or geographic areas into a single contract to make development more attractive.
Cybersecurity	Cyber-attacks are a risk to customers' financial transaction data, personal data, and vehicle-connected devices. Any identified EVSE vulnerabilities can introduce the potential of malware installation and propagation to vehicles, charging infrastructure and other connected technologies. Exposing equipment to breaches in cybersecurity can put payment data and personal information of the customer at risk, and also present risks to the charging network and electrical grid.	Develop and maintain a robust cybersecurity plan throughout the lifetime of the infrastructure. Include requirements from this Plan in all applicable contracts.
Location Viability and Permitting	Some proposed infrastructure locations might be space-constrained and/or on private/leased property.	Permits and agreements should be plainly written and permitting processes streamlined. Space constraints should be considered in the selection of potential EV station sites. As charging infrastructure could recharge RVs or over the road trucks pulling trailers, there should be sufficient space for large vehicles where they could be expected
Charger Types	Multiple connector types exist for DCFC charging. Inclusion of only one type might exclude certain vehicles from being able to utilize the charging infrastructure.	Consider connectors and/or adapters that can be used by different vehicles.
Communication Reliability	All chargers will be networked, and any loss of connection would result in the charger(s) going out of service.	Operating contracts of charging infrastructure should include up-time performance metrics to maintain a very high level of reliability, which could include redundancies of

Risk/Challenge	Description	Mitigation
		different networks if the primary network goes down.
Unbanked Population	Not everyone has access to a credit/debit card as some of the population remains unbanked.	Consider the feasibility and utility of alternative payment methods, such as prepaid debit cards.
Demand Charges	During peak period usage, it is more costly to provide electricity. Utility providers may add additional demand charges on top of standard electricity prices to compensate for the increased delivery costs.	Consider software at charging stations to allow for variable pricing. This would help to manage peak demand and minimize operating costs while still providing adequate levels of charging. ADOT can assist EVSE operators in coordinating with utility providers to understand and anticipate expected demand charges.
Vandalism and Damage	Charging stations could be vandalized if not properly secured or damaged from improper use (e.g., vehicle crash, driving over charging cords)	Implement security features such as protective bollards, retractable cords, vandal-proof chargers, closed circuit television.
Supply Chain Shortages	Due to the COVID-19 pandemic, supply chain shortages exist across all industries, including items needed for EV infrastructure deployment (i.e., raw materials, microchips, equipment, and labor). As all 50 states are simultaneously procuring and deploying NEVI-compliant infrastructure, this impact could worsen.	Actively plan for and incorporate longer-than-expected lead times for the procurement of materials when developing schedules.
Extreme Weather and Battery Fires	During the extreme heat of the summer months, EVs are more susceptible to lithium-ion battery fires. These fires are difficult to extinguish.	Mitigation strategies would include adequate fire suppression facilities at key locations.

Risk/Challenge	Description	Mitigation
Changing Technology	EV technology is rapidly evolving and could quickly outpace currently available EV infrastructure.	Futureproof new station locations by adding larger conduits and other cost-effective improvements to enable future upgrades. Consider requiring chargers that operate at 400 and 800 volts.

State, Regional, and Local Policy

Table 12 summarizes the relevant Arizona policies and plans at various levels of government.

Table 12: Arizona EV Policies and Plans

EV Policy Breakdown		
Policy	Agency	Description
State		
Arizona Statewide Transportation Electrification Plan: Phase II	APS and TEP	In 2021, APS and TEP released the Arizona Statewide Transportation Electrification Plan: Phase II as a follow-up to the Phase I plan released in 2019. It put forth a comprehensive and actionable roadmap for transportation electrification in Arizona, including an analysis of promising EV opportunities and significant engagement with the state's TE stakeholder community. Updates are anticipated every three years. The plan process focused on a cost/benefit analysis of electrification opportunities and stakeholder engagement. The cost/benefit analysis found that transportation electrification could generate net benefits of $28 billion for Arizona, $9 billion for drivers or fleet owners, and $12 billion for utility ratepayers, in present value. Within this Phase II plan, APS and TEP propose statewide EV goals by vehicle segment and utility, with a proposed goal for electric light duty vehicles at 450,000, 95,000, and 1,076,000 vehicles for APS, TEP, and State service areas, respectively. These goals are intended to be met by the year 2030

EV Policy Breakdown		
Policy	Agency	Description
EV Cost-Benefit Analysis	SWEEP	SWEEP released an EV Cost-Benefit Analysis for Arizona in December 2018 with a focus on passenger vehicles in two scenarios (moderate and high adoption rates). The moderate scenario estimated that a cumulative net benefit from plug-in EV use in Arizona will exceed $3.7 billion state-wide by 2050, but this number could increase to exceed $31 billion under the high adoption scenario. These savings would be derived from electric utility customers in the form of reduced electric bills, from drivers in the form of reduced annual vehicle operating costs, from owners of public charging infrastructure, from residents due to reduced costs of complying with future carbon reduction regulations, and from society at large based on the value of reduced nitrogen oxides emissions.
Regional		
Transportation Electrification Implementation Plan	TEP and UNS Electric Inc. (UNSE)	TEP and UNSE intend for the implementation plan to build off the Statewide Transportation Electrification Plan, to focus on the barriers best addressed by the electric utility. This includes public lack of awareness, insufficient charging infrastructure and network, costs of EV charging and grid impacts, and access for underserved and low- to-moderate income (LMI) customers.

EV Policy Breakdown		
Policy	Agency	Description
Local		
Draft Transportation Electrification Plan	City of Phoenix	In June 2022, the City of Phoenix approved the Draft Transportation Electrification Action Plan, which summarizes the current state of the city's EV adoption and infrastructure, their target goals for the year 2030, and a list of goals with provided action items to achieve their target number of 280,000 EVs by the year 2030. The plan follows 'Roadmap 2030,' which includes five steps to prepare for the increased adoption. The plan makes note of issues related to charging infrastructure shortages, actual versus perceived cost, limited model availability, range-anxiety, lack of EV-ready building codes, and public knowledge and experience with EVs as a few of the factors still standing in the way of greater adoption rates. To overcome these issues, the plan sets three distinct strategies: Prioritize Equity, Accelerate Public Adoption of EVs, and Lead by Example. Currently, Phoenix has adoption goals in line with the federal government's 2030 nationwide EV adoption, but they still lack the infrastructure needed for charging the proposed number of EVs by 2030.

Laws and Regulations

Within Arizona, any state agency or political subdivision that operates an alternative fueling station is required to allow vehicles, other state agencies, or political subdivisions to utilize the station to the extent practical.[xxvi] Any state agency, board, or commission must purchase hybrid EVs, AFVs, or another vehicle that meets GHG emission standards.[xxvii] In large counties (defined by having over 1.2 million people), at least 75% of the total municipal fleet must operate on alternative fuels.[xxviii] Any federal fleets based in Arizona that operate primarily in large counties must have at least 90% of the fleet operating on alternative fuel.[xxix]

Coalitions/MOUs

Arizona joined Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming in signing the Regional Electric Vehicle West MOU to create an Intermountain West EV Corridor. This corridor will enable an EV to drive seamlessly across the states that signed the MOU using the major transportation corridors. In 2019, a revised West MOU was signed to update the corridor goals to include educating consumers and fleet owners, coordinating EV charging stations to achieve a consistent user experience, producing minimum standards for EV charging stations, collaborating on funding opportunities, and supporting the build out of DCFCs along EV corridors.[xxx]

Arizona utilities (UniSource, APS, and TEP)[xxxi] joined the National Electric Highway Coalition (NEHC) that aims to create a DCFC network that connects major highways systems across the country. To enable long distance EV travel, NEHC members agree to ensure efficient and effective DCFC deployment plans through avoiding duplication and complementing DCFC sites.

Incentives

Arizona offers a variety of incentives (both monetary and policy oriented) to encourage low and zero-emission vehicle adoption. They are typically stated in relation to AFVs to be more encompassing than just EVs, but in some cases include hybrid vehicles.

State

ADOT issues special license plates dedicated to AFVs that are powered by propane, compressed natural gas (CNG), electricity, or hydrogen. The plates provide applicable drivers with incentives for driving AFVs, including the ability to park without penalty in parking areas designated for carpool operators and in spaces designed for EV charging.[xxxii] [xxxiii] Similarly, Arizona Revised Statute 28-2416 allows qualified AFVs to use high-occupancy vehicle lanes, regardless of the number of occupants, although this exemption will expire in September 2025.[xxxiv] Owners of qualified AFVs that are registered in Arizona for the first time are not required to complete emissions testing in their first year only, unless they are used for commuting into Phoenix or Tucson.[xxxv]

A financial incentive is also currently provided. AFVs purchased in 2022 or earlier have a reduced annual vehicle license tax assessment based on a percent of the suggested retail price.[xxxvi]

Utility and Private Incentives

Utility providers within Arizona offer various incentives and rebates to help encourage building out the charging infrastructure network. APS operates the Take Charge AZ pilot program which offers free EV charger installation, maintenance, and educational services to its workplace, fleet, and multi-unit dwelling customers.[xxxvii] They do not pay for the energy used, but do help businesses, fleets, and multi-family complexes establish EV accessibility by installing charging stations, and cables, establishing service, educating staff, and conducting check-ups on equipment.

The Salt River Project (SRP) offers residential customers who operate an EV or plug-in hybrid vehicle the opportunity to use time-of-use electricity rates for at-home charging during super off-peak hours (11pm to 5am, year-round) and additional off-peak hours (non-peak hours that vary by season) on weekends, holidays, and some weekday hours. A separate smart submeter is required for EV charger usage and is provided by SRP.[xxxviii] SRP also has rebates for commercial users and offers funding to trained vendors who study electrification opportunities. These opportunities can be for commercial non-road equipment through the Electric Qualified Service Provider Assessment Program and on-road electrification opportunities for fleets under the Fleet Advisory Services Program.[xxxix]

On the infrastructure side, SRP provides rebates for installing charging infrastructure. SRP has a marketplace for individuals to purchase Level 2 chargers with instant rebates applied at the time of purchase. Businesses can receive $1,500 per networked Level 2 charging station port, and government, non-profit and school customers can receive $4,000 per Level 2 port. The amount increases to $15,000 per DCFC port for businesses and $20,000 per DCFC port for government, non-profits, and school customers. Rebates are limited to three DCFC ports per customer per program year.

TEP also offers various rebates and incentives. At the residential level, rebates of up to $500 are provided for installing chargers; time-of-use rates are required.[xl] TEP has a program similar to SRP's that offers a rebate of $4,500 per port for Level 2 workplace charging, $6,000 per port at multi-family dwellings, and $24,000 per port for DCFC chargers at any land use. These rebates increase to $6,000, $9,000, and $40,000 if the deployment is in a low-income area.[xli]

Arizona Electric Vehicle Market Analysis

The global EV market has grown over the past decade thanks to increased availability, improved vehicle range, cost competitiveness with ICEs due to maturing battery technology, and the wide availability of tax rebates and other incentives. Emission reduction targets set by government agencies have also led to an increased focus on expanding EV usage.

Overview and Purpose

To support Arizona's EV market analysis, an assessment of the existing number of registered light-duty EVs in Arizona was conducted based on current vehicle registration numbers, existing market information, and EV adoption projections. EV adoption projections were performed for low-, medium-, and high-growth scenarios through the year 2040. Projection results are provided to inform recommendations on charging infrastructure and create the most effective and efficient solutions for EV adoption within Arizona.

Current EV Ownership in Arizona

ADOT reports the number of vehicles registered within Arizona, as shown in **Table 13**, for the previous three fiscal years. There were 40,964 EVs registered in Arizona at the end of FY21, which accounts for 0.55% of all registered vehicles and 64.9% of the 63,147 registered AFVs.

Arizona Revised Statute §1-215.4 defines an alternative fuel as one of the following:

- Electric
- Natural gas/CNG or liquified petroleum gas
- Hydrogen
- Blend of 70% alternative fuels with 30% gasoline (unavailable in Arizona)
- Solar[xlii]

Vehicle sales and historical EV adoption data provide insight into future EV adoption at the localized level.

Table 13: Arizona Vehicle Registrations

	FY19	FY20	FY21
Vehicles Registered	7,863,112	7,828,255	7,444,032
AFVs Registered	33,299	37,477	63,147
EVs Registered	28,770	34,898	40,964

Source: https://azdot.gov/fast-facts

The number of registered EVs increased by 21% between FY19 an FY20 and by 17% between FY20 and FY21. Vehicle registrations in FY19 and FY20 included an "unassigned category" for law enforcement's use and also included disability placards. FY21 excluded these counts, but continued to include trailers, off-road vehicles, and commercial fleets. In FY21, only 4.8 million vehicles are standard, class I passenger vehicles.

To date, EVs do not represent a significant market share in Arizona, although Arizona's share of nationwide EV sales is greater than the national average.[xliii] Barriers to the aggressive adoption of EVs are likely attributed to:

- Initial capital costs: While studies show that operations and maintenance costs throughout the lifecycle of an EV are significantly lower than those of traditional ICE vehicles, EVs have a higher purchase cost which can be a barrier for some, particularly low-income drivers.
- Weather concerns: Higher temperatures significantly reduce EV range—the electricity needed for heating and cooling systems is diverted away from the drivetrain and thus reduces the amount of onboard energy. Given that Arizona experiences extremely hot temperatures throughout the summer, it is easy to expect drivers to worry about range limitations. Most of Arizona's population lives in areas that typically experience mild winters, however, there are a few mountainous areas that experience cold weather which also reduces EV range.
- Range anxiety: Many drivers are reluctant to purchase EVs as their primary vehicle due to concerns that their vehicle will not have sufficient battery capacity and/or that they will not be able to easily access an EV charger in order to cover their desired driving distance or reach their intended destination.

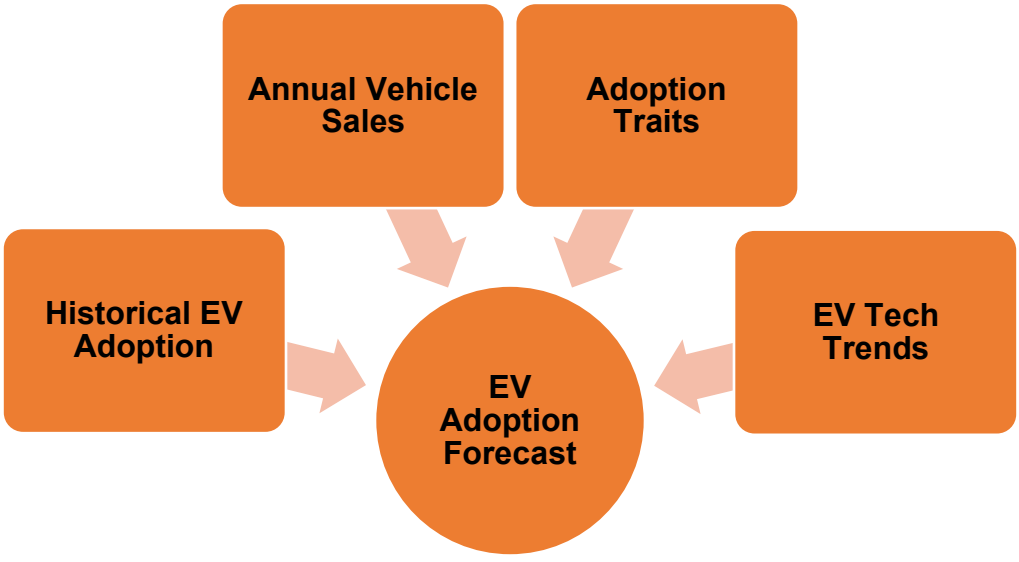
These barriers may eventually be lowered by incentives to make initial purchases of EVs more affordable, improvements to battery capacity and vehicle range, and the expansion of the DCFC network.

EV Adoption Forecast

Methodology

Industry trends, localized EV adoption factors, and historical vehicle trends in Arizona were used to build the EV adoption forecast to estimate the anticipated rate of EV adoption and the percent of Arizona's anticipated passenger EV market over the next 20 years as shown in **Figure 8**. For each future year modeled, the adoption forecast is recalculated based on projected changes in the EV market of preceding years.

Figure 8: EV Adoption Forecast Methodology Flow Diagram



EV Adoption Forecast Factors

For each year modeled, an EV adoption factor was calculated representing the percentage of annual total vehicle sales that is anticipated to be EVs. The calculation itself was developed based on two input categories correlated to EV adoption: industry trends and state characteristics. The calculation was also tested and refined to verify that the forecasted results aligned with both historical data and other industry projections.

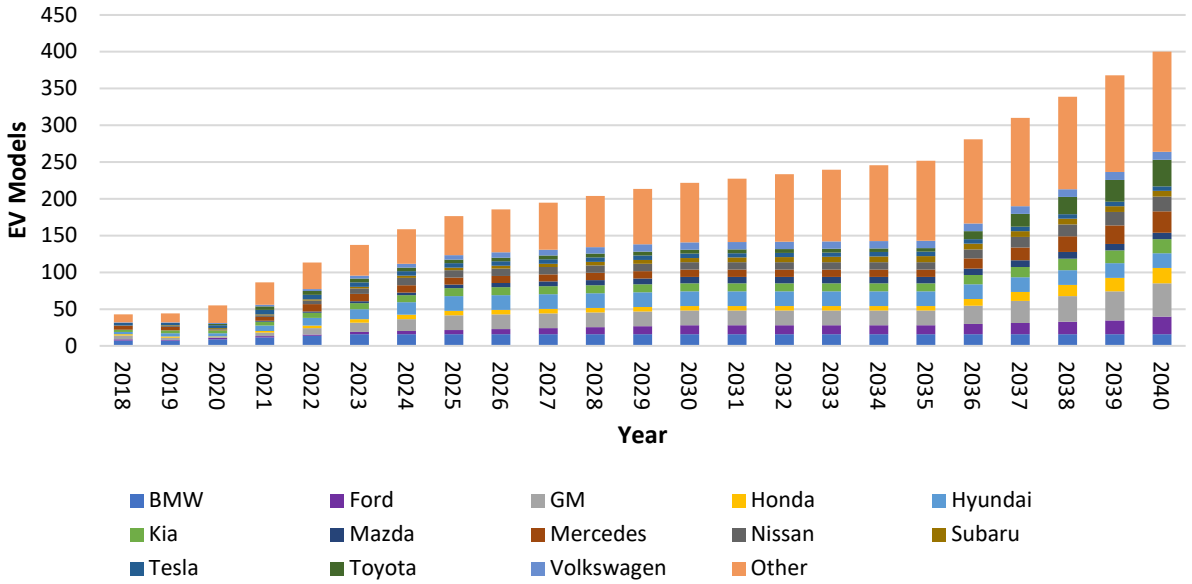
EV Tech Trends – Industry Trends

Battery technology improvements, reduced upfront vehicle costs, and the development of a public charging network are all changing the EV industry by lowering barriers to entry and further encouraging current and future EV purchases. These trends are prerequisite to providing potential vehicle buyers with the evidence needed in order to be confident that EVs are becoming as capable, affordable, and accessible as ICEs. The projection model uses industry trends as input factors for EV adoption, by examining model availability and initial EV capital cost when compared to an ICE vehicle. The density of the public charging network is also utilized in the model.

EV Tech Trends - Model Availability

The expanded availability of EV options on the market gives drivers enough flexibility to select EVs that fit within their preferences, budget, lifestyles, and preferred manufacturer. Model availability was estimated using the number of currently available EV models on the market; projections through 2040 for model availability are based on announcements and electrification commitments from major vehicle manufacturers. Both industry trends, due to public preference as well as federal targets and commitments to reduce emissions, suggest that manufacturers will continue progressing toward fully electrified fleets by 2040. **Figure 9** displays the model availability projections for some of the major vehicle manufacturers.

Figure 9: EV Model Availability Forecast



EV Tech Trends – Costs

One of the primary barriers to EV adoption is the higher upfront cost of an EV when compared to an ICE vehicle. According to Kelly Blue Book, in May 2022 the average price to purchase an EV was $64,338, compared to an ICE vehicle at an average of $47,148.[xliv] Despite the higher purchase price, the current disparity between ICEs and EVs is expected to decrease and lead to increased EV adoption. The adoption model utilizes a projected cost reduction of EVs through 2040, due to declining battery prices, as an input. Anticipated cost competitiveness between EVs and ICEs is expected to occur in 2025 based on the projection.

Adoption Traits – Arizona Characteristics

EV adoption varies significantly depending on numerous indicators, such as the potential purchaser's income, educational attainment, environmental concern, home ownership, and the number of vehicles already owned. For example, drivers with higher levels of household income or higher concern for the environment are more likely to purchase an EV than those with lower income or less concern for the environment.[xlv] These factors can vary geographically, thus they were assessed on a localized level to yield the EV adoption outputs for Arizona.

In Arizona, the average gallon of gasoline costs $4.73 as of July 22, 2022 (higher than the national average of $4.41).[xlvi] Due to global and national macroeconomic factors, gas prices are expected to continue to increase or to stay elevated for the near future, which could make purchasing an EV more attractive to consumers as the difference in operating costs between EVs and ICE vehicles continues to grow.

For EV adoption in Arizona, state level data for residents were assembled from publicly available sources. Each factor is presented in **Table 14** along with the applicable data source.

Table 14: Arizona State Characteristics that Influence EV Adoption

State Characteristic	Factor Measurement	Arizona Value	Source
Median Household Income	Household income	$61,5299	2020 US Census
Environmental Concern	Local election results	49% voted for a platform that supported environmental policies, including EV infrastructure development	2020 Federal Election Results
3+ Car Households	Number of households with three or more cars	590,173	2020 ACS 5-Year Estimates
Total Households	Households	2,643,430	2020 ACS 5-Year Estimates
College Education Attained	Percentage of residents with a bachelor's degree or higher	30.3%	2020 US Census
Homeowner Percentage	Percentage of single unit detached households in Arizona	65.3%	2020 US Census
Vehicle Count	Number of registered passenger vehicles	4,818,711	ADOT
Existing Level 2 Ports	Number of Level 2 charging ports installed	1810	Alternative Fuels Data Center
Existing DCFC Ports	Number of DCFC charging ports installed	459	Alternative Fuels Data Center
EV Policies	Policies that drive EV adoption including charging infrastructure plans,	19%	American Council for an Energy-Efficient Economy

State Characteristic	Factor Measurement	Arizona Value	Source
	emission/adoption goals, building codes, and incentives		
Annual Vehicle Sales	Share of new vehicle registrations in the United States	2.19%	National Automobile Dealers Association
Historical EV Adoption	Number of registered EVs in Arizona	2019: 28,770 2020: 34,898 2021: 40,964	ADOT

EV Adoption Forecast Assumptions

The following key assumptions were made to forecast EV adoption through the year 2040:

- Between 2035 and 2040, car manufacturers will exceed current EV commitments by electrifying their full fleet, including all sedans, SUVs, and trucks.
- Operational and maintenance costs are not included as consumers are typically more concerned with the initial price (rather than full life-cycle costs) when determining which vehicle type to purchase, although it should be noted that the recent significant surge in gas prices has begun to shift this consumer mindset.
- Battery technology will mature by 2030, leading to upfront cost declines of EVs. Beyond 2030, costs are assumed to be constant.

An optimal amount of charging infrastructure is developed to meet the estimated increase in adoption using 4 DCFCs per 1,000 EVs, 60 public Level 2 chargers per 1,000 EVs, and at-home charging is available for homeowners.[xlvii] Each year, the expanded charging network infrastructure is used as the input factor for adoption for the subsequent year being modeled as an iterative process.

- Vehicle sales are constant throughout 2040 as total new vehicles sales have remained generally constant in the United States between 2015-2019; however, impacts from COVID-19 and policy pressure to further encourage EV adoption may impact this assumption in the future.[xlviii]

EV Adoption Scenarios

Three scenarios were analyzed to identify the potential magnitude of growth in EV adoption due to economic and policy trends. The scenarios are defined in **Table 15**. These scenarios were applied to the EV adoption forecasts to quantify the range of potential EV adoption in Arizona. Due to the current economic factors and supply chain shortages, the low-growth scenario describes current circumstances; however, recent EV policy direction and the long-term outlook for widespread EV adoption required the analysis of medium- and high-growth scenarios as well.

Table 15: EV Market Model Growth Scenarios

Growth Scenario	Description
Low	Reduce model availability by 25% compared to the medium projection. This scenario accounts for supply shortages of EV components.
Medium	Scale high-growth scenario to better align with historical EV adoption trends. This scenario accounts for the unique EV adoption factors in Arizona and projections of the EV market into the future.
High	Increase in the cost parity of an EV compared to an ICE vehicle by 25% compared to the medium projection to reflect rising gas prices. This scenario reflects other policies and infrastructure deployment to meet Arizona's 1.5 million EVs on the road in 2038.

Findings

The model generated estimates for Arizona's EV adoption based on the three growth scenarios (as shown in **Figure 10**, **Figure 11**, and **Table 16**). EV adoption estimates for 2030 range between 6%–14% of the total Arizona passenger vehicle market being electric, with 11%–25% of new sales being EVs. For comparison, forecasts predict 9% of the country's fleet will be electric in the same time period, with 36% of new sales being EVs; this is driven by recent federal government targets of 50% of all vehicle sales to be EVs by 2030.[xlix] [l]

Figure 10: Expected EV Adoption in Arizona 2020-2040 Total Registrations

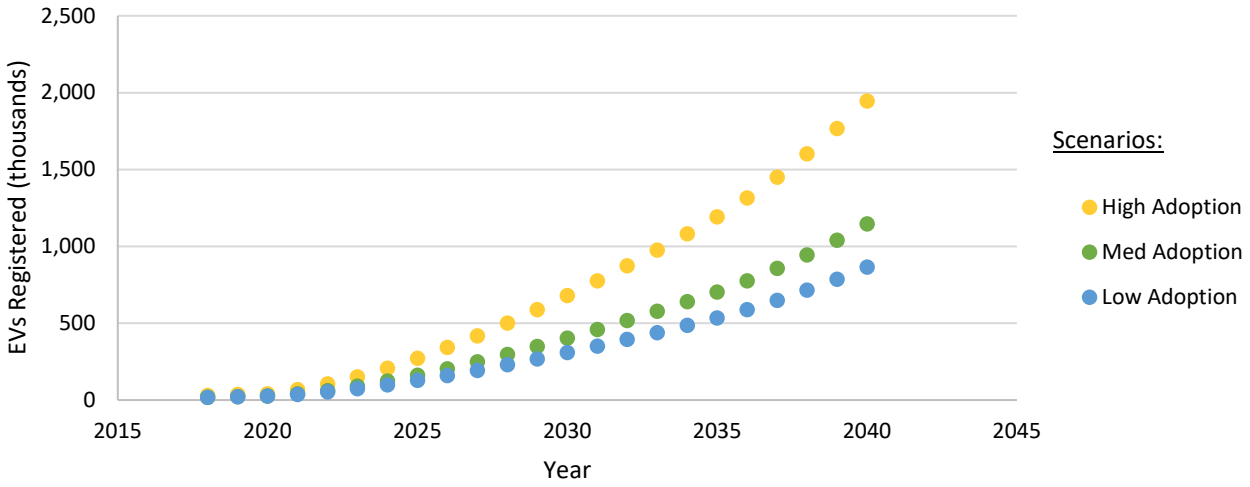


Figure 11: Expected EV Adoption in Arizona 2020-2040 by New Sales

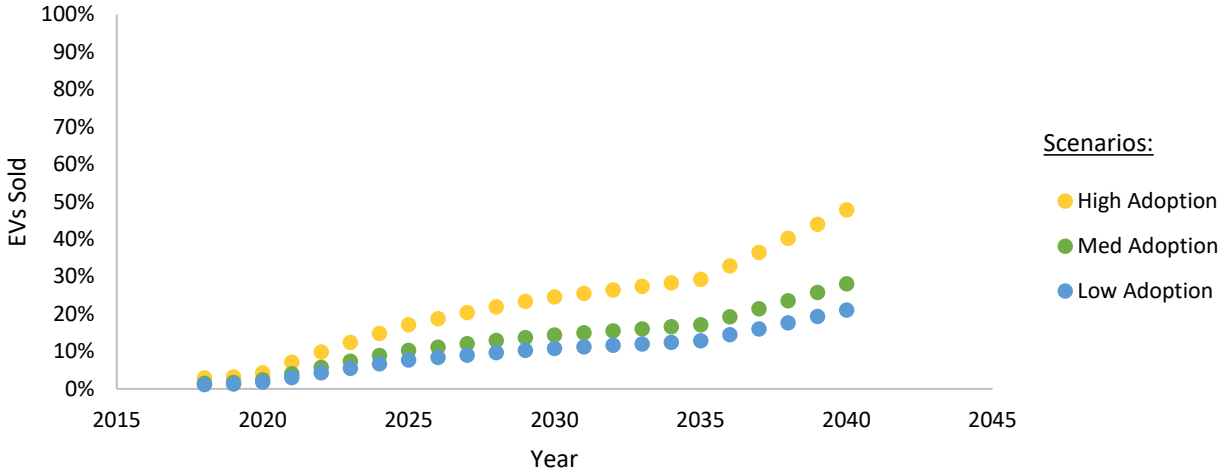


Table 16: Expected In-State EV Adoption

Growth Scenario	EV Estimate 2030		EV Estimate 2040	
	EVs Registered	In-state EV Market %	EVs Registered	In-state EV Market %

Low	307,897	6.4%	864,991	18.0%
Medium	402,293	8.3%	1,145,084	23.8%
High	678,920	14.1%	1,944,045	40.3%

The factors driving EV adoption are key when comparing the different growth scenarios.

- EV models are directly correlated with the number of EVs registered. The low-growth scenario assumes a 25% reduction in EV models available compared to the medium-growth scenario, resulting in only three-quarters as many EVs on the road. EV model availability is a primary factor in any adoption increases, as ICE models are expected to become rare as manufacturers begin to offer only EVs.
- As the initial price of EVs continues to reach parity with ICE vehicles, new EV sales continue to rise in the near-term. The rate of growth of EV sales will begin to slow though still continue to increase as EVs become the more economical option; modeling indicates that this period of slower growth is mostly due to an anticipated lack of new EV models being introduced between 2026 and 2035, and the modeling assumption that rapid EV model development does not begin until 2035.
- While new EV sales are expected to continue to rise annually, growth will be tempered since vehicle fleet stock takes a significant amount of time to turn over (even in the most aggressive scenario). For example, ICEs have an average vehicle life of approximately ten years.

The most likely growth scenario for Arizona over the analysis period is the medium forecast. Continued deployment of EV charging infrastructure, education on the benefits of EVs, federal and local government policy support, and financial assistance will support the forecasted adoption rate.

Recommendations and Considerations

Based on the existing and future conditions assessment, recommendations and considerations are as follows:

- By the year 2030, the medium-growth scenario predicts 402,293 vehicles (8.3%) on Arizona roadways to be EVs. This is expected to be the most likely forecast scenario, as it aligns with historical adoption data and is reflective of federal policies' and local governments' trends to encourage EV adoption. However, due to lingering COVID-19 impacts and current supply chain storages, this trend may start as a low-growth scenario in the near-term, then develop into the medium-growth scenario. In order to achieve the high-growth scenario, aggressive state and federal policies would need to be enacted to further encourage EV adoption.
- Despite Arizona currently having a small number of EVs on the road, all growth scenarios predict that the number of EVs will at least double between 2021 and 2023. The active participation of the Arizona state government, including its coordination with local jurisdictions and electric utilities, is critical to supporting this transition by following best practices to plan for and accelerate EV adoption. Potential initiatives include developing EV readiness plans, providing educational materials, hosting workshops to facilitate cross-stakeholder collaboration (to share best practices and help streamline efforts across the state), or adopting state EV-adoption targets.
- Policy levers may be utilized to accelerate adoption rates and turn over existing vehicle stock more quickly, and they could include early vehicle retirement programs or incentives on new vehicle purchases.
- The long-term COVID-19 pandemic impacts may hinder EV adoption due to economic constraints on individual households and the global automobile market. These impacts should be considered along with any additional EV adoption barriers that may be faced, particularly by disadvantaged or vulnerable populations. Comprehensive electrification considerations—such as incentives for the purchase of EVs, expanded funding sources, partnerships, and streamlined permitting processes—can all support reducing barriers to electrification. The overall EV adoption trends are expected to remain fairly consistent based on current projections, and the trends point toward an increasingly aggressive nationwide electrification trajectory to reduce emissions and promote public health.

Arizona Charging Demand Analysis

To properly plan for future EV needs, it is important to understand and forecast anticipated charging infrastructure demands.

Widespread EV adoption can bring benefits to both individuals and the environment, but there is also a significant challenge in ensuring an adequate network of public charging infrastructure to meet the growing charging demand. Meeting this demand also poses the issue of ensuring local electric utilities can continue to provide reliable service even with the added load of transportation electrification. If not properly planned for, the impacts resulting from increased electrification on the charging network and impacts to electricity demand can lead to rising electricity prices, grid constraints, and blackouts.

Charging Demand Methodology

The charging demand analysis was conducted using traffic data along the AFCs, taking into account the results from the EV market analysis. The analysis calculated the expected annual electricity consumption of EVs along the AFCs through the year 2040 and accounted for traffic pattern changes, anticipated improvements to battery economy, and the impacts of Arizona weather conditions on EV performance. The calculation steps were:

- Utilize the EV adoption forecast to estimate statewide EV traffic using existing average annual daily traffic (AADT) numbers and applying an annual average growth rate.
- Calculate the AADT of EVs along each individual AFC to understand charging demand needs.
- Calculate the yearly energy consumption factor by multiplying the mileage by the estimated fuel efficiency (in kWh/mile).

EV Traffic and Mileage

ADOT records daily passenger vehicular traffic and mileage data for each corridor, as shown in **Table 17**. Daily VMT were calculated by multiplying the corridor segments' length (in miles) by the AADT. To account for increases in traffic resulting from population and economic growth, a 2.1% average annual growth rate was assigned to both the AADT and VMT.[li]

Table 17: AADT of EVs in Arizona, 2021

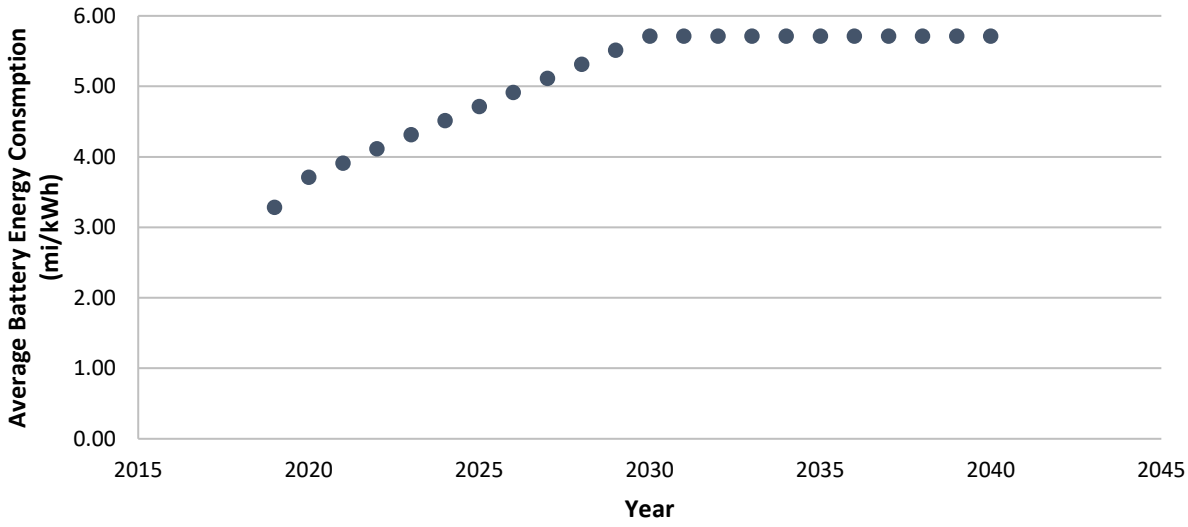
Corridor	Length of Corridor (miles)	2021 AADT (miles)	Forecast 2040 AADT (miles)
I-8	178.3	11,130	16,950
I-10	391.2	49,730	75,740
I-15	29.4	23,270	35,450
I-17	146.5	51,710	78,760
I-19	63.1	29,020	44,210
I-40	359.6	18,190	27,700

Determining the future EV AADT required the use of the forecasted totals of passenger EVs traveling in Arizona by the year 2040. The values are anticipated to change annually due to changes in EV adoption. For this analysis, it was assumed that the percentage of EVs in Arizona's vehicle fleet is equal to EV AADT as a percentage of statewide AADT.

Annual EV energy consumption was calculated by applying an average battery capacity (in kWh/Mile) for passenger EV vehicles to the known AADT on the routes.[lii] The resulting value represents the amount of electricity an EV is estimated to consume on each designated travel corridor; additional mileage is accumulated traveling to and from the corridor.

Figure 12 displays the expected average battery energy consumption of light-duty passenger vehicles (e.g., sedans, SUVs, and trucks) and are based on current EV specifications and forecasted future improvements. Battery fuel economy is assumed constant after 2030 due to limitations on our knowledge of standards and technology improvements past that point.

Figure 12: EV Battery Energy Consumption Projections



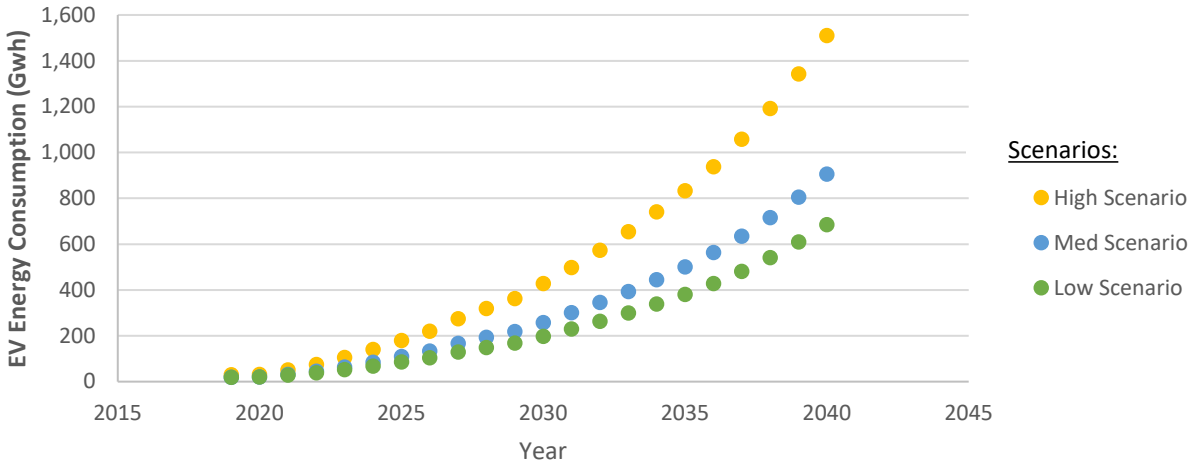
Localized Weather Impacts

As weather impacts can affect battery range, it is important to account for localized weather patterns. Arizona experiences a broad range of temperatures throughout the state, throughout the year, and between day and night. EV performance can be affected by weather due to energy from the vehicle's battery being used to support cooling and heating systems (to condition both the vehicle cabin and to maintain battery temperature) in addition to standard propulsion, which leads to decreased travel range. Studies show that an ambient temperature of 20° F results in a 41% reduction in driving range, while a temperature of 95° F results in a 17% reduction (both results compared to testing at 75° F).[liii] Other factors, such as elevation, wind, and precipitation affect vehicle range; however, these other factors are taken into consideration in the annual fuel efficiency metric.

Charging Demand Results

The charging demand analysis estimates that EVs will account for between 3.0 million and 6.6 million miles of interstate travel daily in Arizona by the year 2030. A significant amount of electricity would be required to recharge the vehicles (estimated to be between 684 gigawatt hours (GWh) and 1,509 GWh as seen in **Figure 13**) under assumed vehicle efficiencies. Much of this electricity will be consumed through home or workplace charging; however, this underlies the importance of deploying a public DCFC network capable of supporting EV growth.

Figure 13: Forecasted EV Energy Consumption



EV Charging Infrastructure Deployment

Developing a nationwide public EVSE network is key to encouraging and supporting EV adoption. To achieve this goal, the NEVI Formula Program designates that a state may receive funding to deploy EVSE along its AFCs if it meets the NEVI requirements including the following:

- Publicly accessible DCFCs must be within 50 miles of each other. Discretionary exceptions may be granted.
- EVSE must be less than one mile away from a highway intersection or interstate exit.
- Site power capability must be at least 600 kW, to support at least 150kW per port simultaneously across four ports.
- Each DCFC station must be equipped with a CCS connector.

Arizona's NEVI-compliant EV Charging Infrastructure Deployment Plan will comply with the aforementioned requirements.

All of Arizona's Interstates (I-8, I-10, I-15, I-17, I-19, and I-40) have received AFC designation by the US DOT. The Plan proposes EVSE in strategic locations to complete the network along the Interstates according to the NEVI requirements.

Funding Sources

The deployment of ADOT's EV infrastructure will involve partnerships with third-party private entities that have the interest, expertise, and resources to meet federal funding match requirements. These partners will upgrade existing or design, build, own, maintain, and operate new EVSE locations, as well as meet the required non-federal share to match the NEVI Formula Program.

Funding sources for EVSE stations in Arizona are displayed in **Table 18**. These sources include utility incentives, for which EVSE station owners may be eligible, federal NEVI Formula Program Funds, and the required non-federal match. Additional programs, such as time of use programs offered by local utilities, are also available to reduce the cost of EV ownership but are excluded from this list as they do not directly reduce upfront EVSE costs.

Table 18: Available Funding Sources

Name	Program Description	Type of Funding	Administering Organization(s)	Amount
Electric Vehicle Charging Station Rebate	Rebate for installing networked Level 2 chargers at commercial, workplace, or multi-family sites.	Rebate	SRP	$1,500 per port
Electric Vehicle Charging Station Rebate	Rebate to cover installation of Level 2 charger at residential sites.	Rebate	TEP	$500 for two-way charger, $250 for one-way
Commercial Electric Vehicle Charging Station Rebate	Rebate for technical assistance and installation of Level 2 or DCFC stations. Higher rebates are available for low-income residents.	Rebate	TEP	Between $4,500 and $40,000, depending on charger type and income level
Commercial Electrification Rebates	Rebate to install, among other technologies, Level 2 charging stations at commercial sites.	Rebate	SRP	$1,500 per port
Arizona's NEVI Planning	Funding to strategically site EVSE along AFCs every 50 miles within 1-mile of AFCs to establish an interconnected network.	Grant	FHWA (NEVI Formula Program)	$76,483,976
Non-Federal Share (Match)	Private entity investment in EVSE and EVSE operations along AFC every 50 miles within one mile of AFCs.	Private investment	EVSE Station Owners	$19,120,994

ADOT anticipates allocating federal NEVI Formula Program funds across program years as follows:

- FFY 2022-FFY 2023: 27,600,000
  - FFY 2022: $11,300,000 (rolled over to FFY 2023)
  - FFY 2023: $16,300,000
- FFY 2024: $16,300,000
- FFY 2025: $16,300,000
- FFY 2026: $16,283,976

The deployment strategy for FFY 2022 and FFY 2023 is described below. Each subsequent year, the Plan will be amended to include a deployment plan and funding allocation amounts for the upcoming FFY.

FFY 2022 - FFY 2023 EVSE Deployment Strategy

ADOT proposes a four-fold EVSE deployment strategy for FFY 2022 and FFY 2023. This strategy is designed to meet the objectives set forth in the *Vision and Goals* section of this Plan. It is also intended to increase the long-range mobility for EV drivers and support the development of an equitable national charging network by closing gaps in charging infrastructure along the State's. The four facets of this strategy include:

- Utilizing existing NEVI-compliant stations
- Upgrading existing DCFC stations within one mile of AFCs
- Closing remaining gaps with new stations
- Using discretionary exemptions as appropriate

NEVI-Compliant EVSE Stations

The first EVSE deployment strategy is to utilize existing NEVI-compliant stations within one mile of AFCs. ADOT has identified 13 existing NEVI-compliant stations along AFCs in the State. These stations are listed in **Table 19** and shown in **Figure 14**. The map also shows the closest DCFC charging stations in neighboring states; these chargers may need to be upgraded to develop a cohesive interstate network.

Table 19: NEVI-Compliant EVSE Stations

State EVSE Location Unique ID	Route	Locations	Address	Exit Number	Anticipated EVSE Network	Utility Territories	Station Ownership
187879	I-40	Kingman	3490 Stockton Hill Rd Kingman, AZ 86409	51	TBD	TBD	Electrify America
184916	I-40	Williams	1100 W Cataract Lake Rd Williams, AZ 86046	163	TBD	TBD	Electrify America
127934	I-10/I-40	Flagstaff	2601 E. Huntington. Rd. Flagstaff, AZ 86004	198	TBD	TBD	Electrify America
135874	I-40	Winslow	700 Mikes Pike St. Winslow, AZ 86047	253	TBD	TBD	Electrify America
187948	I-10	Quartzsite	760 S Quartzsite Blvd Quartzsite, AZ 85346	17	TBD	TBD	Electrify America
121828	I-10	Buckeye	1060 S. S. Watson Buckeye, AZ 85326	117	TBD	TBD	Electrify America
149194	I-10	Tempe	5000 S. Arizona Mills Circle Tempe, AZ 85282	155	TBD	TBD	Electrify America
191561	I-10	Chandler	4976 Premium Outlets Way Chandler, AZ 85226	162	TBD	TBD	Electrify America
198884	I-8	Yuma	1450 S. Yuma Palms Parkway Yuma, AZ 85365	2	TBD	TBD	EVgo Network
169411	I-8	Dateland	1734 Ave 64 E Dateland, AZ 85333	67	TBD	TBD	Electrify America
145749	I-10/I-19	Tucson	6401 W. Marana Center Blvd Tucson, AZ 85742	244	TBD	TBD	Electrify America
123483	I-10	Benson	201 S Prickly Pear Ave Benson, AZ 85602	303	TBD	TBD	Electrify America
124348	I-17	Anthem	4435 W. Anthem Way Anthem, AZ 85086	229	TBD	TBD	Electrify America

Figure 14: NEVI-Compliant EVSE Stations, Arizona, 2022

Upgrading Existing DCFC Stations

The second deployment strategy is to upgrade existing DCFC stations along AFCs to make them NEVI-compliant. ADOT plans to release a solicitation during the first half of FFY 2023 directed at owners of existing DCFC stations that are within one mile of AFCs, but not NEVI-compliant. Eight eligible locations that have DCFC stations have been identified for potential upgrade using NEVI Formula Program funds. These stations are listed in **Table 20** and shown in **Figure 15**.

Table 20: Potential Station Upgrades

State EVSE Location Unique ID	Route	Locations	Address	Exit Number	Anticipated EVSE Network	Utility Territories	Anticipated Station Ownership	FY22 Funding Amount
101984	I-40	Holbrook	2096 Navajo Blvd Holbrook, AZ 86025	286	Tesla	APS	Existing	TBD
101986	I-17	Cordes Lakes / Cordes Junction	14925 Cordes Lakes Rd Mayer, AZ 86333	262	Tesla	Liberty Utilities	Existing	TBD
101981 or 198884	I-10	Casa Grande	2453 E. Florence Blvd Casa Grande, AZ 85194 Or 1005 N Promenade Pkwy Casa Grande, AZ 85194	194	Tesla or EVgo	Electrical District 2	Existing	TBD
101994	I-10	Tucson	9255 S Rita Rd Tucson, AZ 85747	273	Tesla	TEP	Existing	TBD
154797	I-8	Tacna	9250 South Avenue 40E Tacna, AZ 95352	42	Tesla	Wellton-Mohawk Irrigation District	Existing	TBD
122249	I-8	Gila Bend	826 826 W Pima St. Gila Bend, AZ 85337	115	Tesla	SRP	Existing	TBD
101996	I-10	Willcox	1251 Virginia Avenue Willcox, AZ 85643	340	Tesla	Sulphur Springs Valley Electric Coop	Existing	TBD

State EVSE Location Unique ID	Route	Locations	Address	Exit Number	Anticipated EVSE Network	Utility Territories	Anticipated Station Ownership	FY22 Funding Amount
205372, 211832	I-19	Green Valley	1030 W Duval Rd Green Valley, AZ 85614	69	ChargePoint	TBD	Existing	TBD

Figure 15: Potential Station Upgrades

New Stations

Remaining gaps in the network will be addressed by adding new NEVI-compliant stations. During the second half of FFY 2023, ADOT plans to release a second solicitation to seek applicants to build, own, operate, and maintain new EVSE infrastructure where needed. These areas will be identified by taking

into consideration existing NEVI-compliant stations and those selected for upgrade. ADOT proposes that NEVI Formula Program funds be utilized to install, operate, and maintain new EVSE stations during the program period. Depending upon the number of stations chosen for upgrade, ADOT estimates that 11 to 19 new stations will be needed. Proposed charging station locations were identified by first investigating 50-mile gaps within the existing NEVI-compliant and potential upgraded charging sites. A list of proposed locations was identified using on-site specific criteria that would make an EVSE installation impactful. Additional criteria may be added based on public and stakeholder input. The criteria utilized included:

- Traffic volume
- Amenity count
- Justice40 designations
- Connection to other major routes
- Connectivity to neighboring states
- Utility capacity
- Stakeholder feedback

Table 21 and **Figure 16** depict EVSE station locations, including potential upgrades, that could address gaps in the network, although further stakeholder engagement is needed to identify specific sites within the proposed locations. If an appropriate site for EVSE infrastructure can't be identified or acquired at the location, other locations will be considered.

Table 21: EVSE Station Locations* Addressing Network Gaps

State EVSE Location Unique ID	Route	Location	Exit Number	Anticipated EVSE Network	Utility Territories	Anticipated Station Ownership	FY22 Funding Amount
TBD	I-40	Lake Havasu City	9	Unknown at time of Plan submittal	UNS Electric	Unknown at time of Plan submittal	TBD
TBD	I-40	Seligman	123	Unknown at time of Plan submittal	Mohave Electric Cooperative	Unknown at time of Plan submittal	TBD
TBD	I-40	Kingman	66	Unknown at time of Plan submittal	Mohave Electric Cooperative	Unknown at time of Plan submittal	TBD
TBD	I-40	Twin Arrows Casino	219	Unknown at time of Plan submittal	APS	Unknown at time of Plan submittal	TBD

State EVSE Location Unique ID	Route	Location	Exit Number	Anticipated EVSE Network	Utility Territories	Anticipated Station Ownership	FY22 Funding Amount
TBD	I-40	Petrified Forest	311	Unknown at time of Plan submittal	APS	Unknown at time of Plan submittal	TBD
TBD	I-40	Sanders	339	Unknown at time of Plan submittal	Navopache Electric Cooperative	Unknown at time of Plan submittal	TBD
TBD	I-17	Munds Park	322	Unknown at time of Plan submittal	APS	Unknown at time of Plan submittal	TBD
TBD	I-17	Camp Verde	287	Unknown at time of Plan submittal	APS	Unknown at time of Plan submittal	TBD
TBD	I-10	Salome	45	Unknown at time of Plan submittal	APS	Unknown at time of Plan submittal	TBD
TBD	I-10	Tonopah	94	Unknown at time of Plan submittal	APS	Unknown at time of Plan submittal	TBD
TBD	I-10	San Simon	378	Unknown at time of Plan submittal	Sulphur Springs Valley Electric Cooperative	Unknown at time of Plan submittal	TBD
TBD	I-19	Nogales	4	Unknown at time of Plan submittal	UNS Electric	Unknown at time of Plan submittal	TBD
TBD	I-10	Eloy	200	Unknown at time of Plan submittal	TBD	Unknown at time of Plan submittal	TBD
101984	**I-40**	**Holbrook**	286	**Tesla**	**APS**	**Existing**	**TBD**

State EVSE Location Unique ID	Route	Location	Exit Number	Anticipated EVSE Network	Utility Territories	Anticipated Station Ownership	FY22 Funding Amount
101986	**I-17**	**Cordes Lakes / Cordes Junction**	262	**Tesla**	**Liberty Utilities**	**Existing**	**TBD**
101981 or 198884	**I-17**	**Casa Grande**	194	**Tesla or EVgo**	**Electrical District 2**	**Existing**	**TBD**
101994	**I-10**	**Tucson**	273	**Tesla**	**TEP**	**Existing**	**TBD**
154797	**I-8**	**Tacna**	42	**Tesla**	**Wellton-Mohawk Irrigation District**	**Existing**	**TBD**
122249	**I-8**	**Gila Bend**	115	**Tesla**	**SRP**	**Existing**	**TBD**
101996	**I-10**	**Willcox**	340	**Tesla**	**Sulphur Springs Valley Electric Cooperative**	**Existing**	**TBD**
205372, 211832	**I-19**	**Green Valley**	69	**ChargePoint**	**TBD**	**Existing**	**TBD**

**Potential DCFC station upgrades are shown in bold.*

Figure 16: EVSE Station Locations Addressing Network Gaps

Discretionary Exemptions

ADOT is requesting two discretionary exemptions from the requirement that charging infrastructure be installed every 50 miles along the State's AFCs. The proposed discretionary exemptions are described below and illustrated in **Figure 17**. Additional information regarding the discretionary exemptions may be found in Appendix A.

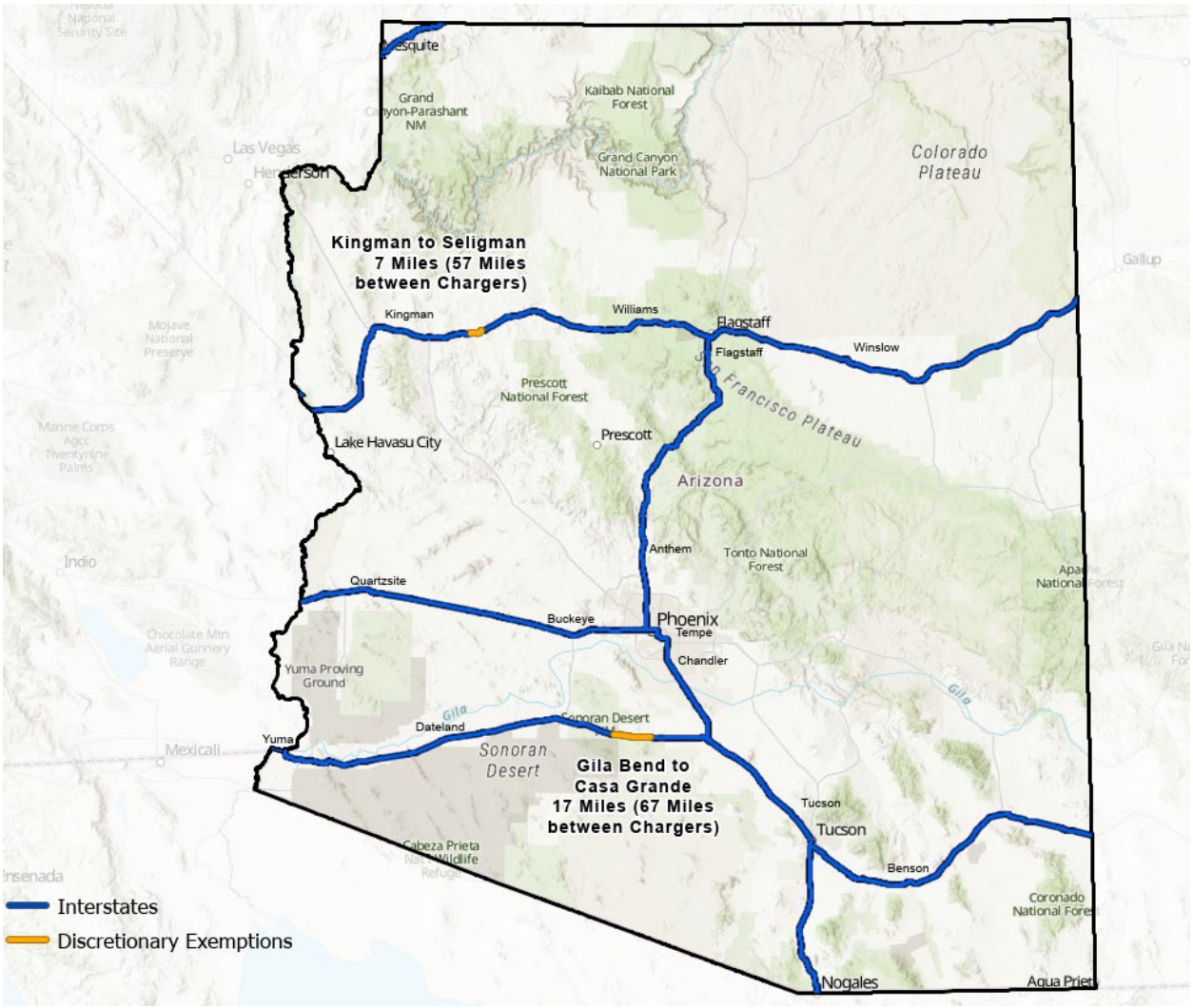
Kingman to Seligman

The 57-mile segment of I-40 between Kingman and Seligman is in a rural area with no existing amenities within one mile of the corridor. ADOT limited the distance of this gap as much as possible by proposing a new charging station just east of Kingman. The proposed exemption is for a 7-mile gap, as NEVI-compliant chargers will be sited 57 miles apart from each other.

Gila Bend to Casa Grande/Eloy

East of Gila Bend, I-8 is a rural area with no existing amenities within one mile of the corridor until reaching the interchange with I-10. ADOT proposed upgrading the existing stations in Casa Grande and installing a new site in Eloy to ensure convenient charging options for both westbound and eastbound I-10. The proposed exemption is for a 17-mile gap, as NEVI-compliant chargers will be sited 67 miles apart from each other.

Figure 17: Discretionary Exemption Requests



FFY 2022 - FFY 2023 EVSE Deployment Strategy Summary

As described previously, ADOT's FFY 2022 – FFY 2023 EVSE deployment strategy contains four facets to increase the long-range mobility for EV drivers by closing gaps in charging infrastructure along the State's AFCs and supporting the development of an equitable national charging network. The deployment strategy identifies NEVI-compliant EVSE stations and non-compliant DCFC stations for potential upgrades, then fills in gaps by providing funding for the installation, operation, and

maintenance of new stations in locations addressing those gaps. Exemptions are being requested only as necessary and will not jeopardize a convenient, affordable, reliable, and equitable national EV charging network. **Figure 18** shows the State of Arizona's proposed EVSE network locations.

Figure 18: Proposed Charging Network

Following the deployment of proposed charging locations and approval of exemptions, ADOT plans to apply to FHWA to upgrade the status of I-8, I-10, I-15, I-17, I-19, and I-40 to the corridor-ready designation, meaning there is sufficient access to refueling along those interstate highways.

FFY 2024 – FFY 2026 Deployment Strategy

ADOT is currently soliciting information from stakeholders and the public about what additional routes should be considered for AFC nomination. Only routes on the National Highway System (NHS) are eligible for nomination as AFCs. The preliminary list of potential AFC candidates may be found in **Table 22**.

Table 22: Preliminary List of Potential New AFC Candidates

Corridor Name	Location
US 60	Phoenix to Wickenburg; Phoenix to Globe; Show Low to New Mexico border
US 93	Wickenburg to I-40; Kingman to Hoover Dam
US 95/State Route (SR) 95	San Luis to Bullhead City
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
SR 85	I-8 to I-10
SR 87	Phoenix to Payson
US 89	Flagstaff to Utah border
SR 90	I-10 to Bisbee
US 160	US 89 to Four Corners
SR 260	Payson to Show Low; Camp Verde to Sedona
SR 80	Bisbee to Douglas
SR 77	Tucson to north limit of NHS route (Pima/Pinal County border)
SR 179	I-17 to Sedona
SR 347	Maricopa to I-10
SR 287	Casa Grande to I-10
SR 89/89A	SR 69/SR 169 to north end of NHS route

ADOT will continue to perform outreach to identify potential candidates, and tentatively plans to identify all new AFC candidates for nomination by the end of FFY 2022. The evaluation of candidates for AFC nomination will be based upon the improvement to State and national EV connectivity they provide and the remaining balance of NEVI Formula Program funding. Nominations, along with their corresponding EVSE infrastructure deployment plans, will be included in future Plan updates.

During FFY 2024 through FFY 2026, and following the status upgrade of I-8, I-10, I-15, I-17, I-19, and I-40 to the corridor-ready designation, ADOT plans to utilize NEVI Formula Program funding to deploy EVSE infrastructure along newly designated AFCs.

Deployment Criteria for FFY 2024 – FFY 2026

To prioritize and support an equitable, efficient, and utilized charging network, ADOT will assess proposed locations based on the following selected criteria. Additional criteria may be added based on public and stakeholder input. The criteria include:

- Traffic Volume
- Amenity count
- Justice40 designations
- Connection to other major routes
- Connectivity to neighboring states
- Cost
- Proximity to other EVSE stations
- Utility capacity
- Public and stakeholder feedback

Other Considerations

Public transportation is a key consideration when addressing the mobility needs of DACs. The proposed charging sites will be accessible to electric rideshare vehicles and transit vans along the corridors.

ADOT plans to focus on increasing the number of EVSE stations to support EV access to state and national highway networks before seeking additional redundancy. ADOT may, based on additional stakeholder and public input or other factors, address redundancy in future Plan updates.

FHWA has designated four Arizona highways (I-10, I-17, I-19, and I-40) as Primary Highway Freight System routes that are critical to the movement of freight. ADOT will consider encouraging EVSE station design to accommodate both passenger vehicles and larger commercial vehicles.

State, Regional, and Local Policy

ADOT has identified plans, policies, and studies relating to transportation electrification. This Plan can help advance the goals of those plans and policies. EVSE locations may utilize utility or other incentives contemplated by these plans and policies for the installation of EVSE infrastructure. ADOT plans to continue coordination and engagement with state, regional, and local policy related stakeholders. **Table 23** summarizes the relevant Arizona policies and plans at these three levels.

Table 23: Arizona EV Policies and Plans

EV Policy Breakdown		
Policy	Entity	Description
State		
Arizona Statewide Transportation Electrification Plan: Phase II	APS and TEP	In 2021, APS and TEP released the Arizona Statewide Transportation Electrification Plan: Phase II as a follow-up to the Phase I plan released in 2019. It put forth a comprehensive and actionable roadmap for transportation electrification in Arizona, including an analysis of promising EV opportunities and significant engagement with the state's TEP stakeholder community. Updates are anticipated every three years. A cost/benefit analysis of electrification opportunities and stakeholder engagement found that transportation electrification could generate net benefits of $28 billion for Arizona, $9 billion for drivers or fleet owners, and $12 billion for utility ratepayers, in present value. Within this Phase II plan, APS and TEP propose statewide 2030 EV goals by vehicle segment and utility, with a proposed goal for electric light-duty vehicles at 450,000, 95,000, and 1,076,000 vehicles for APS, TEP, and State service areas, respectively.
EV Cost-Benefit Analysis	SWEEP	SWEEP released an EV Cost-Benefit Analysis for Arizona in December 2018 with a focus on passenger vehicles in two scenarios (moderate and high adoption rates). For the moderate scenario, it was estimated that a cumulative net benefit from plug-in electric vehicles (PEV) use in Arizona will exceed $3.7 billion state-wide by 2050, but this number could increase to exceed $31 billion under the high scenario. These savings would be derived from electric utility customers in the form of reduced electric bills, from drivers in the form of reduced annual vehicle operating costs, from owners of public charging infrastructure, from residents due to reduced costs of complying with future carbon reduction regulations, and from society at large based on the value of reduced nitrogen oxides emissions.

EV Policy Breakdown		
Policy	Entity	Description
Regional		
Transportation Electrification Implementation Plan	TEP and UNSE	TEP and UNSE intend for the implementation plan to build off the Statewide Transportation Electrification Plan, to focus on the barriers best addressed by the electric utility. This includes public lack of awareness, insufficient charging infrastructure and network, costs of EV charging and grid impacts, and access for underserved and LMI customers.
Local		
Draft Transportation Electrification Plan	City of Phoenix	In June 2022, the City of Phoenix approved the Draft Transportation Electrification Action Plan, which summarizes the current state of the city's EV adoption and infrastructure, their target goals for the year 2030, and a list of goals with provided action items to achieve their target number of 280,000 EVs. The plan follows a 'Roadmap 2030', which includes five steps to prepare for the increased adoption. The plan notes issues related to charging infrastructure shortages, actual/ perceived cost, limited model availability, range-anxiety, lack of EV-ready building codes, and public knowledge and experience with EVs as a few of the factors still standing in the way of greater adoption rates. To overcome these issues, the plan sets three distinct goals/strategies: Prioritizing Equity, Accelerate Public Adoption of EVs, and Lead by Example. Currently, Phoenix has set adoption goals in line with the federal government's 2030 nationwide EV adoption.

Implementation

Implementation requirements and considerations are crucial to ensuring the feasibility of the Plan's recommendations, as well as the long-term sustainability and resiliency of charging stations. These considerations are expected to promote the efficient use of funds and support effective EVSE infrastructure deployment at an efficient cost. They are also intended to meet broader equity goals (including Justice40), by supporting labor, safety, training, and installation standards, and by providing opportunities for small businesses.

ADOT will incorporate the relevant requirements and monitoring provisions into the contracts to be established with EVSE owners. Compliance will be monitored, as appropriate, through reported data and periodic onsite inspection of charging locations, EVSE, and records.

The following implementation requirements and considerations align with the proposed NEVI rule requirements to develop a set of expectations related to operations and maintenance, data collection and sharing, resilience, and labor training for ADOT's site owners' using NEVI Formula Program funding. ADOT may amend the Plan to reflect the final rule when it is issued.

Strategies for EVSE Operations and Maintenance

EVSE are only an asset to EV owners if they remain in working order. The investment of public funds should be protected by ensuring that operations and maintenance best practices are implemented by ADOT's site owners. ADOT intends to comply with FHWA's regulations relating to EVSE operations and maintenance. As regulations and guidance are updated and finalized, ADOT will amend the relevant strategies. The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements

ADOT will ensure that EVSE station owners are maintaining EVSE infrastructure in good working order by using qualified technicians in compliance with all EVSE infrastructure manufacturer requirements and with all requirements issued by FHWA. Technician qualifications are more fully described in the *Labor, Safety, and Training* section. Requirements and monitoring provisions will be set forth in the contract between ADOT and the station owner. ADOT will monitor compliance through reported data and periodic onsite inspection of charging infrastructure and records.

ADOT will require that owners of EVSE infrastructure funded by the NEVI Formula Program provide reasonable plans and guarantees for maintaining the EVSE, related equipment, and overall EVSE locations are in good working order. Those reliability standards are more fully described in the *Program Evaluation - Metrics* section. Maintenance plans, guarantee requirements, and monitoring provisions will be set forth in the contract. ADOT will review plans and guarantees for sufficiency prior to acceptance. ADOT will monitor compliance with maintenance plans and guarantees through reported data and periodic onsite inspection of charging locations, EVSE, and records.

ADOT will require that infrastructure be maintained at the same location for a period of no less than five years from the installation date with the consideration of service beyond the NEVI Formula Program

funds. After the five-year required maintenance period, ADOT's station owners may retire the infrastructure that has reached the end of its useful life and consider upgrading or replacing the EVSE. However, if the EVSE is still functioning to meet its intended purpose after five years, ADOT will require that its station owners consider maintaining, or supporting the maintenance of, the EVSE to make use of federal resources most efficiently.

Annually, identifying information about organizations operating, maintaining, or installing EVSE will be submitted. A use, reliability, and maintenance data submittal will occur quarterly. One of the primary categories of data collection will be maintenance and reliability data. Further details about this data submittal are described in the *Program Evaluation - Reporting* section. The final list of required data in the quarterly submission will be based on the final NEVI rules and the Plan may be amended to reflect the final rule when it is issued.

ADOT will require that EVSE owners provide mechanisms for customers to report outages, malfunctions, and other issues with charging infrastructure. ADOT will require that site owners make these reporting mechanisms accessible and equitable by complying with the American Disabilities Act of 1990 requirements and multilingual access as required by law or applicable guidance.

ADOT will require station owners to consider purchasing EVSE with a parts-and-labor warranty if appropriate and cost effective.

To minimize downtime by ensuring repairs are completed in a timely manner for EVSE at higher risk for high maintenance costs, ADOT will require that owners consider purchasing a continued maintenance plan from the charging infrastructure installer or manufacturer.

ADOT will require station owners to consider the effects of the charger choice on O&M costs early during the design phase. When a charger is part of a network, the network provider may cover payment and maintenance costs. If selecting a networked charger for purchase, ADOT will encourage site owners to first consider the necessity of adequate cell service at the proposed site to ensure the station can communicate with its network and users can access applications for payment.

Additional Strategy

ADOT will encourage owners to consider appropriate funding levels for each station for any costs that extend beyond the initial installation costs (e.g., transaction costs for processing debit or credit card payments, networking fees to connect the unit to cellular or Wi-Fi communications networks, station management activities, rent or lease payments for parking spots, repair of damaged units, and replacement of malfunctioning parts). Consideration of each location's effect on its O&M costs will be valuable. For example, urban areas with higher traffic may require more frequent maintenance due to vehicle damage, overuse, or vandalism; as such, ADOT will recommend that potential owners evaluate each potential site based on location, charger type, level of use, network capabilities, and warranties so that the annual funding reserve fund for its lifetime maintenance costs can be appropriately determined. The following recommendation will be provided to site owners as a suggested O&M best practice to help them meet program requirements. This recommendation will be provided to potential owners along with other solicitation documents during the charging station owner selection process and discussed during pre-bid or similar meetings and in communications with selected owners.

Strategies for EVSE Data Collection and Sharing

ADOT recognizes that data collection and sharing can be used to update and improve the program over time, as well as provide users with the information needed to use the network. ADOT intends to comply with the final NEVI rules and guidance relating to EVSE data collection and sharing. Any cyber security recommendations or requirements related to data sharing or network connectivity are addressed in the *Cybersecurity* section. The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements:

- ADOT will require that its station owners maintain the cost of charging at a price that is reasonable (for example, comparable to competitive market) and minimize demand charges or other fixed utility fees. ADOT will monitor compliance through required data submittals.
- To increase awareness of charging infrastructure and improve customer and station host satisfaction, ADOT will require its EVSE owners to share data describing EVSE location, type of equipment available, price, status, and other information—free of charge—via an application programming interface with public-facing directories, including the Alternative Fuel Data Center's Station Locator.
- Station owners will comply with the proposed interoperability requirements for charger-to-EV communication to ensure that chargers are capable of the communication necessary to perform smart charge management and Plug and Charge.
- To allow for secure remote monitoring, diagnostics, control, and updates, station owners will comply with FHWA's proposed network connectivity requirements for charger-to-charger network communication, charging network–to–charging network communication, and charging network–to–grid communication.
- Station owners will comply with the proposed network connectivity requirements to require chargers to be capable of smart charge management and Plug and Charge capabilities by requiring the ability to communicate through Open Charge Point Protocol in tandem with ISO 15118.
- Station owners will comply with the proposed requirement that payment options include contactless payment methods, that contactless payment be accepted from all major debit and credit cards, and that access and service are not restricted by membership or payment method type. ADOT will require that multilingual access and access for people with disabilities be provided when creating payment instructions. Provisions for payment options will be set forth in the contract. ADOT will monitor compliance through periodic onsite inspection of charging stations.

Strategies to Address Resilience, Emergency Evacuation, Snow Removal/Seasonal Needs

The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Emergency Evacuation, Snow Removal, and Seasonal Needs

EVSE infrastructure should be conveniently and safely located. If the EVSE cannot be safely accessed during snow events or emergency situations, they are not as strong an asset to the AFC. EVSE stations should provide convenient charging to allow vehicles to evacuate an area safely and quickly in an emergency or evacuation scenario.

Strategies:

- ADOT will consider emergency and evacuation needs, including how they will support overall emergency evacuation plans along roadways in the selection of EVSE locations. This will include accounting for the growing number of EVs using designated evacuation routes.
- ADOT will consider the potential impacts of extreme weather events, including the use of currently available USDOT tools and resources to assess the vulnerability and risk of planned and existing EVSE stations and the development, deployment, and monitoring of resilience solutions.
- ADOT will consider the location of existing and proposed EVSE infrastructure with respect to the Federal Flood Risk Management Standard, as well as how climate may affect the floodplain. ADOT will require construction of EVSE infrastructure consistent with the Federal Flood Risk Management Standard. To the extent consistent with the law ADOT will consider users' need to access EVSE during times of emergency such as evacuation from natural disasters, and the risk associated with locating EVSE in base-floodplains in the location of EVSE and in the facility's design. If an existing station that is proposed for an upgrade is identified to be in a floodplain, there must be proposed mitigation strategies if continuing with the selected station. For new station location selection, the owner would identify the station location but be responsible for environmental and floodplain considerations.
- ADOT will comply with future FHWA guidance on addressing traffic incident management, crashes, and emergency situations. Emergency response information will be provided on-site at EVSE. ADOT will ensure compliance with any other required customer service strategies to connect charging stations to or provide access for traffic incident management solutions such as the provision of an emergency call box. Required provisions for traffic incident management and emergency call boxes will be included in the contract and monitored with periodic onsite inspection of charging locations.
- In areas that experience annual snowfall, such as central and northern Arizona, ADOT will ensure its stations owners take preventative actions such as salting, and reactive actions such as snow plowing, to address snow buildup that could block access to the EVSE infrastructure. This could include a barrier or overhang to protect equipment from snow drifts in the design as required.
- In areas that experience intense sun and heat, such as Southern and Western Arizona, ADOT will recommend that station owners consider ways to protect EVSE, such as shade structures.
- The American Automobile Association (AAA) has attempted a pilot program for mobile EVSE in some states. Through the program, trucks with Level 2 and 3 charging on board could be dispatched to EVs that lost charge. This program and its five vehicles have since been retired due to low use. However, AAA is re-evaluating its options and, in the meantime, would provide such vehicles with a tow. ADOT will continue to monitor the availability of similar programs to address these types of incidents.

Resilience Considerations

The AFCs are only an asset if EVSE are functional when needed most—during emergencies, outages, and evacuations. This requires consideration of resilience strategies such as the installation of battery storage and renewable energy sources in order to create a microgrid for EVSE to operate independently off the grid. The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements and Strategies:

- ADOT will require all station owners to consider the inclusion of distributed energy resources (DER) (e.g., solar arrays, energy storage) and electrical distribution and switching equipment where practicable and necessary.
- ADOT will require that EV stations located in floodplains be upgraded to mitigate the impacts of flooding. Resilience data will be submitted quarterly (amending as guidance is finalized). For details, refer to the *Program Evaluation – Reporting* section.
- ADOT will consider requiring backup generation and energy storage at charging station locations with significant resilience needs. This may include installing onsite energy generation such as solar where most appropriate. If renewable options are not practical, other types of back-up generation may be considered, such as diesel or natural gas generators.

Strategies to Promote Strong Labor, Safety, Training, and Installation Standards

Developing an EVSE network provides opportunities to create well-paying jobs to build a modern sustainable infrastructure. Minimum skill, training, and certification standards for technicians ensure that the deployment of EVSE infrastructure will support stable career-track employment for workers, creating more openings for workers to pursue training in the electrical trades—critical occupations for the clean energy transition. By requiring installation, maintenance, and operations to be performed by a well-qualified, highly skilled, certified, licensed, and trained workforce, the EVSE network's safety and reliability will be increased. The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements:

- ADOT will require that designs meet all applicable fire protection and prevention standards and traffic safety requirements. ADOT will monitor compliance through periodic review of station records.
- ADOT will ensure emergency management and public safety agencies will be consulted as appropriate.
- ADOT will ensure that station owners are operating and maintaining EV charging infrastructure with a focus on public road safety. This includes the provision of adequate lighting, fire protection, and other traffic safety features. ADOT will monitor compliance through periodic onsite inspection of charging locations and records.
- As discussed in the *Labor and Workforce - Training Strategies* section, training and hiring standards will be upheld in EVSE contracts and ADOT will monitor compliance through a periodic review of station records.
- ADOT will encourage station owners to ensure that there are trained staff on call in emergency situations.

Additional Strategies

The following recommendations will be provided to site owners as suggested best practices to help them enhance labor and workforce considerations at EVSE stations and the overall network. These

recommendations will be provided to potential owners along with other solicitation documents provided during the EVSE station owner selection process and discussed during pre-bid or similar meetings and in communications with selected owners.

- ADOT will make its site owners aware that several additional DOT funding and finance programs are also available to support workforce training for innovative technologies.
- ADOT will consider the development of workforce training programs to meet future demand of PEV charging infrastructure and drive economic development in DACs.

Opportunities for the Participation of Small Businesses

As EVSE infrastructure can be a draw towards locations that drivers may not have initially gone to without the infrastructure, consideration should be given to those businesses that are being supported by the chosen locations. The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements

- When selecting charging station locations, ADOT will consider locations at or immediately adjacent to land uses with food retailers, convenience stores, and small businesses with an ADA accessible pathway between the EVSE infrastructure and the identified establishment's front door, and other comparable facilities.
- ADOT will continue to engage the public and stakeholders that represent or provide services to small businesses including the Arizona Small Business Association, the state and local chambers of commerce, and other chambers of commerce such as the Hispanic Chamber of Commerce, the Black Chamber of Commerce, and the Chinese Chamber of Commerce.
- ADOT has established a DBE program in accordance with USDOT regulations to ensure DBEs have an equal opportunity to receive and participate in USDOT-assisted contracts. One of the requirements to qualify as a DBE is that the company must not exceed the Small Business Administration size standards in 13 CFR part 121 for the type of work it performs. It is ADOT's policy to:
  - Ensure nondiscrimination in the award and administration of USDOT-assisted contracts.
  - Create a level playing field on which DBEs can compete fairly for USDOT-assisted contracts.
  - Ensure that the DBE program is narrowly tailored in accordance with relevant law.
  - Ensure that only firms that meet 49 CFR Part 26 eligibility standards are counted as DBEs.
  - Help remove barriers to the participation of DBEs in USDOT-assisted contracts.
  - Assist in the development of firms that can compete successfully in the marketplace outside the DBE program.
  - ADOT will use these same policies to ensure DBEs are given equal opportunity in any NEVI Formula Program funded awards.

Installation Standards

Meeting current and anticipated market demands for EVSE infrastructure—including expected power levels and charging speed—and minimizing the time needed to charge vehicles is crucial for a successful EVSE network. Designing and managing facilities properly before installation can reduce upfront costs and later the operational costs associated with charging stations. The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements

The following installation standards will be required:

- ADOT will only consider DCFC for NEVI Formula Program funding.
- Station owners must consider future-proofing EVSE to accommodate expansions needed to support growing demand and the electrification and charging demands of medium- and heavy-duty trucks. Such expansions may address station size, power levels, and conduit size.
- ADOT will submit quarterly data as required by FHWA, such as the submission of detailed EVSE acquisition and installation costs and grid connection and upgrade costs paid by the charging station operator. Refer to the *Program Evaluation – Reporting* section for more detail.
- Station owners must consider pre-wiring new buildings for future EVSE stations to minimize installation costs down the line. Station owners will also be encouraged to consider installing oversized electric conduits to prevent additional costs of trenching and asphalt repairs in the future when additional EVSE are needed.
- Station owners must consider the need for funding to support basic infrastructure needs and upgrades, particularly in rural communities, where roads may not have existing curb and gutters to support a curbside PEV charger installation. Limited existing infrastructure places such communities even further behind in terms of access to technology and/or mobility. Owners must also account for the cost of equipment and infrastructure needed to protect EVSE, such as bollards, which can protect the investment from vehicle damage.
- Station owners must consider installation of signage and pavement markings to designate EVSE locations, prevent non-EVs from parking, and directing EV drivers to less visible station locations. This includes complying with existing requirements in the Manual on Uniform Traffic Control Devices for Streets and Highways found at 23 CFR part 655 and the Highway Beautification regulation at 23 CFR part 750 and any processing updates to those requirements.

Civil Rights

To ensure all EVSE customers and participants are provided with equitable opportunities to engage in EVSE offerings, the Plan complies with State and Federal civil rights laws and regulations, including Title VI of the Civil Rights Act of 1964 (Title VI), the ADA of 1990, Section 504 of the Rehabilitation Act of 1973, Executive Order 12898 on Environmental Justice, and Executive Order 13166 on Limited English Proficient (LEP) Persons.

Title VI prohibits discrimination on the basis of race, color, or national origin, either directly or indirectly in the types, quantity, quality, or timeliness of program services, aids, or benefits that they provide or in the manner in which they provide them, in any program that receives Federal funds or other Federal financial assistance. Executive Order 13166 for Limited English Proficiency is a requirement of recipients of Federal financial assistance to take reasonable steps to provide Limited English Proficient individuals with language services (oral or written) to ensure meaningful access to the agency's programs, activities, and services. Identification of LEP persons is required for the purpose of ensuring access to language services pursuant to this Executive Order. To ensure nondiscriminatory practices based on Title VI, ADOT will:

- Ensure public outreach materials, including handouts, posters, and other communications, are accessible to all persons in alternative language formats and provide vital documents in English and Spanish.
- Ensure EVSE stations provide information, instructions, and other communications in English and Spanish by including these requirements in future contracting and procurement mechanisms.

ADA prohibits discrimination and guarantees that people with disabilities have the same opportunities as everyone else to participate in the mainstream of American life, including employment opportunities, purchasing goods and services, and participating in state and local government services. The following efforts will be instituted to comply with the statutory requirements of the ADA:

- Ensure EVSE stations, including accessible parking spaces, are developed in accordance with ADA and Architectural Barriers Act Disability Guidelines for transportation facilities, including but not limited to the Public Right-of-Way Accessibility Guide.
- Follow procedures outlined in ADOT's Transition Plan for Public Rights-of-Way, including Title II: Public Services and Transportation.
- Maintain EVSE station signage that clearly designates all available facilities and accessible entrances and exits from those facilities.
- Ensure that access for people with disabilities be provided in the creation of payment instructions.
- Ensure that public meetings and outreach efforts are ADA-compliant. This includes, among other efforts, ensuring that public meetings are accessible to everyone, including those with disabilities, that venues are accessible by ADA-compliant transportation options, and information provided is in accessible formats for persons with vision or hearing disabilities.

Section 504 of the Rehabilitation Act protects qualified individuals from discrimination based on their disability by forbidding organizations and employers from excluding or denying individuals with disabilities an equal opportunity to receive program benefits and services. To ensure nondiscriminatory practices based on Section 504, ADOT will:

- Provide Notice of Reasonable Accommodations language at EV charging stations in English and Spanish.

Executive Order 12898 on EJ requires "the fair treatment and meaningful involvement of all people, particularly minority and low-income populations, in the environmental decision-making process." The United States Department of Transportation (USDOT) Order 5610.2(a) and FHWA Order 6640.23A require compliance with Executive Order 12898. This includes the "full and fair participation by all potentially affected communities in the transportation decision-making process."

Executive Order 14008 on Tackling the Climate Crisis (Justice40) states that "40 percent of the overall benefits" of Federal investments from covered programs should flow to DACs. To respond to that directive, ADOT has established a methodology for calculating the benefits that a) flow from the EV Infrastructure Deployment Plan and b) accrue in DACs.

To ensure nondiscriminatory practices based on EJ, ADOT will:

- Identify and engage low-income and minority populations in the Plan development.
- Identify and consider low-income and minority populations in siting EVSE stations.
- Follow the plan outlined in the *Equity* section of this Plan.
- Follow the other mandates of Justice40 as they evolve.

Cybersecurity

Owners of EVSE stations will be responsible for meeting the cybersecurity requirements defined within this section of the Plan, the cybersecurity specification attached as Appendix E, and other applicable State and Federal regulations. The specification in Appendix E is subject to further public comment and review and may require updates in future publications. The cybersecurity requirements posed here will ultimately work to ensure the safety and security of planned EVSE infrastructure. Requirements will include considerations for secure system updates, event logging and intrusion detection, secure operation of EVSE during communication outages, ensuring appropriate encryption systems are in use, and identity and access management processes. The following are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

Requirements

- Provide feasible plans and agreements to address how service will persist in the event of a communications outage. Required output from owners must properly define the minimum amount of information necessary to continue providing service to customers, how that information will be securely stored on the EVSE and illustrate ways that the physical connection to the vehicle will be secured while operating in this mode.
- Enact appropriate physical security measures. These practices must include procedures pertaining to physical access allowed to EVSE by customers and service technicians in order to prevent physical tampering of equipment.
- Adhere to strict identity and access management procedures based on industry best practices to prevent administrative or technological access to equipment by unauthorized personnel.
- Adopt the most current and stable encryption mechanisms to secure any data stored and communicated as which is relevant for service provision to customers.
- Adhere to update and patch management procedures adherent to industry standards and best practices. This works to mitigate the possibility of malware installation and propagation throughout the EVSE network and its vehicular connections.
- Employ mechanisms to detect malware and intrusion attempts into the system. Documented proof is required to ensure the functional capabilities of these mechanisms, which ensure the ability to detect and respond to cybersecurity exposures and potential breaches and additionally to reduce the risk of malware installation and propagation throughout the charging network and vehicular connections.
- Employ event logging and reporting of auditable events, such as logins, failed logins, high-value transactions, warnings and error messages, input validation errors, etc. Documented proof is required to ensure accountability, visibility, incident alerting, and forensics.
- Demonstrate that appropriate cybersecurity assessments are conducted at least annually on deployments and equipment in accordance with the National Institute of Standards and Technology Special Publication (SP) 800-115.
- Ensure the protection of collected, stored, and communicated customer payment information. Ensure that only the minimum required customer payment information is collected, stored, and communicated with appropriate payment services and administration centers as applicable.

- Provide feasible plans for how they will address future cybersecurity considerations as they pertain to the equipment and charging network. As new cybersecurity incidents occur and exposures are discovered, the cybersecurity posture of EVSE deployed must scale and adapt to meet the further growing security requirements and best practices.
- Cybersecurity requirements and guidance provided by the latest revisions of applicable standards and regulations shall be adhered to. These include, but are not limited to:
    - NEVI Notice of Proposed Rulemaking 23 CFR Part 680
    - Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT)
    - National Institute of Standards and Technology (NIST)
        - SP 800-53
        - SP 800-115
    - Arizona Statewide Policy (8130) System Security Acquisition and Development
    - Payment Card Industry Data Security Standard (PCI DSS)
    - Health Insurance Portability and Accountability Act (HIPAA)
    - North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP)

Labor and Workforce Considerations

ADOT has developed labor and workforce strategies to support and expand existing EVSE programs to build an equitable, diverse, and local EVSE workforce.

ADOT will require a standardized specification (e.g., Electric Vehicle Infrastructure Training Program (EVITP) or other qualifying program) that documents requirements for a minimum level of skill and training through certification. This ensures that the workforce installing and maintaining EVSE has appropriate level of training, licenses, and certifications to ensure that the installation and maintenance of EVSE is performed safely by a qualified and increasingly diverse workforce.

In addition, ADOT will encourage EVSE owners to hire from existing certification, licensing, and apprenticeship programs to build a cohesive EVSE workforce pipeline that provides careers to personnel qualified to perform EVSE installation, maintenance, and operations.

ADOT will consider establishing partnerships and requirements to support training pathways inclusive of DACs, women, minorities, and other underrepresented groups to ensure the EVSE careers are accessible to all Arizonans. As described more fully in the *Implementation* section of this Plan, ADOT has established a DBE program in accordance with USDOT regulations to ensure DBEs have an equal opportunity to receive and participate in USDOT-assisted contracts.

Workforce and Training Strategies

The following strategies are based on proposed NEVI rules, but the Plan may be amended to reflect the final rule when it is issued.

ADOT will require the following certification/training standards. These standards will be set forth in the contracts between ADOT and ESVE owners, and ADOT will monitor compliance through periodic review of station records.

Requirements:

- ADOT will require that, apart from apprentices, all electricians installing and maintaining EVSE must be certified through EVITP or be a graduate of a Registered Electrical Apprenticeship Program that includes EVSE-specific training and is developed as part of a national guideline standard approved by the Department of Labor in consultation with the Department of Transportation.
- For projects requiring more than one electrician, at least one electrician must meet the requirements above, and at least one electrician must be enrolled in an electrical registered apprenticeship program.
- Other onsite, non-electrical workers involved in the installation, operation, and maintenance of EVSE must have graduated from a registered apprenticeship program or have the appropriate licenses, certifications, and training as required by the State.

ADOT will consider additional strategies for recommendation to EVSE owners to help them enhance labor and workforce considerations at charging stations and the overall network.

Recommendations:

- ADOT will consider pathways to fund individual EVITP certifications as a low-cost method to support a large group of electricians to become certified quickly.
- ADOT will inform site owners that several additional USDOT funding and finance programs are also available to support workforce training for innovative technologies.
- ADOT will also consider partnering with other potential government agencies who develop programs that increase women and minority participation, address workforce gaps, build skills supporting emerging transportation technologies, and attract new sources of job-creating investment.
- ADOT will encourage EVSE owner participation with training providers, including existing pre-apprenticeship and apprenticeship programs, workforce boards, labor unions, community-based organizations, and nonprofits to support a diverse, local workforce for the EVSE network. To build a diverse, local EVSE workforce, ADOT will encourage EVSE owners to coordinate with and hire from the below list of existing electrician licensing, certification, and apprenticeship programs. ADOT will reevaluate opportunities at these and other programs annually.
- Existing electrician licensing and certification programs
    - AZ Department of Economic Security Apprenticeship Office: Arizona's Apprenticeship Program[liv]
    - Pima Community program (certification and associate degrees)
    - Gateway Community College (certification and associate degrees)
    - Chandler-Gilbert Community College (certification)
- Existing electrician apprenticeship programs
    - ABA-AGC Education Fund
    - Independent Electrical Contractors of Southern Arizona
    - Independent Electrical Contractors Association
    - Tucson Electrical Joint Apprenticeship and Training Program (JATC)
    - National Electrical Contractors Association Apprenticeship Program
    - Western Electrical Contractors Association
    - Globe-Miami Electrical Jt. Apprenticeship and Training program
    - Phoenix Electrical JATC

Equity Considerations

ADOT is committed to complying with the Justice40 Initiative—a part of Executive Order 14008—when using the NEVI Formula Program. This section outlines how the Plan identified and engaged with DACs throughout the Plan's development, as well as the actions taken to ensure that benefits to DACs are captured throughout this work.

Identification and Outreach to Disadvantaged Communities in the State

As part of the public involvement planning process, a review of statewide census data was conducted to identify the State's demographics. Data points reviewed include race/ethnicity, age, income level, and disability. Separately, vehicle accessibility/ownership was reviewed to assess the current status of EV market penetration and the equitable distribution of EV accessibility and ownership. As part of planning for in-district meetings, additional reviews were conducted to identify specific areas within districts for targeted outreach and notification of public meetings.

Tools to Engage Disadvantaged Communities

Tools utilized to ensure opportunity for meaningful participation by disadvantaged and traditionally underserved individuals and communities are listed below. These tools will continue to be utilized as outreach is conducted for further refinement of the Plan:

- Translation of public involvement materials, including notices and the project fact sheet, into Spanish and other languages, as identified through the LEP Four-Factor Analysis or by request.
- Spanish oral interpretation at all public meetings and Spanish translation of graphics on the project webpage. Additional language services available by advance request.
- Use of Google Translate on the ADOT project webpage, allowing the translation of information into approximately 100 languages.
- Outreach and engagement of local government partners and special interest groups to participate and share information with their constituents and members.
- Promotion of public meetings and other outreach efforts by posting fliers in English and Spanish at community gathering places.
- Utilization of community contacts, mailing lists and other means to initiate and continue communication.
- Targeted public outreach to the identified low-income and minority communities within the project area via stakeholder partner channels.
- Display of Notice of Availability of Reasonable Accommodations on all project public-facing materials.
- Selection of meeting venues accessible by public transit.

Actions to Ensure Nondiscriminatory Practices

To ensure nondiscriminatory practices based on Title VI, ADOT has adhered to the following applicable actions and will continue to do so during outreach throughout Plan refinement.

- Provide ADOT Nondiscrimination brochures in both English and Spanish to public meeting attendees.
- Display the ADOT Nondiscrimination Notice to the Public poster in English and Spanish at public meetings and encourage meeting participants to read the information.
- Include ADOT's Nondiscrimination Notice to the Public slide in English and Spanish in the meeting presentations and read the accompanying script.
- Provide the opportunity for in-person and virtual meeting attendees to complete the voluntary Title VI Self Identification cards. Virtual meetings provide the Self-ID Survey through a slide with a link and the link posted in the chat for attendee convenience. Hard-copy cards are provided to attendees at in-person meetings upon check in.

Actions to Ensure Accessibility

The following strategies have been utilized when appropriate for the outreach activity and will continue to be utilized throughout Plan development to comply with the ADA's statutory requirements.

- Ensured public meeting venues are ADA-compliant and accessible by ADA-compliant transportation options, and that information provided is accessible for persons with vision or hearing disabilities.
- Ensured that virtual public meetings and stakeholder workshops are ADA accessible, which included instructing users how to turn on closed captioning services, having speakers turn on their cameras, providing minimum font sizes in presentations, and including a required Auxiliary Aids and Services slide regarding how to request ADA accommodations.
- Ensured that materials posted to the website are accessible PDFs that are compatible with readers.
- If online resources are used to provide project information, guidance is provided on how to use online resources and resources will be ADA accessible, including assistance for those with visual impairment and information about alternative methods for participation.
- Provided the Notice of Availability of Reasonable Accommodations on all public-facing materials for the study. Reasonable accommodations are provided upon request (e.g., sign language interpreter, copies of materials in accessible formats, etc.).

DAC Outreach Results

As part of the survey collection, optional questions about demographics were included for those who wished to provide such information. Demographic data received from the survey was not included with any other information collection but was used to determine the representative cross-section of survey reach within the State.

At the time of submission of this report, final public outreach results have not been collected since additional public outreach activities are planned. However, engagements are scheduled to be completed by November 2022 and the Plan will subsequently be updated in accordance with the feedback received throughout the outreach.

Process to Identify, Quantify, and Measure Benefits to DACs

Executive Order 14008 states that "40 percent of the overall benefits" of Federal investments from covered programs should flow to DACs. To respond to that directive, ADOT has established a methodology for calculating the benefits that flow from the EV Infrastructure Deployment Plan and accrue in DACs.

ADOT's EV Infrastructure Deployment Plan intends to meet the Justice40 program requirements by monitoring program success in identifying, quantifying, and measuring benefits to DACs. ADOT intends to monitor and report progress as required by FHWA and will amend this Plan as needed as guidance and regulations are finalized. ADOT is soliciting feedback regarding DAC benefits and metrics through stakeholder and public engagement. ADOT will amend the Plan to reflect input from stakeholders and the public through the Public Outreach and Involvement activities.

The USDOT methodology for defining DACs includes data for 22 indicators collected at the census tract level and grouped in to six categories of transportation disadvantages:

1. **Transportation access disadvantage** identifies communities and places that spend more, and take longer, to get where they need to go.
2. **Health disadvantage** identifies communities based on variables associated with adverse health outcomes, disability, as well as environmental exposures.
3. **Environmental disadvantage** identifies communities with disproportionately high levels of certain air pollutants and high potential presence of lead-based paint in housing units.
4. **Economic disadvantage** identifies areas and populations with high poverty, low wealth, lack of local jobs, low homeownership, low educational attainment, and high inequality.
5. **Resilience disadvantage** identifies communities vulnerable to hazards caused by climate change
6. **Social disadvantage** identifies communities with a shared history of discrimination, racism, or other forms of disadvantage that warrant consideration along with each/any of the above measures.

Benefits to DACs through this Plan

ADOT developed a methodology to measure benefits to DACs associated with implementing the Plan by assessing impacts aligned with the USDOT categories and the interim Justice40 guidance. These benefits and associated metrics reflect the positive impacts of expanding EVSE access to DACs and tribal communities, as defined by Justice40, through transportation planning that emphasizes equitable investments. These equitable investments will be important as Arizona's population continues to grow and impact the distribution of EV and EVSE access in DACs.

For example, in 2020, Arizona recorded the second fastest growing population in the nation, and approximately 45% of Arizonans identify as minorities.[lv] Arizona is also home to one of the largest Native American populations in the nation, and approximately 27% of the State's land is owned by Native American Tribes.[lvi] Measuring benefits to DACs in a rapidly changing and growing environment will better inform decision-making around EVSE access throughout the duration of this program.

Benefits to DACs will be reassessed and amended to meet the final Justice40 and NEVI rulemaking requirements and feedback from the public and stakeholders.

Metrics to Measure Impacts and Benefit to DACs

- Benefit to DAC: Improvement in EV transportation and accessibility, reliability, and options (USDOT Categories: 1, 5, 6)
  - Metric: Number of new EVSE installed in DAC-defined census tracts and tribal lands
    - Frequency of Measurement: Annually
    - Data Source: ADOT charging station location identifier for potential new AFCs
- Benefit to DAC: Increased access to charging system for disadvantaged populations by having alternative payment options (USDOT Categories: 1, 4, 6)
  - Metric: Percentage of chargers in the network with alternative payment options and the percentage of chargers within the system with alternative payment options in DACs
    - Frequency of Measurement: Annually
    - Data Source: ADOT charging station locations
- Benefit to DAC: Reduction of exposure to harmful transportation-related emissions (including diesel particulate matter, other PM 2.5, and air toxics), (USDOT Categories: 2, 3)
  - Metric: Concentration of pollutants, PM, and other air toxins found in DAC defined census tracts and tribal lands with newly installed EV charging locations
    - Frequency of Measurement: Annually
    - Data Source: Air quality monitoring results for ozone, diesel particulate matter, or other emissions in DACs obtained from the Arizona Department of Environmental Quality
- Benefit to DAC: Increased EV transportation accessibility, reliability, and options (USDOT Categories: 1, 4, 6)
  - Metric: Number of new EVSE installed in close proximity to public and affordable housing properties and multifamily dwellings
    - Frequency of Measurement: Annually
    - Data Source: ADOT charging station locations
- Benefit to DAC: Reduce negative impacts on DACs due to installation of EV charging stations (USDOT Categories: 2, 3, 4, 5, 6)
  - Metric: Measure negative impacts such as increased right-of-way acquisition, negative impact to overall aesthetics including decreasing greenspace, and increases in safety concerns in DACs
    - Frequency of Measurement: Annually
    - Data Source: ADOT traffic data, ADOT crash/safety data, ADOT right-of-way plans and records

- Benefit to DAC: Increased access to clean, high-frequency transportation options (USDOT Categories: 1, 2, 3, 5)
  - Metric: Number of new EVSE installed in DAC-defined census tracts and tribal lands
    - Frequency of Measurement: Annually
    - Data Source: Locations of chargers and transit/rideshare locations
- Benefit to DAC: Improved Job Access Score (USDOT Categories: 4, 6)
  - Metric: Number of EVSE installation, operations and maintenance, network connectivity, and other support jobs created for residents in DAC-defined census tracts and tribal lands
    - Frequency of Measurement: Annually
    - Data Source: Electric Vehicle Charging Justice40 Map tool, Arizona Commerce Authority's Occupation Employment and Wages, Employment Projections, and In-Demand Jobs reports

Program Evaluation

ADOT's data-driven program evaluation plan will ensure accountability, evaluate performance toward meeting the State's vision and goals for the EV Infrastructure Deployment Plan, and meet NEVI Formula Program requirements by monitoring three key areas of success: data collection, equitable access, and network reliability. ADOT intends to monitor and report progress as required by FHWA and may amend the Plan as needed to reflect the final rule when issued. This plan will be revisited and updated annually to address opportunities for improvement.

Metrics

ADOT will monitor and evaluate the program using the following metrics. A summary can be found in **Appendix B**.

- Performance Goal: Develop a convenient public EVSE network along Arizona's AFCs (Plan Goals 1, 2, 4, 6)
  - Metric: Number of new AFC locations identified and developed
    - Frequency of measurement: Quarterly
    - Data source: ADOT charging station location identifier for potential new AFCs
  - Metric: Number of EVSE locations for transit and shared ride vehicles
    - Frequency of measurement: Quarterly
    - Data source: Locations of EVSE and transit/rideshare locations
- Performance Goal: Provide access to program benefits (Plan Goals 1, 2, 3, 4, 5, 6)
  - Metric: EV adoption rates
    - Frequency of measurement: Annually
    - Data source: ADOT, Motor Vehicle Division, vehicle registration records
  - Metric: Estimated number of EV charger installation, operations and maintenance, network connectivity, and other support jobs created
    - Frequency of measurement: Annually
    - Data source: Arizona Commerce Authority, Occupation Employment and Wages, Employment Projections, and In-Demand Jobs reports
  - Metric: Number of minority, Veteran, woman, and/or businesses owned by economically disadvantaged individuals that operate, maintain, and install the EVSE
    - Frequency of measurement: Annually
    - Data source: Local or state certification records from programs for minority-owned businesses, veteran-owned businesses, woman-owned businesses, and/or businesses owned by economically disadvantaged individuals

- Performance Goal: Achieve a resilient, equitable, accessible, and reliable EV charging network (Plan Goals 2, 5, 6)
  - Metric: Number of charging stations that meet the EV charging uptime (functioning) goal of 97% (calculated as required by program guidance) at the individual port level
    - Frequency of measurement: Quarterly
    - Data source: Total hours of outage and total hours of outage for reasons outside the charging station operator's control
  - Metric: EV charging station utilization rates
    - Frequency of measurement: Quarterly
    - Data source: EV charging stations utilization metrics including the number of charging sessions, energy (kWh) dispensed per session and successful session completion
  - Metric: Installation costs per EV charging station
    - Frequency of measurement: Quarterly
    - Data Source: Charging station real property acquisition cost, charging connection, and upgrade cost on the utility side of the electric meter, equipment acquisition and installation cost, DER acquisition and installation cost, and grid connection and upgrade costs paid by the charging station operator
  - Metric: Operating costs per EV charging station
    - Frequency of measurement: Quarterly
    - Data source: Total cost of electricity that the charging station operator must pay to operate on a charging station and maintenance and repair costs per charging station
  - Metric: Number of EV charging stations with DERs
    - Frequency of measurement: Quarterly
    - Data source: DER installed capacity, in kW or kWh as appropriate, of asset by type (e.g., stationary battery, solar, etc.) per charging station
- Performance Goal: Maintain high stakeholder engagement in the development of the EV charging network (Plan Goals 2, 3, 4, 6)
  - Metric: Number of engagement activities held
    - Frequency of measurement: Annually
    - Data source: ADOT stakeholder engagement records
  - Metric: Number of engagement activities held among DACs and tribal communities
    - Frequency of measurement: Annually
    - Data source: ADOT stakeholder engagement records
  - Metric: Number of participants in engagement activities
    - Frequency of measurement: Annually
    - Data source: ADOT stakeholder engagement records

- Performance Goal: Efficient use of Federal funding measured by amount of charging leveraged per Federal Dollar (Plan Goals, 2, 4, 5, 6)
  - Metric: Quantity of funds distributed
    - Frequency of measurement: Quarterly
    - Data source: ADOT FFY funding records
  - Metric: Number of funding recipients
    - Frequency of measurement: Annually
    - Data source: ADOT FFY funding records
  - Metric: Charging station utilization rate per Federal Dollar
    - Frequency of measurement: Quarterly
    - Data source: ADOT FFY funding records, number of successful EV charging visits per month

Annual Plan Update

Before each FFY, ADOT will review and assess program performance using the metrics in the Program Evaluation Plan and other relevant data. Performance metrics will be made available to the public on at least an annual basis. Opportunities for improvement will be identified and addressed as necessary through the Plan's annual update.

Reporting

Reporting will occur on a quarterly and annual basis. The method and format of reporting will be in accordance with that required by the Joint Office.

Quarterly Reporting

Data will be submitted quarterly on charging station use, reliability and maintenance, and installation costs. Quarterly submittals shall include:

- Charging station location identifier
- Charging session start time, end time, and successful session completion (yes/no) by port
- Energy (kWh) dispensed to EVs per session by port
- Peak session power (kW) by port
- Charging station uptime calculated in accordance with the equation in § 680.116(b) for each of the previous 3 months
- Cost of electricity to operate per charging station in each of the previous 3 months
- Maintenance and repair cost per charging station for each of the previous 3 months
- Charging station real property acquisition cost, charging equipment acquisition and installation cost, DER acquisition and installation cost, and grid connection and upgrade cost on the utility side of the electric meter
- DER installed capacity, in kW or kWh as appropriate, of asset by type (e.g., stationary battery, solar, etc.) per charging station

Annual Reporting

- Information relating to the operation, installation, or maintenance of EVSE. These reports will contain:
  - The name, address and type of private entity involved in the operation, maintenance, and installation of EVSE
  - For private entities, identification of and participation in any state or local business opportunity certification programs including but not limited to minority-owned businesses, veteran-owned businesses, woman-owned businesses, and businesses owned by economically disadvantaged individuals

- Community Engagement Outcomes Report. This report will address community engagement activities conducted in accordance with the approved State EV Infrastructure Deployment Plan, including:
  - Community engagement type
  - Dates of community engagement activities
  - Numbers of attendees
  - Communities represented by attendees
  - How community engagement is included and reflected in the Plan

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[v] U.S. Department of Energy. (n.d.) *Electric Vehicles*. Alternative Fuels Data Center. Retrieved from https://afdc.energy.gov/vehicles/electric.html.

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[li] The 2.1% growth rate is based on historical VMT trends and will fluctuate slightly from year to year.

[lii] Battery energy consumption refers to the energy consumption rate of the EV and accounts for propulsion, cabin climate control, and other subsystems. It does not include losses during charging.

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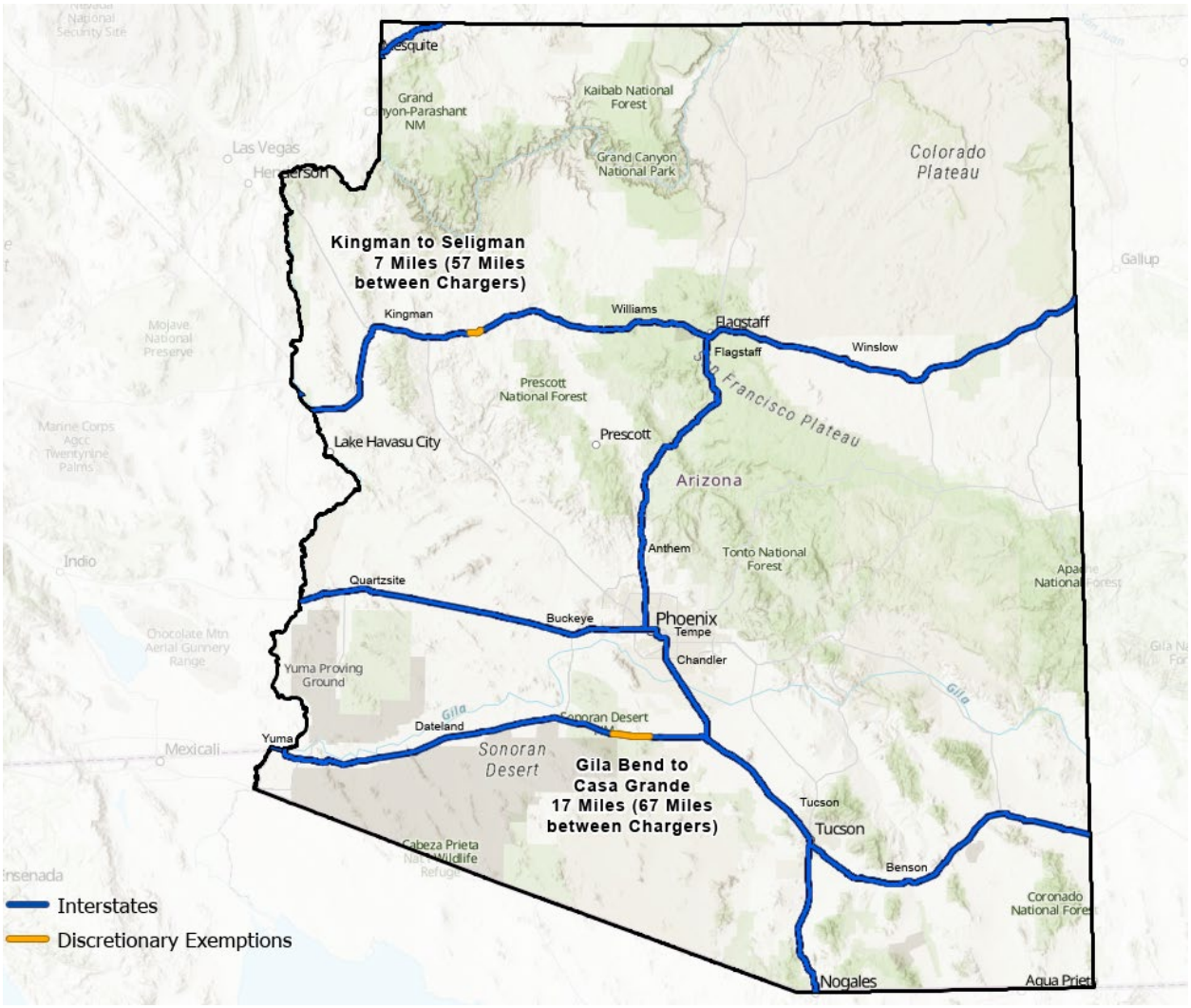
Appendix A Arizona EV Deployment Plan Exception Request

ADOT is requesting two discretionary exemptions from the requirement that charging infrastructure be installed every 50 miles along the State's AFCs. The proposed discretionary exemptions are described in **Table A-1** and shown in **Figure A-1**. Stakeholder engagement activities should confirm if a charging installation would be feasible at any of the segments applied for discretionary exemptions.

Table A-1: Discretionary Exemption Requests

Exception Number	Type	Distance of Deviation	Included in Round 6 AFC Nomination	Reason for Exception Request
1 – Kingman to Seligman (I-40)	☒ 50 miles apart ☐ 1 mile from exit	7 miles __ miles	☐ Yes ☒ No	☒ Grid Capacity ☒ Geography ☐ Equity ☐ Extraordinary Cost
2 – Gila Bend to Casa Grande/Eloy (I-8)	☒ 50 miles apart ☐ 1 mile from exit	17 miles __ miles	☐ Yes ☒ No	☒ Grid Capacity ☒ Geography ☐ Equity ☐ Extraordinary Cost

Figure A-1: Map of Discretionary Exemption Requests



Justification for Exceptions

Kingman to Seligman

The 57-mile segment between Kingman and Seligman on I-40 is a rural area with no existing amenities within one mile of the corridor. ADOT limited the distance of this gap as much as possible in the new station proposal just east of Kingman. The proposed exemption is for a 7-mile gap as NEVI-compliant chargers will be sited 57-miles apart from each other.

Gila Bend to Casa Grande/Eloy

East of Gila Bend on I-8 is a rural area with no existing amenities within one mile of the corridor until reaching the interchange with I-10. ADOT proposed upgrading the Casa Grande existing stations and a new site in Eloy to ensure convenient charging options for both westbound and eastbound routes on I-10. The proposed exemption is for a 17-mile gap as NEVI-compliant chargers will be sited 67 miles apart from each other.

Appendix B Performance Evaluation Metrics Summary Table

Table B-1: Performance Evaluation Metrics Summary Table

Performance Goal	Metric	Frequency of Measurement	Data Source
Develop a convenient public charging network along Arizona's AFCs	Number of new AFC locations identified and developed	Quarterly, Annually	ADOT charging station location identifier for potential new AFCs
	Number of charging infrastructure locations for transit and shared ride vehicles	Quarterly	Locations of chargers and transit/rideshare locations
Provide access to program benefits	EV adoption rates	Annually	ADOT Motor Vehicle Division, vehicle registration records
	Number of EV charger installation, operations and maintenance, network connectivity, and other support jobs created	Annually	Arizona Commerce Authority, Occupation Employment and Wages, Employment Projections, and In-Demand Jobs reports
	Number of minority, veteran, woman, and/or businesses owned by economically disadvantaged individuals that operate, maintain, and install the EVSE	Annually	Local or state certification records from programs for minority-owned businesses, Veteran-owned businesses, woman-owned businesses, and/or businesses owned by economically disadvantaged individuals.
Achieve a resilient, equitable, accessible, and reliable EV charging network	Number of charging stations that meet the EV charging uptime (functioning) goal of 97% (calculated as required by program guidance) at the individual port level	Quarterly	Total hours of outage and total hours of outage for reasons outside the charging station operator's control
	EV charging station utilization rates	Quarterly	EV charging stations utilization metrics including the number of charging sessions, energy (kWh) dispensed per session and successful session completion

Performance Goal	Metric	Frequency of Measurement	Data Source
	Installation costs per EV charging station	Quarterly	Charging station real property acquisition cost, charging connection and upgrade cost on the utility side of the electric meter, equipment acquisition and installation cost, DER acquisition and installation cost, and grid connection and upgrade costs paid by the charging station operator
	Operating costs per EV charging station	Quarterly	Total cost of electricity that the charging station operator must pay to operate on a charging station and maintenance and repair costs per charging station
	Number of EV charging stations with DERs	Quarterly	DER installed capacity, in kW or kWh as appropriate, of asset by type (e.g., stationary battery, solar, etc.) per charging station
Maintain high stakeholder engagement in the development of the EV charging network	Number of engagement activities held	Annually	ADOT stakeholder engagement records
	Number of engagement activities held among DACs and tribal communities	Annually	ADOT stakeholder engagement records
	Number of participants in engagement activities	Annually	ADOT stakeholder engagement records
Efficient use of Federal funding measured by amount of charging leveraged per Federal Dollar	Quantity of funds distributed	Quarterly	ADOT FFY funding records
	Number of funding recipients	Annually	ADOT FFY funding records
	Charging station utilization rate per Federal Dollar	Quarterly	ADOT FFY funding records, number of successful EV charging visits per month

Appendix C Utility Capacity

Determining the available capacity on electric distribution infrastructure for proposed EV charging station locations allows cities and community planners to understand whether grid upgrades will be needed. Such upgrades can include substation level upgrades to increase capacity or re-wiring of distribution lines. Grid upgrades are a complex undertaking and can often include significant costs. This coupled with considerations such as long lead supply chain items that add to implementation schedules can create delays and complexities in deployment. To better understand grid capacity and ensure that the local grid has sufficient capacity for planned deployments, surveys were sent to each utility serving the proposed sites as part of the technical effort supporting the Plan. Results from the survey are provided in **Table C-1**.

Table C-1: Utility Capacity at Proposed Charger Sites

Charger Location	Route	Exit Number	Serving Utility	480V - Three Phase Service Available	600kW Capacity Available
Camp Verde[1]	I-17	287	APS	Yes	Capacity will be Available in 2025
Casa Grande	I-17	194	APS	Yes	Yes
Cordes Lakes / Cordes Junction	I-17	262	APS	Yes	Yes
Eloy	I-10	200	APS	Yes	Yes
Gila Bend	I-8	115	APS	Yes	Yes
Green Valley	I-19	69	TEP/Trico	Yes	Yes
Holbrook	I-40	286	APS	Yes	Yes
Kingman	I-40	66	Mohave Electric Cooperative	Yes	Yes
Munds Park	I-17	322	APS	Yes	Limited
Nogales	I-19	4	Unisource	Yes	Yes
Petrified Forest	I-40	311	APS	Yes	Yes
Salome	I-10	45	APS	Yes	Limited
San Simon	I-10	378	SSVEC	Yes	Yes
Sanders	I-40	339	Navopache Electric Cooperative	No Response	No Response
Seligman	I-40	123	APS	Yes	Yes
Tacna	I-8	42	Welton – Mohawk Irrigation District	No Response	No Response
Tonopah	I-10	94	APS	Yes	Yes
Tucson	I-10	273	TEP	Yes	Yes
Twin Arrows[2]	I-40	219	APS & NTUA	APS does not have 3 phase service	APS would require grid upgrades
Willcox	I-10	340	SSVEC	Yes	Yes

DCFC typically require three phase, 480 V input service to operate. Four 150 kW DCFC units, as specified by NEVI also require 600 kW of power capacity available if all units are operational. Based on the survey, sixteen of the twenty proposed sites of locations identified in the Plan have capacity and service

conditions available to support DCFC charging stations. Hence, no major grid infrastructure upgrades would be required for these sites based upon current conditions. It should be noted that some utilities did not respond to the survey provided. In these instances, further utility coordination would be needed for these sites.

As grid conditions consistently change, establishing early utility engagement to confirm grid capacity is important as well as continuous utility engagement throughout the entirety of planning and deployment. Early engagement also streamlines installation timelines and can help mitigate supply chain concerns of electrical components, such as transformers. The Plan details highway exits to site proposed chargers, additional best practices can be followed to reduce the amount of electrical upgrades. Best practices include siting chargers near existing electric infrastructure to minimize conduit runs and closer to substations so as to be more likely to have available capacity. Additionally, distributed energy resources (DERs) should be investigated as potential technologies to co-locate at charger sites to help supplement energy needs, reduce emissions from EV charging, and avoid costly peak demand charges.

Appendix D EV Charging Costs

A cost estimate is provided to supplement the proposed locations to better depict how funding can be allocated. Costs are incurred from purchasing of equipment, installation, and potential electric upgrades needed at each site. Lower cost locations are preferrable as they provide the opportunity to utilize resources to support additional network sites and expand the network as quickly as possible. **Table D-1** provides cost estimates for charger installations based on information from previous project experience and other industry papers. The estimated costs are likely to vary based on factors such as whether the charger is in a rural or urban location, existing supply chain shortages, and level of electrical upgrades.

Table D-1: EV Charger Cost Estimates

Charger Cost Component	Cost Estimate
Charging Station (150kW)	$94,000
Installation	$40,000
Total 150kW Charger	$134,000
Charging Station ((4) 150kW)	$376,000
Installation	$80,000
Total (4) 150kW Charger	$456,000
Charging Station (350kW)	$150,000
Installation	$50,000
Total 350kW Charger	$200,000

Ensuring that purchasing and installation costs remain low to providers, implementation of best practices to provide greater availability are essential. A practice implemented for EV charger installations is the Make-Ready model. This model reduces the cost of EV-charging infrastructure for customers and developers. This is done by sizing electrical infrastructure to accommodate future demand and placing conduit for future stations to minimize civil work.

ADOT EV Charging Infrastructure Cybersecurity Specification

CHAPTER 1. TERMINOLOGY AND ABBREVIATIONS

ACRONYMS

Abbreviation	Meaning
ADOT	Arizona Department of Transportation
ARC-IT	Architecture Reference for Cooperative and Intelligent Transportation
CISA	Cybersecurity and Infrastructure Security Agency
CSO	Charging Station Operator
CSMS	Charging Station Management System
CVE	Common Vulnerabilities and Exposures
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
ICS-CERT	Industrial Control Systems Cyber Emergency Response Team
ITS	Intelligent Transportation Systems
IVI	In-Vehicle Infotainment Center
NEVI	National Electric Vehicle Infrastructure
NERC-CIP	North American Electric Reliability Corporation Critical Infrastructure Protection
NIST	National Institute of Standards and Technology
OBE	On-Board Equipment
OCPP	Open Charge Point Protocol
PCI DSS	Payment Card Industry Data Security Standard

TERMS

Term	Definition
Charging Station	The physical system where Electric Vehicles can be charged.
Charging Station Operator	The mobility partner who operates the charging station infrastructure. For purposes of this specification this term will simultaneously refer to the Charging Station Vendor since the vendor is fulfilling this same role.
Connector/Plug	An independently operated and managed electrical outlet on a charging station which corresponds to a single physical connector.
Electric Vehicle Supply Equipment	An independently operated and managed part of the charging station that can deliver energy to one EV at a time.

REQUIREMENTS TERMINOLOGY

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in the Internet Engineering Task Force Requests for Comment 2110[lvii] and 2119,[lviii] which are defined in the below table.

Key Word	Definition
MUST	This word, or the terms “REQUIRED” or “SHALL”, mean that the definition is an absolute requirement of the specification.
MUST NOT	This phrase, or the phrase “SHALL NOT”, mean that the definition is an absolute prohibition of the specification.
SHOULD	This word, or the adjective “RECOMMENDED”, mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
SHOULD NOT	This phrase, or the phrase “NOT RECOMMENDED” mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but when the full implications should be understood, and the case carefully weighed before implementing any behavior described in this label.
MAY	This word, or the adjective “OPTIONAL”, mean that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

CHAPTER 2. INTRODUCTION

PURPOSE

The purpose of this specification is to establish a statewide cybersecurity standard for the deployment of Electric Vehicle (EV) charging infrastructure along the state's NEVI Formula Program funded EV charging installations by illustrating cybersecurity provisions derived from federal laws and regulations, and industry best standards to create cybersecurity requirements which the Charging Station Operator (CSO) MUST strictly and completely fulfill regarding the deploying and maintaining of EV charging infrastructure throughout the state of Arizona's EV charging installations.

Through strict adherence to the requirements in this document, the CSO can assure ADOT that the EV charging infrastructure met a baseline of substantial cybersecurity controls throughout ADOT's EV Infrastructure Deployment Plan.

SCOPE

- Requirements in this specification apply strictly to and are the responsibility of the CSO.
- Requirement items in this specification MUST be strictly and completely fulfilled by the CSO and submitted to ADOT for assessment.

CHAPTER 3. CYBERSECURITY RATIONALE

To establish the foundation of cybersecurity for the state of Arizona's EV charging installations, ADOT has constructed a set of requirements which correspond with both federal laws & regulations and industry best practice cybersecurity controls. These requirements are based primarily on cybersecurity provisions from the *National Electric Vehicle Infrastructure (NEVI) Formula Program Notice of Proposed Rulemaking (NPRM) (Title 23 CFR Part 680)*[lix] and the *National ITS Architecture and Standards (ARC-IT)* conformity requirements from the *Intelligent Transportation System Architecture and Standards (Title 23 CFR Part 940)*.[lx] The narrative for requirement creation and steps are described herein.

CONTROL MAPPING

A crosswalk mapping all relevant cybersecurity provisions present in the various requirement sources and NIST SP 800-53[lxi] was created. Primary and secondary requirement sources utilized in this mapping are described below.

PRIMARY

NEVI

In order to address the cybersecurity provisions in *Title 23 CFR Part 680*, each provision was mapped to applicable cybersecurity controls defined in NIST SP 800-53r5 *Security and Privacy Controls for Information Systems and Organizations*. [lxii]

ARC-IT

Next, the cybersecurity requirements defined in ARC-IT's *Device Class 5 Areas*[lxiii] (the security class applicable to ARC-IT's "Electric Charging Station" physical object) were mapped to applicable NIST SP 800-53 controls in much the same manner.

SECONDARY

Statewide Policy (8130): System Security Acquisition and Development

ADOT relied on its own *System Security Acquisition and Development Statewide Policy (P8130)*,[lxiv] which contains relevant third-party information system acquisition and deployment controls for the Payment Card Industry Data Security Standard[lxv] (PCI DSS) and the Health Insurance Portability Act[lxvi] in order to meet the customer and payment info cybersecurity considerations defined in *Title 23 CFR Part 680*. The PCI DSS and HIPAA controls[lxvii] contained within this statewide policy document were mapped to the applicable NIST SP 800-53 controls.

North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP)

To address the cybersecurity consideration contained within *Title 23 CFR Part 680* defining the security of *Charging-Network-to-Grid Communication*, NERC CIP standards were utilized (*NERC CIP-011-2* "Information Protection" Requirements 1.1 & 1.2)[lxviii] and mapped to NIST SP 800-53.

CONTROL BASELINE

An initial cybersecurity baseline was constructed in accordance with NIST SP 800-53Br5 *Control Baselines for Information Systems and Organizations*[lxix] tuned to the *Security Control Baseline* of "High", which was further modified with supplemental controls which were a product of the mapping crosswalk.

CREATION OF REQUIREMENTS

Submission of NIST SP 800-53A Assessment

Title 23 CFR Part 940 pertains to additions of modifications to ITS systems which are funded partly or in whole by the Highway Trust Fund.[lxx] This requirement was created to fulfill the conformity provisions present in *Title 23 CFR Part 940* as it pertains to ITS conformity requirements with *The National ITS Architecture and Standards* (ARC-IT), of which therein defines "Securing ITS" as a core architectural directive. Fulfillment of the current cybersecurity baseline (Appendix A) covers the physical components with the security class of ARC-*IT's Device Class 5 Areas*.[lxxi]

Fulfillment of Cybersecurity Compliance Controls Table

This requirement was created to meet cybersecurity provisions defined in *Title 23 CFR Part 680* by taking each particular cybersecurity provision and citing the cybersecurity baseline and component each provision should apply to. From there, the CSO MUST submit their plan to meet each requirement in the table.

Security Testing and Assessment - NIST SP 800-115

This section elaborates on the expectations with respect to security testing and assessment, guided by *NIST SP 800-115 Technical Guide to Information Security Testing and Assessment*. [lxxii] The goal of this guidance is to ensure that vendors and owners regularly conduct security testing and assessments to demonstrate the effectiveness of security controls established in equipment, software, and networks utilized by EV charging infrastructure components. The CSO shall ensure that the activities outlined in NIST SP 800-115 are conducted on a regular interval, which includes policy reviews, vulnerability assessments, penetration testing, and others, as well as creating and maintaining a plan which shall define the logistical and technical details required to execute these activities.

CHAPTER 4. EV CHARGING INFRASTRUCTURE COMPONENTS

This section illustrates the multiple components which comprise electric vehicle charging infrastructure as defined in ARC-IT and OCPP diagrams and documentation. For the purpose of this specification, the CSO MUST address requirements for each relevant component listed when filling out requirements (see Chapter 5. Cybersecurity requirements for further details).

COMPONENT LIST

Below is a list of components owned by the CSO which facilitate the charging station's functionality.

Component	Description
Electric Vehicle Charging Station	Provides access to electric vehicle supply equipment that is used to charge hybrid and all-electric vehicles. For the purpose of this specification, this component will include the EVSE and connector(s). This component is provided, owned, and managed by the CSO.
CSMS	The system utilized by the CSO to manage charging stations. A majority of the CSMS core functions, including collection and management, overlap with that of the *Traffic Information Center* defined in ARC-IT. This system is owned and managed by the CSO.
PCI DSS Compliant Vehicle Payment Service	Supports vehicle payments for charging of EVs. Charging stations may utilize various methods of payment, to include an interface on the charging station itself which accepts debit/credit payment, or contactless methods in which the operator engages with the charging station remotely via either a mobile phone application or other OBE methods such as in-vehicle applications via the EV's IVI. Payment service mechanisms are provided, owned, and managed by the CSO.
PCI DSS Compliant Payment Administration Center	Provides general payment administration capabilities and supports the electronic transfer of funds from the customer to the CSO for charging services rendered. This system may be owned and managed by the CSO.

COMPONENT DIAGRAMS

Below are physical and interface diagrams of EV charging stations from ARC-IT and OCPP documentation. These are included as a resource for the CSO and others to describe the various components of EV charging infrastructure. [Note: "Electric Charging Station" as labeled by these ARC-IT diagrams is synonymous with "EV Charging Station" as utilized in this document.]

ARC-IT

ST05: Electric Charging Stations Management[lxxiii] *– Physical Diagram*

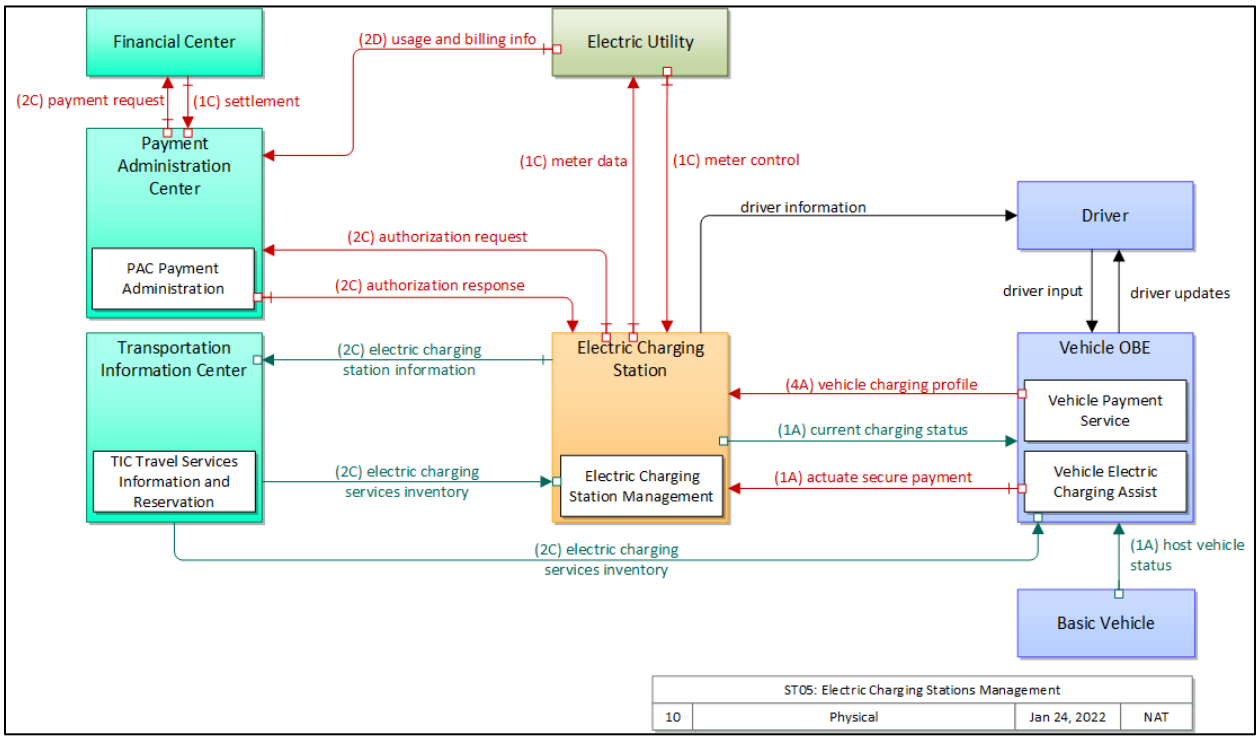


Figure E-4-1. ARC-IT Physical Diagram - ST05: Electric Charging Stations Management

Electric Charging Station – Interfaces Diagram

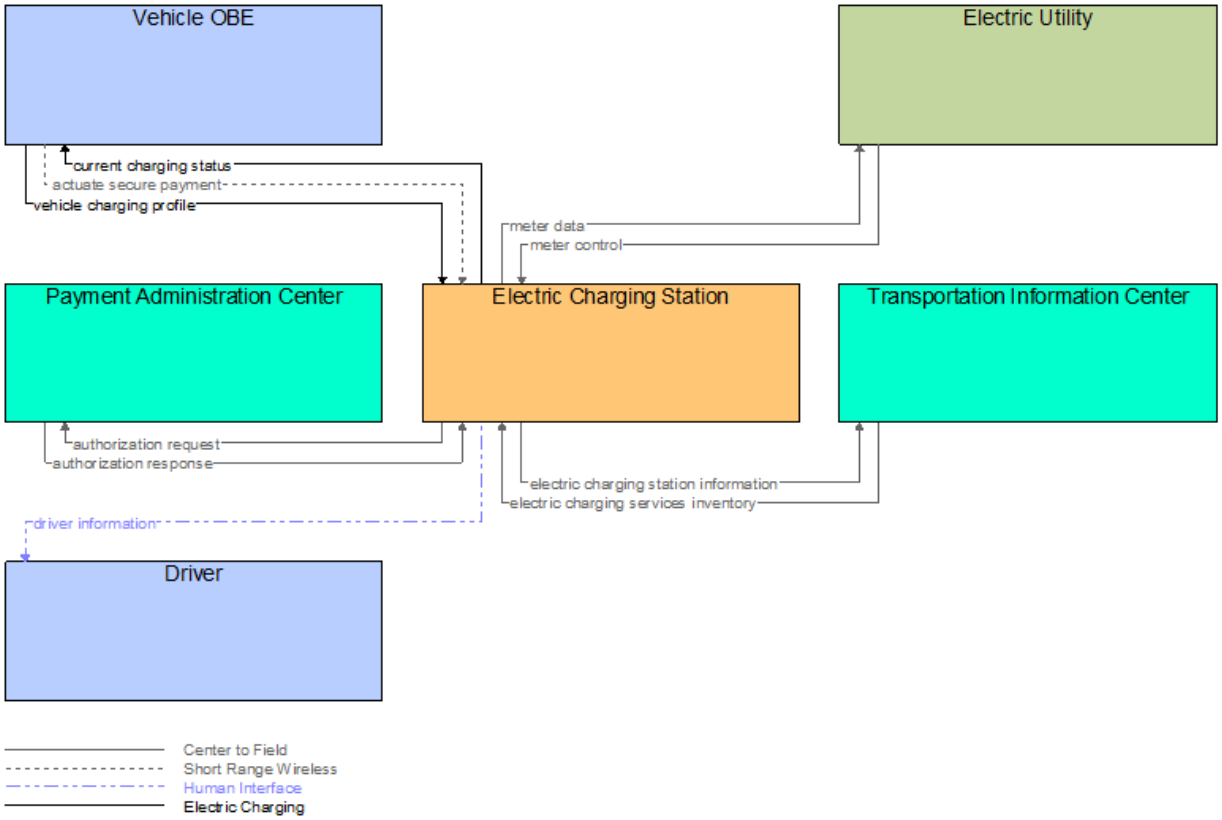


Figure E-4-2. ARC-IT Interfaces Diagram – Electric Charging Station

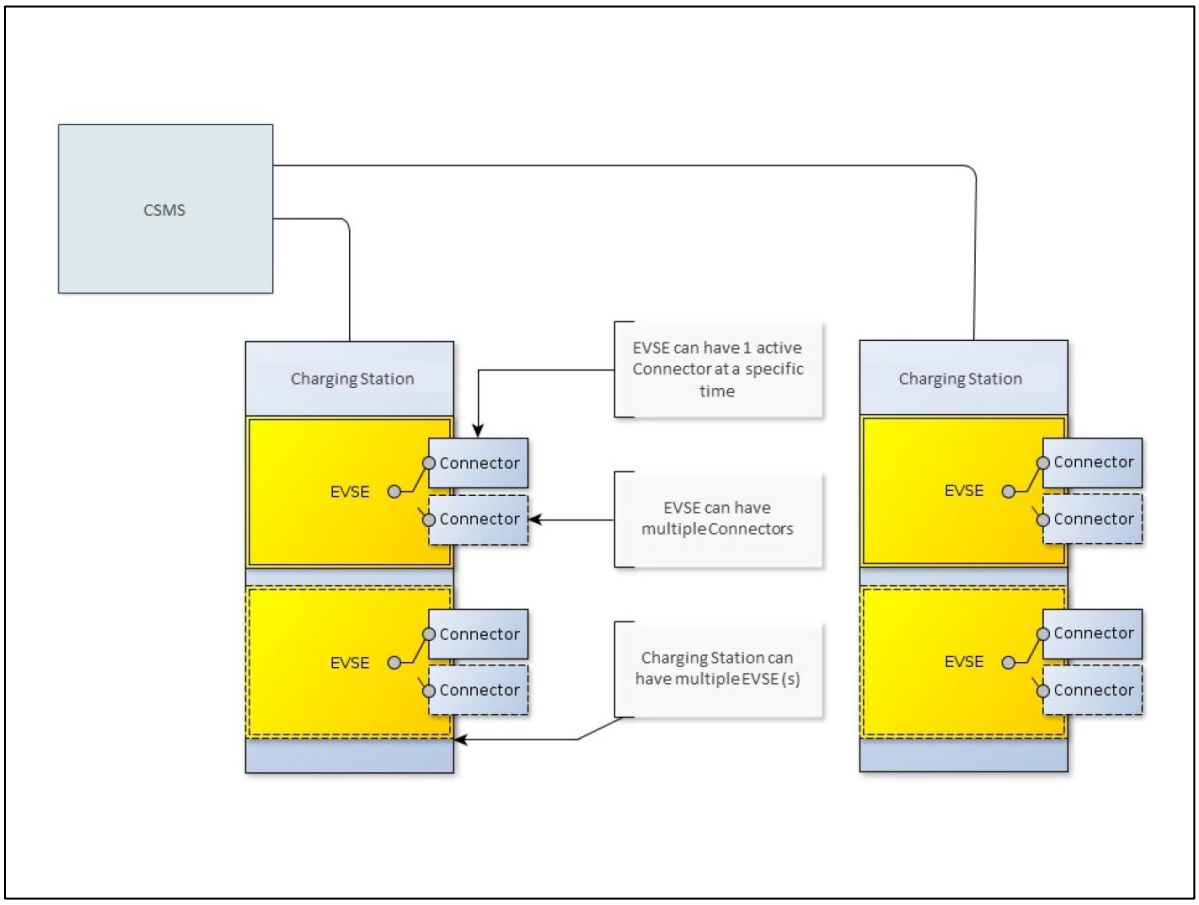


Figure E-4-3. 3-tier model as used in OCPP

CHAPTER 5. CYBERSECURITY REQUIREMENTS

This section contains mandatory cybersecurity requirements the CSO must fulfill. These requirements exist to fulfill the following cybersecurity provisions:

- Cybersecurity considerations present in the *NEVI Formula Program* and requirements defined the *Notice of Proposed Rulemaking (NPRM)* of *Title 23 CFR Part 680*.[lxxiv] View *Appendix B* for exact definitions.
- Device Class 5 Areas[lxxv] (security Controls) defined in the *National ITS Architecture Reference/Architecture Reference for Cooperative and Intelligent Transportation* (ARC-IT) for *Electric Charging Station*[lxxvi] and *Vehicle Payment Service*.[lxxvii] View *Appendix B* for exact definitions.

The mandatory cybersecurity requirements are detailed in section *REQUIREMENT SUBMISSION GUIDELINES* below, and steps include:

1. Submission of NIST SP 800-53A Assessment[lxxviii]
2. Fulfillment of Cybersecurity Compliance Controls Table
3. Security Testing and Assessment – NISP SP 800-115[lxxix]

Though these requirements may be addressed in any order, it is RECOMMENDED that the CSO address each requirement in numerical order. By completing step 1 *Submission of NIST SP 800-53A Assessment* first, this significantly expedites step 2 *Fulfillment of Cybersecurity Compliance Controls Table*.

REQUIREMENT SUBMISSION GUIDELINES

Submission of NIST SP 800-53A Assessment

The CSO is required to submit the attached *NIST SP 800-53A* assessment spreadsheet, fulfilling each control listed in ***Table E-6A-1. Cybersecurity Control Baseline*** in Appendix A. Fulfillment of each control must be met for each component as applicable. If a control is deemed as non-applicable for one or more components, then CSO must provide further detail in *Column I – "EXPLANATION & COMMENTS"* of the assessment document. For certain requirements with no present control, the CSO must provide a detailed explanation as to how exactly they are meeting the requirement for each component. While this baseline has been designed to incorporate PCI-DSS required controls outlined in ADOT P8130, the CSO shall be responsible for putting further controls in place as required by the latest version of the PCI DSS for payment systems.

While assessing each control, the CSO MUST annotate in *Column I – "EXPLANATION & COMMENTS"* how each control is applying to each component.

Cybersecurity Compliance Controls Table

Each requirement listed in the Cybersecurity Compliance Controls Table must be addressed and filled out in full by the CSO.

Column/Field Descriptions & Requirements

Cybersecurity Compliance Controls Table Columns	
Column	Description
#	Numeric identifier of each requirement.
Requirement	The stated cybersecurity requirement which must be met by the CSO.
Baseline Controls	The controls which fulfill the stated requirement.
Comp. Code	Component code for each component a requirement applies to. The codes are as follows: - *CS*: EV Charging Station - *MS*: CSMS - *PS*: Vehicle Payment Service - *PA*: Payment Administration Center If one of more of the components listed above are deemed as non-applicable to the charging station deployment by the CSO, then the CSO must provide in detail which components meet non-applicable status and a detailed explanation as to why it's non-applicable. This explanation must be provided in the column titled "**Compliance Description**" on how they are to meet said requirement. The CSO may also add listed component codes to this cell which weren't previously listed by default and must provide a detailed explanation on that component's inclusion into the requirement. Requirements will apply to all newly added component(s).
Compliance Status	CSO must denote compliance status by inputting a bold and capitalized **X** in the sub-column: - **Yes** if the requirement is fully and strictly met for all listed component codes for the relevant requirement. - **No** if requirements are not fully and strictly met for 1 or more of the listed component codes for the relevant requirement.
Compliance Description	This is where the CSO must describe: - Compliance status. - Plan to address compliance for the relevant requirement item. - Any components which are deemed as *non-applicable* for the charging infrastructure deployment and a detailed explanation as to why. - Any added components outside of the default listed components which are deemed as applicable to the charging infrastructure deployment, and a detailed explanation as to why. Each cell contains default pre-filled text which may contain additional information or description needs which the CSO must address in their entry.

Cybersecurity Compliance Controls Table

#	Requirement	Initial Control Baseline	Comp. Code	Compliance Status		Compliance Description
				Yes	No	
1	Ensure contactless remote payment methods are secure.	NIST SP 800-53 Control Numbers: AC-4;AC-10;AC-25;CA-2;CA-7;CA-8;PE-3;PL-8;PM-4;RA-3;RA-5;SA-3;SA-4SA-5;SA-8;SA-10;SA-11;SA-15;SA-17;SC-7;SI-2;SI-3:SI-4;SI-5;SI-12; SI-13; SI-14; SI-16; SI-17;SR-2;SR-3;SR-4;SR-5:SR-6;SR-7;SR-8;SR-9;SR-10	CS; MS; PS; PA			A detailed plan shall be provided that addresses how contactless payment methods will be secured on the charging station. Include payment methods applicable to the charging station in explanation (i.e., mobile app, terminal payment, etc). This plan shall additionally incorporate and maintain compliance with all elements of the latest versions of PCI DSS and PCI SCC.
2	Physical security strategies to address EV charging station tampering and unauthorized access.	NIST SP 800-53 Control Numbers: PE-1;PE-2;PE-3;PE-4;PE-5;PE-6;PE-8;PE-9;PE-10;PE-11;PE-12;PE-13;PE-14;PE-15;PE-16;PE-17;PE-18	CS			A detailed plan shall be provided that addresses physical security strategies of the charging station.
3	Cybersecurity strategies to address user identity and access management, selection of appropriate encryption systems, intrusion and malware detection, event logging and reporting,	NIST SP 800-53 Control Numbers: AC-1;AC-2;AC-3;AC-5;AC-6;AC-7;AC-8;AC-10;AC-11;AC-12;AC-	CS; MS; PS			A detailed plan shall be provided that addresses user identity and access management, selected encryption systems, intrusion and malware detection, event logging and reporting,

	management of software updates, and secure operation during communication outages.	14;AC-17;AC-18;AC-19;AC-20;AC-21;AC-22;AU-1;AU-2;AU-3;AU-4;AU-5;AU-6;AU-7;AU-8;AU-9;AU-10;AU-11;AU-12;IA-1;IA-2;IA-3;IA-4;IA-5;IA-6;IA-7;IA-8;IA-11;IA-12;MA-1;MA-2;MA-3;MA-4;MA-5;MA-6;SI-1;SI-2;SI-3;SI-4;SI-5;SI-6;SI-7;SI-8;SI-10;SI-11;SI-12;SI-16;SI-18				management of software updates, and secure operation during communication outages. To address "…secure operation during communication outages" describe the plan in detail on how you will persist service under this circumstance.
4	Ensure secure collection, processing, and retention of only the personal information strictly necessary to provide charging service to the customer, to include information required to complete the charging transaction.	NIST SP 800-53 Control Numbers**:** AC-1;AC-2;AC-3;AC-5;AC-6;AC-7;AC-8;AC-10;AC-11;AC-12;AC-14;AC-17;AC-18;AC-19;AC-20;AC-21;AC-22;AT-1;AT-2;AT-3;AT-4;AU-1;AU-2;AU-3;AU-4;AU-5;AU-6;AU-7;AU-8;AU-9;AU-10;AU-11;AU-12;CA-1;CA-2;CA-3;CA-5;CA-6;CA-7;CA-8;CA-9;IR-1;IR-2;IR-3;IR-4;IR-5;IR-6;IR-7;IR-8;MP-1;MP-	CS; MS; PS; PA			A detailed plan shall be provided that addresses how the charging station will account for and enact secure collection, processing, and retention of personal information strictly necessary to provide charging service.

		2;MP-3;MP-4;MP-5;MP-6;MP-7;PL-1;PL-2;PL-4;PL-8;PL-10;PL-11;PM-3;PM-5;PM-18;PM-19;PM-20;PM-21;PM-22;PM-24;PM-25;PM-26;PM-27;PT-2;PT-3;PT-4;PT-5;PT-6;SA-1;SA-2;SA-3;SA-4;SA-5;SA-8;SA-9;SA-10;SA-11;SA-15;SA-16;SA-17;SA-21;SA-22;SI-1;SI-2;SI-3;SI-4;SI-5;SI-6;SI-7;SI-8;SI-10;SI-11;SI-12;SI-16;SI-18				
5	Enact *Charger-to-Charger-Network* communications using a secure communication method.	NIST SP 800-53 Control Numbers: SC-1;SC-2;SC-3;SC-4;SC-5;SC-7;SC-8;SC-10;SC-12;SC-13;SC-15;SC-17;SC-18;SC-20;SC-21;SC-22;SC-23;SC-24;SC-28;SC-39	CS; MS			A detailed plan shall be provided that addresses how the charging station will secure communications to its charging network.
6	Ensure charging stations have the ability to receive and implement secure remote software updates, conduct real-time protocol translations, encryption and decryption, authentication, and	NIST SP 800-53 Control Numbers: AC-1;AC-2;AC-3;AC-5;AC-6;AC-7;AC-8;AC-10;AC-11;AC-12;AC-14;AC-17;AC-	CS; MS			A detailed plan shall be provided that addresses how the charging station will secure remote software update receipt and implementation, conducts real-time protocol translations, handles encryption and

	authorization in their communications with charging networks.	18;AC-19;AC-20;AC-21;AC-22;AU-1;AU-2;AU-3;AU-4;AU-5;AU-6;AU-7;AU-8;AU-9;AU-10;AU-11;AU-12;IA-2;IA-3;IA-4;IA-5;IA-6;IA-7;IA-8;IA-11;IA-12;MA-1;MA-2;MA-3;MA-4;MA-5;MA-6;SC-1;SC-2;SC-3;SC-4;SC-5;SC-7;SC-8;SC-10;SC-12;SC-13;SC-15;SC-17;SC-18;SC-20;SC-21;SC-22;SC-23;SC-24;SC-28;SC-39;SI-1;SI-2;SI-3;SI-4;SI-5;SI-6;SI-7;SI-8;SI-10;SI-11;SI-12;SI-16;SI-18				decryption, enacts authentication and authorization in communications within their charging networks.
7	Ensure charging stations and charging networks securely measure, communicate, store, and report energy and power dispensed, real-time charging-port status, real-time price to the customer, and historical charging-port uptime.	NIST SP 800-53 Control Numbers: AC-1;AC-2;AC-3;AC-5;AC-6;AC-7;AC-8;AC-10;AC-11;AC-12;AC-14;AC-17;AC-18;AC-19;AC-20;AC-21;AC-22;SC-1;SC-2;SC-3;SC-4;SC-5;SC-7;SC-8;SC-10;SC-12;SC-13;SC-15;SC-17;SC-18;SC-	CS; MS			A detailed plan shall be provided that addresses how the charging station securely measures, stores, communicates, and reports required information within their charging networks.

		20;SC-21;SC-22;SC-23;SC-24;SC-28;SC-39				
8	Ensure charging stations utilize appropriate cybersecurity use cases and requirements in their communications with any charging network provider.	OCPP v2.0.1 Part 2 – Section A2 "*Use cases & Requirements"*	CS			List and provide detail here regarding which applicable use cases and requirements are fulfilled and how. Additionally, list and provide detail regarding which use cases and requirements are deemed non-applicable to your charging station system.
9	Ensure charging stations are designed to securely switch charging network providers without any changes to hardware.	N/A	CS; MS			A detailed plan shall be provided that addresses the design strategy for securely switching charging network providers without any changes to hardware.
10	Ensure the charging network must be capable of communicating with other charging networks to enable an EV operator to utilize a single credential to charge at charging stations that are a part of multiple charging networks.	N/A	CS; MS; PS			A detailed plan shall be provided that addresses how the charging network will enable utilization of a single credential for EV operators to charge at charging stations that are a member of multiple charging networks.
11	Ensure charging networks are capable of secure communication with electric utilities, other energy providers, or local energy management systems.	NIST SP 800-53 Control Numbers: SI-1; SI-2;SI-3;SI-4;SI-5;SI-6;SI-7;SI-8;SI-10;SI-11;SI-12;SI-16;SI-18;SR-1;SR-2;SR-3;SR-5;SR-6;SR-8;SR-9;SR-10;SR-11;SR-12	CS; MS			A detailed plan shall be provided that addresses how the charging network will secure it's communication with electric utilities, energy providers, and local energy management systems.

Security Testing and Assessment - NIST SP 800-115

Active assessment and testing of security controls and policies from both procedural and technical standpoints are critical to verify proper security control implementation and procedure compliance, as well as to demonstrate their practical effectiveness against modern cyber-attack methodologies. NIST SP 800-115 shall be utilized by system integrators, vendors and owners (CSO) of EV charging infrastructure as the guiding standard for security testing and assessment of their equipment and networks. For vendors, efforts shall include code reviews, periodic vulnerability analysis and security testing (white box and black box) of their equipment. For the CSO and system integrators, similar assessment efforts shall be conducted at the system level, with a primary focus on the network, interfaces, and site-specific configuration. Vulnerability scanning and penetration testing shall be conducted at both the equipment level (by the vendor) and at the system/network level (internal and external) by a professionally certified tester (e.g., OSCP, PNPT, eCPPT, or similarly qualified with demonstrated hands-on experience) using modern techniques, frameworks, and tools.

The CSO shall both develop cybersecurity assessment plans in accordance with section 6 of NIST SP 800-115. Assessment planning shall adhere to the following steps, which are quoted from section 6.7 of this standard:

- **Developing a security assessment policy.** Organizations should develop an information security assessment policy to provide direction and guidance for their security assessments. This policy should identify security assessment requirements and hold accountable those individuals responsible for ensuring that assessments comply with the requirements. The approved policy should be disseminated to the appropriate staff, as well as third parties who are to conduct assessments for the organization. The policy should be reviewed at least annually and whenever there are new assessment-related requirements.
- **Prioritizing and scheduling assessments.** Organizations should decide which systems should undergo assessments and how often these assessments should be done. This prioritization is based on system categorization, expected benefits, scheduling requirements, applicable regulations where assessment is a requirement, and resource availability. Technical considerations can also help determine assessment frequency, such as waiting until known weaknesses are corrected or a planned upgrade to the system is performed before conducting testing.
- **Selecting and customizing technical testing and examination techniques.** There are many factors for organizations to consider when determining which techniques should be used for a particular assessment. Factors include the assessment objectives, the classes of techniques that can obtain information to support those objectives, and the appropriate techniques within each class. Some techniques also require the organization to determine the assessors' viewpoint (e.g., internal versus external) so that corresponding techniques can be selected.
- **Determining the logistics of the assessment.** This includes identifying all required resources, including the assessment team; selecting environments and locations from which to perform the assessment; and acquiring and configuring all necessary technical tools. - Developing the assessment plan. The assessment plan documents the activities planned for an assessment and other related information. A plan should be developed for every assessment to provide the rules and boundaries to which assessors must adhere. The plan should identify the systems and

networks to be assessed, the type and level of testing permitted, logistical details of the assessment, data handling requirements, and guidance for incident handling. -

- **Addressing any legal considerations.** Organizations should evaluate potential legal concerns before commencing an assessment, particularly if the assessment involves intrusive tests (e.g., penetration testing) or if the assessment is to be performed by an external entity. Legal departments may review the assessment plan, address privacy concerns, and perform other functions in support of assessment planning.

The CSO SHALL, in concert with the requirement defined in section 3544 of the *Federal Information Security Modernization Act of 2014*,[lxxx] conduct "periodic testing and evaluation of the effectiveness of information security policies, procedures, and practices, to be performed with a frequency depending on risk, but no less than annually." This is echoed in the recommendation provided by NIST SP 800-115, which also recommends conducting such reviews "whenever there are new assessment-related requirements." NIST SP 800-53 provides further recommendations regarding the frequency of conducting security assessments. Vulnerability scanning and penetration testing shall be part of the activities conducted at least annually.

Assessments for payment systems must additionally comply with all PCI-DSS requirements. A PCI Security Standards Council (SCC) certified Quality Security Assessor (QSA) shall be utilized to determine the appropriate assessment frequency of EV charging payment systems, to verify that the latest PCI DSS requirements are being properly met, and to review/recommend changes to plans and controls as required for the payment system to maintain PCI DSS compliance. Payment software must additionally comply with PCI SSC Software Standards.

CSO SHALL also actively monitor and react to threat intelligence (including new CVEs and ICS-CERT advisories related to elements of their systems) which may necessitate re-assessment of their equipment and/or networks and may require patching or re-configuration to mitigate risk from emerging threats. Vendors shall immediately inform owners of any such information that may adversely impact their systems and provide guidance for temporary and long-term mitigation of associated risks.

CHAPTER 6. APPENDICES

APPENDIX A – CYBERSECURITY BASELINE

Table E-6A-1 contains a listing of identifiers for cybersecurity control families and their enhancements for environments with a ***High*** security control baseline in accordance with NIST SP 800-53B r5, which has been further modified to include additional controls to meet requirements of *Title 23 CFR Part 680*, *Title 23 CFR Part 940*, and the *Statewide Policy (8130): System Security Acquisition and Development.*

Table E-6A-1. Cybersecurity Control Baseline

CYBERSECURITY CONTROL BASELINE		
Control Number	Control Name	Initial Control Baselines
Access Control		
AC-1	Policy and Procedures	AC-1
AC-2	Account Management	AC-2 (1) (2) (3) (4) (5) (11) (12) (13)
AC-3	Access Enforcement	AC-3
AC-4	Information Flow Enforcement	AC-4 (4)
AC-5	Separation of Duties	AC-5
AC-6	Least Privilege	AC-6 (1) (2) (3) (5) (7) (9) (10)
AC-7	Unsuccessful Logon Attempts	AC-7
AC-8	System Use Notification	AC-8
AC-10	Concurrent Session Control	AC-10
AC-11	Device Lock	AC-11 (1)
AC-12	Session Termination	AC-12
AC-14	Permitted Actions Without Identification or Authentication	AC-14
AC-17	Remote Access	AC-17 (1) (2) (3) (4)
AC-18	Wireless Access	AC-18 (1) (3) (4) (5)
AC-19	Access Control for Mobile Devices	AC-19 (5)
AC-20	Use of External Systems	AC-20 (1) (2)
AC-21	Information Sharing	AC-21
AC-22	Publicly Accessible Content	AC-22
Awareness and Training		
AT-1	Policy and Procedures	AT-1
AT-2	Literacy Training and Awareness	AT-2 (2) (3)
AT-3	Role-based Training	AT-3
AT-4	Training Records	AT-4
Audit and Accountability		
AU-1	Policy and Procedures	AU-1
AU-2	Event Logging	AU-2
AU-3	Content of Audit Records	AU-3 (1)
AU-4	Audit Log Storage Capacity	AU-4

AU-5	Response to Audit Logging Process Failures	AU-5 (1) (2)
AU-6	Audit Record Review, Analysis, and Reporting	AU-6 (1) (3) (5) (6)
AU-7	Audit Record Reduction and Report Generation	AU-7 (1)
AU-8	Time Stamps	AU-8
AU-9	Protection of Audit Information	AU-9 (2) (3) (4)
AU-10	Non-repudiation	AU-10
AU-11	Audit Record Retention	AU-11
AU-12	Audit Record Generation	AU-12 (1) (3)
Assessment, Authorization, and Monitoring		
CA-1	Policy and Procedures	CA-1
CA-2	Control Assessments	CA-2
CA-3	Information Exchange	CA-3 (6)
CA-5	Plan of Action and Milestones	CA-5
CA-6	Authorization	CA-6
CA-7	Continuous Monitoring	CA-7 (1) (4)
CA-8	Penetration Testing	CA-8 (1)
CA-9	Internal System Connections	CA-9
Configuration Management		
CM-1	Policy and Procedures	CM-1
CM-2	Baseline Configuration	CM-2 (2) (3) (7)
CM-3	Configuration Change Control	CM-3 (1) (2) (4) (6)
CM-4	Impact Analyses	CM-4 (1) (2)
CM-5	Access Restrictions for Change	CM-5 (1)
CM-6	Configuration Settings	CM-6 (1) (2)
CM-7	Least Functionality	CM-7 (1) (2) (5)
CM-8	System Component Inventory	CM-8 (1) (2) (3) (4)
CM-9	Configuration Management Plan	CM-9
CM-10	Software Usage Restrictions	CM-10
CM-11	User-installed Software	CM-11
CM-12	Information Location	CM-12 (1)
Contingency Planning		
CP-1	Policy and Procedures	CP-1
CP-2	Contingency Plan	CP-2 (1) (2) (3) (5) (8)
CP-3	Contingency Training	CP-3 (1)
CP-4	Contingency Plan Testing	CP-4 (1) (2)
CP-6	Alternate Storage Site	CP-6 (1) (2) (3)
CP-7	Alternate Processing Site	CP-7 (1) (2) (3) (4)
CP-8	Telecommunications Services	CP-8 (1) (2) (3) (4)
CP-9	System Backup	CP-9 (1) (2) (3) (5) (8)
CP-10	System Recovery and Reconstitution	CP-10 (2) (4)
Identification and Authentication		
IA-1	Policy and Procedures	IA-1

IA-2	Identification and Authentication (organizational Users)	IA-2 (1) (2) (5) (8) (12)
IA-3	Device Identification and Authentication	IA-3
IA-4	Identifier Management	IA-4 (4)
IA-5	Authenticator Management	IA-5 (1) (2) (6)
IA-6	Authentication Feedback	IA-6
IA-7	Cryptographic Module Authentication	IA-7
IA-8	Identification and Authentication (non-organizational Users)	IA-8 (1) (2) (4)
IA-11	Re-authentication	IA-11
IA-12	Identity Proofing	IA-12 (3) (4) (5)
Incident Response		
IR-1	Policy and Procedures	IR-1
IR-2	Incident Response Training	IR-2 (1) (2)
IR-3	Incident Response Testing	IR-3 (2)
IR-4	Incident Handling	IR-4 (1) (4) (11)
IR-5	Incident Monitoring	IR-5 (1)
IR-6	Incident Reporting	IR-6 (1) (3)
IR-7	Incident Response Assistance	IR-7 (1)
IR-8	Incident Response Plan	IR-8
Maintenance		
MA-1	Policy and Procedures	MA-1
MA-2	Controlled Maintenance	MA-2 (2)
MA-3	Maintenance Tools	MA-3 (1) (2) (3)
MA-4	Nonlocal Maintenance	MA-4 (3)
MA-5	Maintenance Personnel	MA-5 (1)
MA-6	Timely Maintenance	MA-6
Media Protection		
MP-1	Policy and Procedures	MP-1
MP-2	Media Access	MP-2
MP-3	Media Marking	MP-3
MP-4	Media Storage	MP-4
MP-5	Media Transport	MP-5
MP-6	Media Sanitization	MP-6 (1) (2) (3) (7) (8)
MP-7	Media Use	MP-7
Physical and Environmental Protection		
PE-1	Policy and Procedures	PE-1
PE-2	Physical Access Authorizations	PE-2
PE-3	Physical Access Control	PE-3 (1)
PE-4	Access Control for Transmission	PE-4
PE-5	Access Control for Output Devices	PE-5
PE-6	Monitoring Physical Access	PE-6 (1) (4)
PE-8	Visitor Access Records	PE-8 (1)
PE-9	Power Equipment and Cabling	PE-9
PE-10	Emergency Shutoff	PE-10
PE-11	Emergency Power	PE-11 (1)

PE-12	Emergency Lighting	PE-12
PE-13	Fire Protection	PE-13 (1) (2)
PE-14	Environmental Controls	PE-14
PE-15	Water Damage Protection	PE-15 (1)
PE-16	Delivery and Removal	PE-16
PE-17	Alternate Work Site	PE-17
PE-18	Location of System Components	PE-18
Planning		
PL-1	Policy and Procedures	PL-1
PL-2	System Security and Privacy Plans	PL-2
PL-4	Rules of Behavior	PL-4
PL-8	Security and Privacy Architectures	PL-8
PL-10	Baseline Selection	PL-10
PL-11	Baseline Tailoring	PL-11
Program Management		
PM-3	Information Security and Privacy Resources	PM-3
PM-5	System Inventory	PM-5 (1)
PM-18	Privacy Program Plan	PM-18
PM-19	Privacy Program Leadership Role	PM-19
PM-20	Dissemination of Privacy Program Information	PM-20
PM-21	Accounting of Disclosures	PM-21
PM-22	Personally Identifiable Information Quality Management	PM-22
PM-24	Data Integrity Board	PM-24
PM-25	Minimization of Personally Identifiable Information Used in Testing, Training, and Research	PM-25
PM-26	Complaint Management	PM-26
PM-27	Privacy Reporting	PM-27
Personnel Security		
PS-1	Policy and Procedures	PS-1
PS-2	Position Risk Designation	PS-2
PS-3	Personnel Screening	PS-3
PS-4	Personnel Termination	PS-4 (2)
PS-5	Personnel Transfer	PS-5
PS-6	Access Agreements	PS-6
PS-7	External Personnel Security	PS-7
PS-8	Personnel Sanctions	PS-8
PS-9	Position Descriptions	PS-9
PII Processing and Transparency		
PT-2	Authority to Process Personally Identifiable Information	PT-2
PT-3	Personally Identifiable Information Processing Purposes	PT-3

PT-4	Consent	PT-4
PT-5	Privacy Notice	PT-5 (1) (2)
PT-6	System of Records Notice	PT-6
Risk Assessment		
RA-1	Policy and Procedures	RA-1
RA-2	Security Categorization	RA-2
RA-3	Risk Assessment	RA-3
RA-5	Vulnerability Monitoring and Scanning	RA-5 (2) (4) (5) (11)
RA-7	Risk Response	RA-7
RA-8	Privacy Impact Assessments	RA-8
RA-9	Criticality Analysis	RA-9
System and Services Acquisition		
SA-1	Policy and Procedures	SA-1
SA-2	Allocation of Resources	SA-2
SA-3	System Development Life Cycle	SA-3
SA-4	Acquisition Process	SA-4
SA-5	System Documentation	SA-5
SA-8	Security and Privacy Engineering Principles	SA-8
SA-9	External System Services	SA-9
SA-10	Developer Configuration Management	SA-10
SA-11	Developer Testing and Evaluation	SA-11
SA-15	Development Process, Standards, and Tools	SA-15 (3)
SA-16	Developer-provided Training	SA-16
SA-17	Developer Security and Privacy Architecture and Design	SA-17
SA-21	Developer Screening	SA-21
SA-22	Unsupported System Components	SA-22
System and Communications Protection		
SC-1	Policy and Procedures	SC-1
SC-2	Separation of System and User Functionality	SC-2
SC-3	Security Function Isolation	SC-3
SC-4	Information in Shared System Resources	SC-4
SC-5	Denial-of-service Protection	SC-5
SC-7	Boundary Protection	SC-7 (3) (4) (5) (7) (18) (21)
SC-8	Transmission Confidentiality and Integrity	SC-8 (1)
SC-10	Network Disconnect	SC-10
SC-12	Cryptographic Key Establishment and Management	SC-12 (1)
SC-13	Cryptographic Protection	SC-13
SC-15	Collaborative Computing Devices and Applications	SC-15
SC-17	Public Key Infrastructure Certificates	SC-17

SC-18	Mobile Code	SC-18
SC-20	Secure Name/address Resolution Service (authoritative Source)	SC-20
SC-21	Secure Name/address Resolution Service (recursive or Caching Resolver)	SC-21
SC-22	Architecture and Provisioning for Name/address Resolution Service	SC-22
SC-23	Session Authenticity	SC-23
SC-24	Fail in Known State	SC-24
SC-28	Protection of Information at Rest	SC-28 (1)
SC-39	Process Isolation	SC-39
System and Information Integrity		
SI-1	Policy and Procedures	SI-1
SI-2	Flaw Remediation	SI-2 (2)
SI-3	Malicious Code Protection	SI-3
SI-4	System Monitoring	SI-4 (2) (4) (5) (10) (12) (14) (20) (22)
SI-5	Security Alerts, Advisories, and Directives	SI-5 (1)
SI-6	Security and Privacy Function Verification	SI-6
SI-7	Software, Firmware, and Information Integrity	SI-7 (1) (2) (5) (7) (15)
SI-8	Spam Protection	SI-8 (2)
SI-10	Information Input Validation	SI-10
SI-11	Error Handling	SI-11
SI-12	Information Management and Retention	SI-12
SI-16	Memory Protection	SI-16
SI-18	Personally Identifiable Information Quality Operations	SI-18
Supply Chain Risk Management		
SR-1	Policy and Procedures	SR-1
SR-2	Supply Chain Risk Management Plan	SR-2 (1)
SR-3	Supply Chain Controls and Processes	SR-3
SR-5	Acquisition Strategies, Tools, and Methods	SR-5
SR-6	Supplier Assessments and Reviews	SR-6
SR-8	Notification Agreements	SR-8
SR-9	Tamper Resistance and Detection	SR-9 (1)
SR-10	Inspection of Systems or Components	SR-10
SR-11	Component Authenticity	SR-11 (1) (2)
SR-12	Component Disposal	SR-12

APPENDIX B. DEFINITIVE TEXT

The excerpts below are extracted from normative references in this document, and MUST NOT be accepted by the CSO as applicable cybersecurity requirements for the CSO, but instead the text is meant specifically as a reference.

The National Electric Vehicle Infrastructure (NEVI) Formula Program Guidance

Section III. STATE EV INFRASTRUCTURE DEPLOYMENT PLAN – B. Plan Format – Cybersecurity

This section of the Plan should discuss how the State will address cybersecurity. The Plan should identify considerations when software updates are made to ensure the station or vehicle is not compromised by malicious code, or that a vehicle infects other stations during future charges.

National Electric Vehicle Infrastructure (NEVI) Formula Program – Notice of Proposed Rulemaking (NPRM) - 23 C.F.R. § 680

§ 680.106 - Installation, operation, and maintenance by qualified technicians of electric vehicle charging infrastructure.

(f) Payment methods.

> *(1) Charging stations must provide for secure payment methods, accessible to persons with disabilities, which at a minimum shall include a contactless payment method that accepts major debit and credit cards, and Plug and Charge payment capabilities using the ISO 15118 standard (incorporated by reference, see § 680.120);*

(h) Security. States must implement physical and cybersecurity strategies consistent with their respective State EV Infrastructure Deployment Plans to mitigate charging infrastructure, grid, and consumer vulnerability associated with the operation of charging stations.

> *(1) Physical security strategies may address lighting, siting, driver and vehicle safety, fire prevention, tampering, charger locks, and illegal surveillance of payment devices.*
>
> *(2) Cybersecurity strategies may address user identity and access management, selection of appropriate encryption systems, intrusion and malware detection, event logging and reporting, management of software updates, and secure operation during communication outages.*

(k) Customer service. States must ensure that EV charging customers have mechanisms to report outages, malfunctions, and other issues with charging infrastructure. States must comply with the American with Disabilities Act of 1990 requirements and multilingual access when creating reporting mechanisms.

> *(l) Customer data privacy. Charging Station Operators must collect, process, and retain only that personal information strictly necessary to provide the charging service to a consumer, including information to complete the charging transaction and to provide*

the location of charging stations to the consumer. Charging Stations Operators must also take reasonable measures to safeguard consumer data.

§ 680.114 - Charging network connectivity of electric vehicle charging infrastructure.

(a) Charger-to-Charger-Network communication.

(1) Chargers must communicate with a charging network via a secure communication method.

(2) Chargers must have the ability to receive and implement secure, remote software updates and conduct real-time protocol translation, encryption and decryption, authentication, and authorization in their communication with charging networks.

(4) Chargers and charging networks must securely measure, communicate, store, and report energy and power dispensed, real-time charging-port status, real-time price to the customer, and historical charging-port uptime.

(5) Chargers must be capable of using Open Charge Point Protocol (OCPP) (incorporated by reference, see § 680.120) to communicate with any Charging Network Provider.

(6) Chargers must be designed to securely switch Charging Network Providers without any changes to hardware.

(b) Charging-Network-to-Charging-Network communication. A Charging Network must be capable of communicating with other Charging Networks to enable an EV driver to use a single credential to charge at Charging Stations that are a part of multiple Charging Networks.

(c) Charging-Network-to-grid communication. Charging Networks must be capable of secure communication with electric utilities, other energy providers, or local energy management systems.

Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT)

Device Class 5 Areas

Device Class 5:

- *Confidentiality: HIGH*
- *Integrity: HIGH*
- *Availability: HIGH*

Devices of this class must meet controls from NIST 800-53 and ISO/IEC 15408 in the following areas:

- *Access Control*
- *Audit and Accountability*
- *Configuration Management*
- *Contingency Planning*
- *Identification and Authentication*
- *Incident Response*
- *Media Protection*
- *Personal Privacy*
- *Risk Assessment*
- *System and Services Acquisition*
- *System and Communications Protection*
- *System and Information Integrity*

In addition, organizations that develop, operate or maintain devices of this class must meet controls from NIST 800-53 and ISO/IEC 15408 the areas above and the following additional areas:

- *Awareness and Training*
- *[Security] Assessment and Authorization*
- *Maintenance*
- *Physical and Environmental Protection*
- *Planning*
- *Personnel Security*

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[lx] *23 CFR Part 940 Intelligent Transportation System Architecture and Standards.* Retrieved from https://www.ecfr.gov/current/title-23/chapter-I/subchapter-K/part-

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[lxxii] U.S. Department of Commerce, National institute of Standards and Technology (September 2008). *NIST SP 800-115 Technical Guide to Information Security Testing and Assessment*. Retrieved from https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-115.pdf

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Phase 2 Public Engagement Summary

December 13, 2022

Table of Contents

Prepared by

AECOM

ENGAGEMENT APPROACH

The Arizona Department of Transportation (ADOT) conducted a second phase of public engagement efforts in fall 2023 to present the approved Electric Vehicle (EV) Infrastructure Deployment Plan, referred to here as the EV Plan, and seek public input on potential additional EV corridors for inclusion in future phases of the EV Plan.

Two primary methods were used to seek input during this phase of the EV Plan:

1. A series of in-person open houses throughout the state
2. Virtual, online engagement through a public survey and the website.

The purpose of this outreach phase was to:

- Provide an overview of NEVI, the federal program funding the development of a statewide EV charging network in Arizona, and provide the public with an opportunity to have questions and comments addressed by the ADOT team and their consulting partners.
- Present the approved EV Plan, particularly the proposed locations for EV charging station construction and upgrade.
- Outline future steps in the EV Plan's implementation process.
- Seek public input on nominating non-Interstate roads on the state highway system to the federal network of alternative fuels corridors to be eligible for the use of NEVI funds to upgrade and build EV charging stations, as well as input on the payment options to be made available at EV charging stations and the availability of station information online, to help guide the ADOT team through key decisions in the EV Plan's implementation process.

Open House Information

Five in-person open house meetings were held across the state from late October through early November 2022. These meetings were supplemented by informational materials posted on the project website and an online survey that was available from mid-October through the end of November.

Engagement included five in-person open house events geographically spread out across the state. This provided an opportunity to learn about the EV Plan for the first time for members of the public who were unaware of or unable to participate in the July 2022 Virtual Public Meeting, while also updating those who had attended the July meeting with new information about the EV Plan.

The five open house events followed a similar format featuring:

- Twenty 24x36" informational exhibits arranged throughout the meeting space
- Staff from ADOT and their consulting partners, available to provide additional explanation about information presented and to answer questions
- A video of a narrated PowerPoint presentation, playing on repeat, summarizing the information covered in the exhibits
- Tables for event sign-in, receipt of an 11x17" printed factsheet, and filling out printed comment cards and completing either paper or digital versions of the accompanying public survey

The ADOT team provided equitable access to the information presented at the open houses. All printed materials were made available translated into Spanish, including printed packets containing a Spanish

version of all displayed exhibit boards. A Spanish-language version of the recorded presentation was also available for viewing upon request, and a Spanish-language translation of the survey was offered in print and online. Each event also featured bilingual team members who could answer questions in Spanish or provide directions and interpretation as needed. For deaf and hard-of-hearing attendees, both versions of the video presentation contained subtitles in their respective languages.

The open houses were held in five major cities spread across the state, with venues chosen for optimal convenience, accessibility, and ease of parking and navigation.

Table F-19 - Dates, Times, and Locations of Open Houses

Date	Time	City	Venue
October 19, 2022	5:00 – 7:00 p.m.	Tucson	Ramada by Wyndham
October 25, 2022		Yuma	Yuma City Hall
November 1, 2022		Kingman	Mohave County Administration
November 2, 2022		Flagstaff	Flagstaff Aquaplex
November 16, 2022		Phoenix	GateWay Community College

Notification

To promote the open houses, as well as the public survey and the EV Plan more generally, a range of notification methods were utilized to reach local and statewide audiences through both print and digital media.

ADOT utilized its own social media channels to send information to stakeholders and the public, including those who had signed up for updates through the plan website.

Advertisements were placed in print newspapers serving markets including and near to each of the five open house locations, with print dates approximately two weeks prior to the relevant event. The ads also provided a brief overview of the EV Plan, its website, and the different ways readers could contact the ADOT team for more information and to provide comment. Accommodation information in English and Spanish was included, and one ad was printed in Spanish in a Spanish-language publication (*TV y Más* by La Voz Arizona).

Table F-20 - Newspaper Advertisement Information

Meeting	Publication	Market	Date (2022)
Tucson	Copper Era	Greenlee County	September 28
	Eastern Arizona Courier	Safford area	September 28
	Sierra Vista Herald Review	Cochise County	September 28
	Arizona Daily Star	Tucson area	October 3
Yuma	Yuma Sun	Yuma area	October 10
Kingman	Mohave Valley Daily News	West Mohave County	October 18, 23, 26, and 30
	Kingman Daily Miner	Kingman area	October 26 and 30
Flagstaff	Arizona Daily Sun	Flagstaff area	October 16, 19, 23 and 26
	Navajo-Hopi Observer	Navajo and Hopi Nations and surrounding area	October 19 and 26
	Holbrook Tribune	South Navajo County	October 19 and 26
	Williams-Grand Canyon News	Williams, Grand Canyon area	October 19 and 26
Phoenix	Arizona Republic	Phoenix area, statewide	October 31, November 2 and 4
	TV y Más (La Voz Arizona)	Phoenix area	November 4

Statewide online advertising was also placed in the *USA Today* media network through the Arizona Republic's ad services agency, LocalIQ; doing this enabled ads to be displayed to Arizonans who visited the websites of a wide range of local and national news outlets from across the country. These ads ran through the month of November 2022 and advertised the EV Plan website and public survey.

Website

All information and opportunities for comment that were available at the open houses were also made available on the EV Plan website. This allowed for members of the public who were interested in the plan but unable to attend an open house to replicate the experience as closely as possible, ensuring equity and accessibility in access to information. Items posted to the website included PDF versions of all informational exhibits in English and Spanish, both English and Spanish versions of the presentation video, copies of the EV Plan fact sheet in both languages, and contact information and survey links for providing feedback. This was in addition to content already posted to the website, such as a draft of the EV Plan with supporting maps and materials from previous engagement.

Public Survey

To achieve the goal of seeking public input on EV Plan implementation, a public survey was launched through the online platform SurveyMonkey. This survey was promoted through all event notifications and digital advertisements, as well as through the project website. A survey station was present at all open houses as well, which featured signage with QR codes to scan to take the survey on mobile devices and paper copies of the survey for those who were unable to or preferred not to complete the survey digitally. The factsheet also included information for accessing the survey for attendees who preferred to complete it afterwards. Aside from providing their ZIP Code, respondents were able to skip any question that they did not wish to answer. The full text of the survey is included in Appendix E.

PARTICIPATION SUMMARY

The five open houses hosted a total of 178 attendees based on event sign-in sheets. Attendees included the general public as well as representatives of community groups and businesses. All five events were also attended by staff from local print, radio, and/or television news; these attendees are not included in the total.

Table F-21 - Open House Attendance Counts

City	Tucson	Yuma	Kingman	Flagstaff	Phoenix	Total
Attendees	42	10	40	16	70	**178**

The public survey received 1,423 submissions, with 1,385 completed online through SurveyMonkey and 38 paper surveys completed in person at the five open houses. To help ADOT better understand the communities being reached in public involvement, the online survey featured a self-ID question for respondents to indicate the racial/ethnic groups they belong to. The self-ID question was optional and based on how individuals identify themselves. This question was completed by 1,011 respondents, a response rate of 73.0%, with 60 respondents (5.9%) selecting two or more options.

Table F-22 - Online Survey Self-ID Results

Options	White	African American/ Black	American Indian/ Alaskan Native	Native Hawaiian/ Pacific Islander	Asian	Hispanic/ Latino
Responses	883 (87.3%)	36 (3.6%)	39 (3.9%)	14 (1.4%)	44 (4.4%)	96 (9.5%)

A paper version of the self-ID question was also available at the open houses for attendees to fill out. This was filled out by 60 attendees, a rate of 33.7%, with two attendees (3.3%) selecting two or more options.

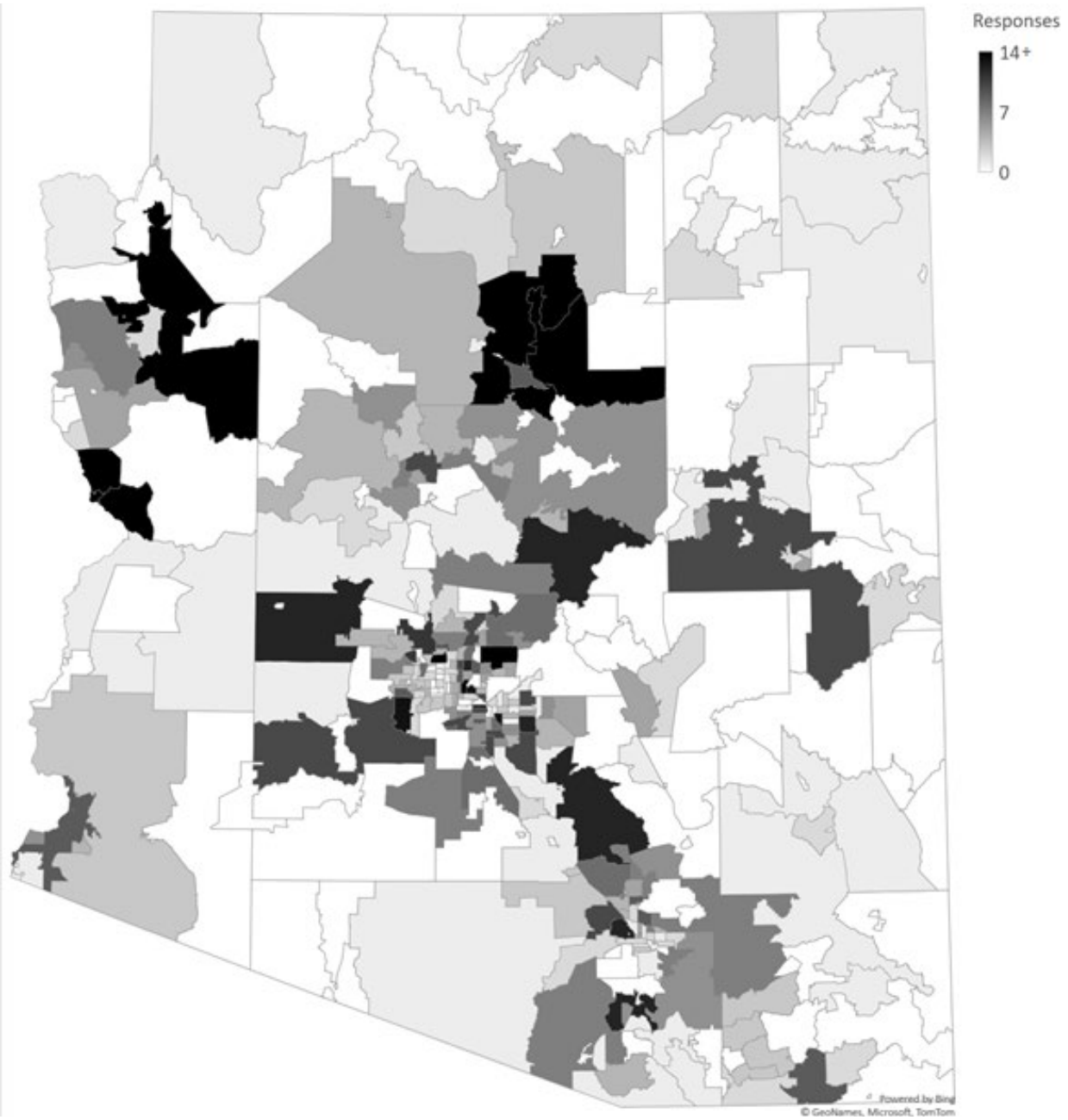
Table F-23 - In-Person Self-ID Results

City	White	African American/ Black	American Indian/ Alaskan Native	Native Hawaiian/ Pacific Islander	Asian	Hispanic/ Latino
Tucson	3 (60.0%)	1 (20%)		1 (20%)	1 (20%)	
Yuma	4 (66.7%)	1 (16.7%)				1 (16.7%)
Kingman	9 (81.8%)	1 (9.1%)				1 (9.1%)
Flagstaff	12 (100%)					1 (8.3%)
Phoenix	23 (85.2%)	1 (3.7%)				3 (11.1%)
Total	**51 (85.0%)**	**4 (6.7%)**	**0 (0%)**	**1 (1.7%)**	**1 (1.7%)**	**7 (11.7%)**

The survey also asked for the respondent's ZIP Code to determine a geographic breakdown of responses throughout the state. The majority of responses (1,363 or 96.5%) were from ZIP Codes within the state of Arizona. Surveys were received from a broad geographic area across Arizona with 258 Arizona ZIP Codes represented.

Figure F-1 displays the locations of ZIP Codes in Arizona where responses were received from, shaded according to the number of responses.

Figure F-1 - Map of Survey Respondents by ZIP Code



The survey also asked respondents to describe themselves using a provided list of descriptors (presented in Table F-6). 1,421 respondents (99.9%) indicated that at least one descriptor applied, and 744 (52.3%) selected multiple options.

Figure F-6 - Descriptor Question Responses

Descriptor	Responses
Arizona resident (full- or part-time)	1,349 (94.8%)
Non-Arizona resident	50 (3.5%)
Live in urban/suburban area	436 (30.6%)
Live in rural area	294 (20.7%)
Electric vehicle industry representative	22 (1.5%)
Construction contractor, subcontractor, or supplier	25 (1.8%)
Local municipality, regional, state, or federal agency	49 (3.4%)
Tribal member	17 (1.2%)
Other (please specify)	88 (6.2%)

Typical 'other' responses include 'EV Owner', 'Retiree', and clarification on residency such as 'Snowbird'.

Respondents were also asked if their interest in the EV Plan was personal or if they represented a company or organization that is interested in the plan. 1,398 (98.2%) responses were received for this question.

Table F-7 - Plan Interest Question Responses

Option	Personal Interest	Representing a Company or Organization
Responses	1,279 (91.5%)	129 (9.2%)

10 paper survey respondents selected both; selecting both was not possible with the digital survey

The final question asking about the respondents themselves was whether they own an electric vehicle and, if not, if they were interested in owning one in the future. This question received 1,419 responses (99.7%).

Table F-8 - Vehicle Ownership Question Responses

Option	Responses
I own at least one electric vehicle	506 (35.7%)
Only own other vehicles, interested in owning an electric vehicle	480 (33.8%)
Only own other vehicles, not interested in owning an electric vehicle	380 (26.8%)
None of the above	54 (3.8%)

One paper survey respondent selected multiple options; this was not possible with the digital survey

In addition to the survey, comment cards were available for open house attendees to fill out, the full text of which is available in Appendix D. A total of 19 comment cards were received across all five open houses.

What We Heard

The public survey was the primary method for public input in this round of engagement. In addition to the questions which sought information about the respondent, addressed in Section 2 of this report, four questions aimed to gather input on plan implementation and future steps in the decision-making process. For the complete text of each question, see Appendix E.

The first question discussed the criteria that should be used for prioritizing nominating non-interstate roadways as alternative fuel corridors, which would qualify them for NEVI-funded EV charging stations.

Respondents were asked to score the importance of seven different criteria on a scale of 1 to 5, with 1 being 'least important' and 5 being 'most important'. **There was little separation in the average scores between the seven criteria, indicating the public believes each of these criteria are of equal importance in prioritizing future alternative fuel corridors.** The best-rated criterion was only 0.4 ahead of the worst-rated, and six of the seven were only separated by 0.15 points. A full breakdown of responses is available in Appendix A.

Table F-9 - Prioritization Criteria Question Responses

Proposed Criteria	Average Rating
Providing connectivity between Arizona and other states	3.56
Availability of existing services (convenience stores, restaurants, etc.) on route	3.55
Accessing major parks and tourist attractions/destinations	3.51
Connecting the Phoenix and Tucson metro regions with other AZ communities	3.47
Amount of vehicle traffic currently using the roadway	3.43
How feasible and cost-effective implementation would be	3.41
Connecting rural and tribal areas	3.16

Respondents were also able to suggest additional criteria for prioritizing the nomination of non-interstate roadways. 462 written comments were received, though some responses reiterated the listed criteria or discussed matters unrelated to the question. Common suggestions included:

- Connecting to communities projected for significant future growth
- Routes that can maintain station access during detours and constructions
- Heat, topography, and other factors that impact vehicle power consumption
- Presence of or feasibility for future green energy infrastructure
- Current and projected EV ownership concentration and infill opportunities between busy stations
- Spurring new tourism and economic growth
- Placing them near communities without fast charging options for local use, particularly in underserved areas and areas with high percentages of rental housing

Full text of these suggestions is available in Appendix B.

Next, respondents were presented with a list and a map of 23 roadways in the state and were asked to pick five that they would most like to see added to the electric vehicle charging network. The list of 23 roadways were the most common suggestions for additional network roadways identified through the July 2022 public survey and are also part of the National Highway System, a requirement for NEVI funding. Despite the prompt asking for five choices, respondents were able to select as many or as few as they liked; 1,023 respondents (71.9%) answered the question by providing at least one selection, with 93 of those (9.1%) selecting more than five. Figure F-11 ranks these roadways in order by number of responses.

Table F-10 - Additional Roadways Question Responses

Roadway	Selections	Selection Rate
SR 64: I-40 to Grand Canyon National Park	409	40.0%
SR 87: Phoenix to Payson	382	37.3%
SR 69: I-17 to Prescott	373	36.5%

SR 179: I-17 to Sedona	365	35.7%
US 89: Flagstaff to UT	353	34.5%
US 60: Phoenix to Wickenburg	275	26.9%
US 60: Phoenix to Globe	248	24.2%
US 93: Wickenburg to I-40	245	23.9%
US 93: Kingman to Hoover Dam	241	23.6%
SR 260: Payson to Show Low	238	23.3%
SR 85: I-8 to I-10	195	19.1%
US 160: US 89 to Four Corners	193	18.9%
SR 89/89A: SR 69/169 to north end of route	164	16.0%
SR 77: Tucson to Pinal County	161	15.7%
US 60: Show Low to NM	160	15.6%
SR 260: Camp Verde to Sedona	154	15.1%
SR 90: I-10 to Bisbee	149	14.6%
SR 347: Maricopa to I-10	137	13.4%
SR 287: Casa Grande to I-10	115	11.2%
SR 68: US 93 to Bullhead City	99	9.7%
US 95/SR 95: San Luis to Bullhead City	96	9.4%
SR 77: SR 260 to I-40	89	8.7%
SR 80: Bisbee to Douglas	71	6.9%

The third question asked respondents to identify the payment methods they believed should be provided at EV charging stations. Respondents were asked to rate the importance of five different payment methods on a scale of 1 to 5, with 1 being 'least important' and 5 being 'most important'. The average ratings show a preference for traditional, widely adopted payment methods. A full breakdown of responses is available in Appendix A.

Table F-11 - Payment Methods Question Responses

Proposed Payment Method	Average Rating
Chip-and-pin credit and debit cards	3.93
Contactless payment (tap-to-pay cards)	3.63
Phone-based payment like Apple Pay or Samsung Wallet	3.23
App-based payment method through charger network operator	2.98
Vehicle-based payment	2.93

The final topical question addressed which information about the stations and chargers should be available online. Respondents were asked to rate the importance of five different pieces of information on a scale of 1 to 5, with 1 being 'least important' and 5 being 'most important'. While the average ratings do show a stronger preference for some options, all five scored relatively high on the scale, suggesting that any information that can be provided is helpful. A full breakdown of responses is available in Appendix A.

Table F-12 - Online Information Question Responses

Proposed Online Information	Average Rating

Availability and hours of operation at location	4.23
Number/type of chargers currently available	4.23
Number/type of chargers currently installed at location	4.07
Charging pricing	3.72
Availability of services near the location	3.56

Respondents were also able to provide suggestions for online information beyond the five items listed. 287 written comments were received, though some responses reiterated the listed criteria or discussed matters unrelated to the question. Common suggestions included:

- Photos or live video of the charging site
- Estimated wait times and queue lengths
- Charger reliability information and when chargers were last verified as functional
- Accessibility, safety, and security features
- Amenities such as covered stations and cell phone or Wi-Fi service
- The source of the electricity powering the station

Several respondents, perhaps prompted by the previous question on payment methods, also requested cash payment options at stations. Full text of these suggestions is available in Appendix C.
As mentioned, 19 written comment cards were submitted at the five open houses, the full text of which is in Appendix D. Recurring topics addressed in these topics included:

- Suggestions for roadways to nominate for inclusion in the EV charging network
- Questions about bidding, contracting, and site selection
- Ensuring station reliability
- Improving access, and equity of access, to EV charging, and expanding EV adoption
- Station signage, amenities, and utilizing the best technology available

CONCLUSIONS AND NEXT STEPS

The Phase 2 fall 2022 round of engagement for the EV Plan was successful in reaching people in person and online across the state of Arizona.

The virtual survey in the fall round of outreach received 1,423 responses, which exceeds the combined total responses from the previous public survey (919) and its accompanying stakeholder survey (157). While the ADOT team is also guided by factors such as cost and feasibility in decision-making, public input is a vital factor that helps to establish priorities and generate new ideas and perspectives. Considering the number of responses and the focused nature of the questions, the ADOT team has identified a sense of public sentiment to guide decisions as they progress towards implementation. Particularly:

- No single proposed criteria for prioritizing future corridors is strongly supported or supported significantly more than others; respondents had many further ideas for the ADOT team to consider.
- The potential future corridors listed for preference, indicated a clear hierarchy , with the top five locations picked by more than one in three respondents and five more picked by more than one in five.
- Respondents strongly preferred more traditional methods of payment, with credit and debit cards—whether chip-and-pin or tap-to-pay—scoring highly, and many asking about cash options.

- Preferences for information available online strongly favored being able to ensure that chargers are available and functional, though high ratings for all options suggest all information is welcome.

In 2023, the ADOT team expects to establish contracts with private sector partners who will upgrade and construct new stations on interstate highways. The process of studying and nominating additional corridors will begin during this time as well.

APPENDIX A: RATINGS QUESTIONS RESPONSE BREAKDOWN

Criteria for Prioritizing Additional Corridors (1 = Least Important, 5 = Most Important)

Proposed Criteria	1	2	3	4	5	Average
Providing connectivity between Arizona and other states	221 (18.4%)	49 (4.1%)	177 (14.8%)	339 (28.3%)	413 (34.4%)	3.56
Availability of existing services (convenience stores, restaurants, etc.) on route	193 (16.0%)	80 (6.7%)	189 (15.7%)	349 (29.0%)	392 (32.6%)	3.55
Accessing major parks and tourist attractions/ destinations	209 (17.5%)	61 (5.1%)	186 (15.5%)	389 (32.5%)	352 (29.4%)	3.51
Connecting the Phoenix and Tucson metro regions with other AZ communities	227 (19.0%)	71 (6.0%)	207 (17.4%)	285 (23.9%)	403 (33.8%)	3.47
Amount of vehicle traffic currently using the roadway	186 (15.6%)	90 (7.5%)	281 (23.5%)	300 (25.1%)	337 (28.2%)	3.43
How feasible and cost-effective implementation would be	182 (15.2%)	112 (9.4%)	289 (24.1%)	259 (21.6%)	355 (29.7%)	3.41
Connecting rural and tribal areas	264 (22.2%)	119 (10.0%)	256 (21.5%)	268 (22.5%)	284 (23.8%)	3.16

Payment Methods at Charging Stations (1 = Least Important, 5 = Most Important)

Payment Method	1	2	3	4	5	Average
Chip-and-pin credit and debit cards	166 (14.2%)	37 (3.2%)	136 (11.6%)	211 (18.0%)	623 (53.1%)	3.93
Contactless payment (tap-to-pay cards)	192 (16.5%)	57 (4.9%)	198 (17.0%)	260 (22.3%)	458 (39.3%)	3.63
Phone-based payment like Apple Pay or Samsung Wallet	245 (21.3%)	104 (9.1%)	261 (22.7%)	224 (19.5%)	315 (27.4%)	3.23
App-based payment method through charger network operator	308 (26.8%)	127 (11.0%)	286 (24.8%)	193 (16.8%)	237 (20.6%)	2.98
Vehicle-based payment	300 (26.1%)	127 (11.1%)	256 (22.3%)	226 (19.7%)	240 (20.9%)	2.93

Station Information Available Online (1 = Least Important, 5 = Most Important)

Proposed Online Information	1	2	3	4	5	Average
Availability and hours of operation at location	125 (10.7%)	18 (1.5%)	63 (5.4%)	214 (18.3%)	748 (64.0%)	4.23
Number/type of chargers currently available	133 (11.4%)	12 (1.0%)	68 (5.8%)	199 (17.0%)	758 (64.8%)	4.23
Number/type of chargers currently installed at location	143 (12.2%)	22 (1.9%)	98 (8.4%)	252 (21.5%)	657 (56.1%)	4.07
Charging pricing	144 (12.3%)	61 (5.2%)	242 (20.7%)	256 (21.9%)	466 (39.9%)	3.72
Availability of services near the location	162 (13.9%)	76 (6.5%)	233 (20.0%)	337 (29.0%)	355 (30.5%)	3.56

APPENDIX B: FULL TEXT OF PRIORITIZATION CRITERIA WRITTEN RESPONSES

Some comments have been lightly edited for coarse language and ease of reading without affecting the intent of the comment.

Number	Comment
1	1. Land use - 1:1 ratio of land use to natural landscaping/park. 2. Multi-use facility - not just charging or food. 3. High speed internet - ability to work while charging. 4. Solar powered - should be minimum of 50% solar powered at each location or pay for solar within a certain radius.
2	24/7 manned, on-site security
3	A tax for these EV to use the streets and highways
4	A well planned approach to achieve the above combined goals
5	Abandon this waste of money.
6	Ability to connect charging stations to solar power supply.
7	Absolutely no to this. Ridiculous.
8	Access to all cities and towns in the state
9	Access to new tourism opportunities in rural areas (e.g., Sonoita/Elgin wineries, offroad/camping attractions).
10	Accessibility of chargers within cities, providing low cost options to improve EV/PHEV adoption
11	Actual range of the vehicles to ensure that EV's can travel effectively to all areas of the state.
12	Actual usage should impact decisions on location and numbers of chargers
13	Add routes in tribal lands O'Odham, Navajo & Hopi ex: SR 86, SR 98, and SR 264

14	Adding charging stations where Arizonans drive between cities in AZ and to our CA border are the highest priority.
15	Additional fast charge stations adjacent/near single station locations in major shopping centers - Fashion Sq and Kierland.
16	ADOT needs to consider implementing the NASC (North American Charging Standard) that Tesla has now opened to all. Less expensive, more reliable with higher kilowatt capacity
17	ADOT needs to STRONGLY consider the border crossings, and the tractor trailers that come through them, possibly have them come through AZ in an area that would not have so many other traffic types, so they can monitor the drug traffic, and other things needed to make the roads safer, and maybe bring the regular traffic up I-19 and have charging stations in Nogales, Green Valley and into Tucson. Get the tractor trailers off I-19 and bring them across other border crossing areas.
18	ADOT should consider that this is going to be a huge drain on an already burdened power system. One single charge uses more power than an entire home uses in 2-3 days and the cost? They better have to pay a reasonable rate and not some discounted fee, leaving the taxpayers to foot the rest of the bill
19	ADOT should study where cars in Arizona currently sit the longest OUTSIDE THE HOME, and concentrate efforts to build charging capacity in those areas
20	Advertising for charging stations.
21	All charging stations should be uniform in the plug type - make Tesla conform
22	All EV compatible
23	Alternative routes people may be detoured onto during road closures (construction, weather, accidents)
24	Amenities near charging stations.
25	Amount of traffic using the highway, related how, what traffic?
26	Are electric system in Arizona is not big enough to handle what is needed for personal needs let alone charging needs of out of State people
27	Are you all NUTS!! EV's are the stupidest and most wasteful idea ADOT has ever come up with. Just to be WOKE!!
28	Areas of poorest air quality so more people can get electric vehicles
29	Arizona should do not support electric cars or such a system.
30	As an EV owner since 2019, we've been frustrated with the lack of quality from the current existing charging stations. It's not enough to just trust the third party EV charging company to provide a charger, you must have oversight in place to ensure they're operational. More often than not, the EV chargers don't work. It's like having only closed gas stations all around you. The stations are most unreliable in the summer months, making it a big challenge to drive our EV very far for 1/3 of the year.
31	Availability of electricity availability with transparent and cost effective pricing.
32	Available for AZ Residences for Free
33	Avoiding existing charging so as not to build right next to other chargers
34	Awarding contracts to veteran and minority owned businesses
35	AZ should consider all areas that electric grid can handle, as soon as possible. Upgrading electric grid, also, with federal funds. (The common verbiage is that the grid cannot handle multiple (hundreds of) charging stations operating simultaneously). This myth should be dispelled.

36	AZ State highways to medium size cities not on Interstate
37	Banning electric cars in Arizona
38	Bathrooms.
39	Battery life in auto (no air conditioning, especially on hot days), getting stuck, far too progressive unless you live in an urban area
40	Because this is early in the process, locating on the busiest regional routes should be the highest priority.
41	Build a comprehensive transportation system, highway & transit, well-coordinated, something non-existent
42	Building non-Tesla charging stations alongside tesla charging stations.
43	Business partnership
44	Bypass if major routes have failures
45	Chargers near or on the way to hiking/birding/camping locations, e.g., Chiricahuas, Huachucas, etc.
46	Charging cost. Don't just award government funds to companies who will then charge high prices like what happened with the Blink network.
47	Charging equipment reliability, service, and support to improve driver experience and confidence in this infrastructure
48	Charging for vehicles towing trailers.
49	Charging highways, to be able to drive and charge your vehicle at the same time
50	Charging infrastructure that is backward compatible with j1772 Level 2
51	Charging locations which will be considered safe 24 hours per day.
52	Charging should have no government support. It should be left to free enterprise, just as gas and diesel are already.
53	Charging speed (watts), more than 6 available stations, surface area required for charging & duration of charge, solar on top of charging stations, dog relief & picnic area near stations
54	Charging speed and number of chargers per site.
55	Charging speed, should be about the time it takes to fill my tank with Gas.
56	Charging station infrastructure is required for safe transition to electric vehicles.
57	Charging stations every 50 miles on every state or interstate highway, also consider charging stations at Interstate Rest Stops. All super chargers…. please.
58	Charging Stations every 75-100 miles
59	Charging stations near commonly accessed trailheads
60	Charging stations set up to accommodate EV trucks towing trailers
61	Charging stations should be designed for easy access and should be positioned no more than 50 miles apart.
62	Charting whether charging stations have malfunctioned units so that you don’t get off your route only to find none of the chargers are working
63	Combine convenience store and restrooms with charging stations.
64	Common commuting routes
65	Community use of AFC sites where corridors intersect with dense commercial areas. Low cost charging, and unique revenue streams, other than "charge for charging".

66	Commuter EVs can't get outside of Phoenix to go to California, Nevada, etc. I've been stuck in the city since 2014. Let me out! Run the stations at 50 mile increments to each of our neighbor states.
67	Compatibility between charging port types from Tesla to J1772.
68	Connecting Las Vegas and Phoenix.
69	Connecting northern Arizona to the other three Four Corners states - UT, NM, and CO.
70	Connecting Prescott and Prescott Valley to Phoenix
71	Connecting underserved and/or low income communities Also, to ensure equitable access to infrastructure
72	Connectivity to renewable electricity.
73	Consider city charging plans like Austin's Plug-In Everywhere
74	Consider identifying hotels/motels that have EV charging that the public can use w/o staying in the hotel/motel.
75	Consider miles to the stations. Don't need to be at every exit. Widen service area vs all on the cities. We've got to be able to vacation.
76	Consider NOT DOING IT!
77	Consider that many Americans feel this is being rammed through at enormous costs and little consideration to the EV effects on environment, how much electricity used, cost of vehicle, disposal of batteries, cost of implementing the infrastructure, and how much electricity will be used to charge all of these vehicles. Absurdity.
78	Cost & time
79	Cost of charging
80	Cost of generating and environmental dangers that Eva harm the environment when considering disposal
81	Cost to non-electric vehicle owners for adding charging stations for local and out of state users
82	Cost to user
83	Costs associated with long-term maintenance and vandalism
84	Coupling with utility programs, which may fund chargers, use EV registration data
85	Currently utility infrastructure and plan for infrastructure expansion. Ruggedness of equipment to support vehicles in AZ heat. Supporting small businesses by encouraging charging at their sites.
86	Different electric vehicles use different types of chargers. Accessibility should be universal.
87	Digitally connecting all of the charging stations with ADOT for real time monitoring
88	Disability access
89	Disrupting traffic for only a few vehicles
90	Distance between chargers
91	Distance from existing electrical infrastructure
92	Distance from initial planned fast-charging stations.
93	Distance from interstate chargers
94	Distance from other chargers

95	Distance from other charging options. IE - if there are no other chargers within 50 miles, one should be planned. Example - 89/89A in the northern part of the state has no fast chargers available making EV travel along that road impossible.
96	Distance from other charging stations (between 80 and 100 miles.)
97	Distance on all county roads in state from one charger to another.
98	Distance to other charging stations
99	Distances between charging stations. Brands of vehicles accommodated (not all use the same charging system)
100	Distributing chargers geographically and equitably across the state.
101	Do not put in charging stations.
102	Do not underestimate the number of chargers needed per site. 101/Shea Supercharger is always full. Best way to do this is to look at new standalone charging facilities in the 1st round also. Most existing highway chargers are in bad often dangerous areas.
103	Do not use our tax money to pay any part of this unnecessary and ridiculous plan. It is way past time to repair the existing roads.
104	Do not use our tax money to pay any part of this unnecessary and ridiculous plan. It is way past time to repair the roads.
105	Do not waste our tax dollars on EV
106	Don't charge us tax for this. Find a way to find it privately.
107	Don't do it
108	Don't do it …. where are all the dead batteries going to be in ten years ????
109	Don't give in to socialism
110	Don't support the insane electric fad.
111	Don't do it.
112	E-roaming capability
113	ease of getting in/out and that people tend to stay longer than you think, so multiple units will be needed
114	Economic impact of ignoring the rural areas, to those areas. Do we want to eventually force everyone to live in the cities
115	Electric cars and their batteries are too expensive. I don't want to keep having to charge them anyway.
116	Electric cars are not going to work on a large scale
117	Electric charging stations are not the concern of the government nor a valid use of tax money. These systems should be private funded programs just as gas stations are. I do not think I should pay for charging stations that I will never use.
118	Electric vehicles are an abomination!
119	Electric vehicles are the future and we need to prepare for them. I also think we should charge for the service.
120	Electric vehicles are too expensive for average people, and we will not have enough electricity to run them.
121	Electrify Navajo Nation includes SR 98 and SR 264.
122	Electrify routes to the Navajo Nation Capital on the Navajo Nation.
123	Elevation, winter cold impacts on range
124	Encourage hotel chains, state parks and visitor centers to have at least level 2 charging.

125	Enough level 3 chargers to go from Show Low to Phoenix or Tucson.
126	Equity
127	Equity for underserved communities
128	EV are not Green, batteries made by slave labor of our enemies, they are an environmental disaster, fire hazard, and should be banned from the state
129	EV can tow. It's got to have some pull thru spaces so one can charge without unhitching (just like gas stations).
130	EV charging stations in forests and mountain roads or even at State/Fed Campgrounds
131	EV is a hoax. How toxic it is making batteries for cars. Much more polluting than gas power. NO MORE NWO CORRUPTION
132	EV is bad for the consumer
133	EV is totally stupid
134	EV need to pay for their charging as others pay for their gasoline.
135	EV ownership and usage in the area
136	EV's are bad for the environment and should be restricted to bicycle lanes.
137	EVs are very expensive to buy and own. While not politically correct only the wealthy will own EVs for another 10+ years so if you want the chargers to get used you might as well put them in areas and on corridors wealthier people use.
138	EV's should be also located in "disadvantaged communities" in business neighborhoods
139	Existing infrastructure
140	Expandability of EV stations EV. EV private partnerships to be transparent and open to public comment.
141	Facilitating tourism in areas dependent thereon.
142	Filling current gaps, e.g., Flagstaff to Moab and Phoenix to Vegas
143	Firstly, Climate Change is a Hoax. Only GOD can affect the Weather. We are being sold a bill of goods by the Globalist Cabal in order to facilitate the Largest Exchange of Wealth in the history of the World. You folks at ADOT are swallowing hook, line, and sinker this planetary mumbo jumbo. First, the extraction of the rare earths is akin to the long banned "strip mining" of hydrocarbon coal deposits here in America. Harmful to those local environs. Secondly, the power grid here in America is of such an antiquated state that it will never, in current state, support a nation of EV's. Thirdly, the disposal of these heavy metal bearing battery assemblies, the Windmills, solar collection arrays is another issue of cart before the horse. This is a technology which is ONLY for the Wealthy and Vain.AS a former Petroleum industry employee I can tell you that TODAY here in America we have yet another 200 + year supply of Petro beneath our feet. The Earth is constantly producing petroleum, contrary to the fallacy that these are "Fossil Fuels." You Bureaucrats there at ADOT will do as you like, to [redacted] with the will of WE the People. You could well spend this money to repair our current roadways, Finish I-11 corridor which you are slow rolling to completion. CDOT is building a SuperCharging station in Needles currently, it is at this time unfinished as the realization has hit home that the current power grid in Needles CANNOT support its installation. You folks need to wait another 50 or so years until the Tech has been fully developed, tested before spending any of OUR monies on your PIE in the SKY pork barrel projects.
144	Fix Hwy 40, it's horrible from Lake Havasu all the way to Williams AZ. The bridges that have been fixed are awful to over they are not smooth and tear up all cars and RV's

145	Fix our roads first. I-10 between Benson and Tucson horrible
146	Fix the highways we already have! They are falling apart!
147	Fixing the road on the 40. Too many ruts in the road that ruin vehicles.
148	For remote locations consider solar powered level 2 charging. for those areas with available electric power consider a reasonable cost per KW /charge time.
149	Forgetting the idea
150	Future growth potential for all of these areas.
151	Future proofing infrastructure and growth
152	Gaps on other roadways for EV charging
153	Get back to drilling so we are not dependent on other forms for the electricity.
154	Green New Deal is a waste of money. Fix our roads!!
155	Growth projections.
156	H2 power
157	Hardly anybody has an electric vehicle so what are you doing
158	Have each EV have their own solar panels
159	Having enough charging stations at any one place ... and making sure they are WORKING. I drove to CA a few weeks ago and not enough charging stations on I-10 ... Made new friends as I waited for others to finish charging, but if all the stations had been working, I would not have had to wait.
160	Having municipalities provide the EV Charging Stations and generating revenues for their services
161	HEAT, most charging stations can only withstand 120 F, so invest in materials that can handle higher than that and position the screen or interface on the NORTH side of the device
162	Heat, vandalism
163	High speed chargers 150 to 350 kWh
164	Highway rest stations seem like an obvious place to have several DC fast chargers available.
165	Hotels and resorts also need charging stations
166	How about subsidizing Gasoline and Diesel Gas Stations as well? Just be fair and create those stations as well.
167	How about widening I-10 first???
168	How can disadvantaged areas afford electric vehicles-ever? Electric vehicles are a rich people's pipe dream. It costs more to fill an electric vehicle than a gasoline vehicle!
169	How few AZ people are even interested in buying electric vehicles!!!!
170	How intrusive to traffic will the construction be. I'm sick of seeing I19 down to one lane when I see no construction for miles and miles of one lane freeway.
171	How is ADOT considering additional investments Surface Transportation Block Grant? How is ADOT considering plans of local governments and utilities to supplement additional charging investments? Are we focusing on
172	How many people will actually use electric
173	How much infrastructure the private sector and vehicle manufactures will pay for these services and not using taxpayer funding methods.
174	How much money is being appropriated to fix roads in general. ALL cars use the roads.

175	How much the private sector should pay for the infrastructure and not use taxpayer money.
176	How much they take up on our grid. Look at California's issues. Also, look at the facts of how they produce higher emissions than my gas powered car. From creation to charging to battery termination. Facts are facts. I would stay away until technology catches up.
177	How much this is actually costing taxpayers.
178	How the new power grid will affect wildlife, additional trash caused by loitering as people recharge, infrastructure required to house charging station restrooms etc.
179	How the sun impacts EV charging stations - providing covered shade while the car is being charged would be critical for a good charge of the EV battery
180	How will we dispose of EV batteries, where will the rare earth minerals in batteries, how will all the new electric vehicles effect the electricity infrastructure of the state/
181	HWY 60 is an integral artery of Arizona to the north, south, east, and west
182	I am not interested in electric vets and want nothing to do with them or these questions.
183	I don't like using tax dollars for this. Let private companies build the charging stations just like gas stations
184	I own a hybrid and gas cars I have no interest in going electric it will leave a bigger carbon footprint as all those batteries die and go to the dump or get dumped in the desert like the tires
185	Ideally, I'd like to see a cost/benefit analysis (including externality costs/benefits) with all these options in the mix before choosing; Most important -> Highest amount of GHG reduction from each; 2nd -> equity - not as simple as designating rural and tribal although it includes that. a more comprehensive analysis of equity should take place.
186	If Arizona wants to be the next leasing state for the manufacture of electric cars, I think it's in the best interest of the state, the people, and the economy to invest in the electric market. The reason why electric cars are not affordable is due to the lack of infrastructure and lack of demand because of the lack of infrastructure. This isn't something that should be a matter of public opinion but moving the economy forward. And THAT is what you should consider.
187	If AZ has the power generation to implement an increase in electric vehicles
188	If charging stations are placed near restaurants and or convenience stores, folks could take a break while vehicle is charging.
189	If you are going to do it, do it right.
190	If you are looking to put EV charging stations in disadvantaged/underserved communities, what makes you think that those populations would even be able to afford an EV? They are very cost prohibitive at this time and can't go very far.
191	IF you buy an electric car, it is your personal responsibility to fine your charging station NOT the states
192	Incentives to condo and apartment communities.
193	Incentivize hotels and other businesses to build charging infrastructure
194	Include CHAdeMO charging at each location for Nissan LEAF vehicles
195	Including the ability to wash windows at charging stations and dispose of garbage if not at gas stations.
196	Install the fast chargers. Make like a gas station so it is covered and several outlets.
197	Interstate highways need more EV charging stations but don't forget tourists and those that like to see Arizona sites need charging stations too!

198	Interstates run mostly east and west and needed is EV stations on routes North and South as well.
199	It is a bad idea for Arizona
200	JUST SAY NO TO ELECTRIC VEHICLES
201	Justice 40 & Minority Vendor considerations
202	Kayenta/ Monument Valley
203	Keeping access for diesel trucks.
204	Keeping these areas open and fully maintained once they are built.
205	Kill EV until it's ready for prime time. It clearly is not even close.
206	Lack of charging options at the "destination" at either end of the corridor
207	Lake Havasu is in need of charging stations. The drive through Parker to central areas of Arizona is greatly hindered by not having more opportunities to charge other than Quartzsite
208	Leaving well enough alone.
209	Length of time for charge.
210	Let business put in charging stations. Not public money!
211	Let the open market deal with this. Gas stations are not state installed. Let the truck stops and such build this and charge accordingly to make a profit.
212	Lighting, security
213	Lighting, security amenities, etc. Drivers will be at that location anywhere from 10 minutes to over 1 hour. Quick and longer term options (24 hour operations) would benefit the most.
214	Lightning. Security of the person charging.
215	Lobby Feds to allow at Interstate rest areas!
216	Local grid strength to handle energy demands from installed high speed EV chargers
217	Locating in an area people will want to spend enough time in for a full charge
218	Location of vehicles waiting to charge
219	Location? Security.
220	Maintainability and reliability are even more important as chargers are placed further from metro areas.
221	Maintenance of charging stations
222	Maintenance of charging stations so that they work when needed.
223	Majority of the population cannot afford EV or Hybrids with costs for families to use and maintain over 10-15 years is a taxation on transportation for families in Arizona. Look at the math Arizona has 2.5% of EV or Hybrid vehicles and long term cost of EV vehicles as well as limitations on batteries and time to charge. If it's 115 degrees between Phoenix and Tucson, can you sit in your car for an hour+ to charge it in Casa Grande, No! How about when it's 30 degrees in Flagstaff, No! Arizona has some of the most extreme temperatures. It's not California weather! What is ADOT doing to address these issues nothing! Take the 76 million from the feds really helps inflation! Maybe ADOT can find a way to fix some roads leading to the charging stations.
224	Make it EASY & Reliable (like Tesla, NOT like Electrify America!)
225	Make sure EV users pay their fair share to use the highways

226	Make sure low and moderate income and minority communities are included in future plans.
227	Make sure that high density communities, as well as economically disadvantaged ones, have access to public charging infrastructure
228	Make sure there is a uniform charging plug
229	Make sure they have traditional level two charging for older electric cars.
230	Making sure that cellular or fiber optic communications are available for the stations particularly in rural areas.
231	Making sure that multiple charging standards are accessible.
232	Many people travel long distances regularly but away from interstates, for example, from Sierra Vista to Tucson. Part of that is on I10, but it is easy to put on miles in SE Arizona off of the interstates. We love nature and birding and will be using our vehicle for that a lot. Another example is the drive to Portal, via state highways. Thank you.
233	Mexico Border LUKEVILLE! So we can go to Rocky Point! Or WHY, AZ.
234	Mobile DCFC Solutions
235	Modularity of the selected sites. EV charging tech will change in about 15 years, please keep this in mind as the infrastructure around these sites will need to expand slightly.
236	More DC Fast Chargers
237	More urban charging stations
238	Most EV owners will charge at home, when they need fast charging is for long trips to visit families, tourist sites, national parks, and camping.
239	Most people cannot afford an EV and if they could the cost of batteries are way out of control. there's a long way to go I think before they perfect the EV
240	Most rural and tribal communities do not have heavy adaptation of EVs. ADOT goal should be to maximize funds to install infrastructure with the highest utilization rates as possible.
241	Most traffic along I-10 between Phoenix and Tucson and along I-17 and Flagstaff is likely to be people who life in those urban areas. Most of them with EV's should be doing their charging in the urban setting and not in between.
242	Must consider the proximity of fast charging stations already present along other routes when choosing new locations on additional highways.
243	N/A
244	Need in "vacation" corridors, for weekend and weekly traffic
245	need to have 24 hour monitored charge station "in the middle of nowhere" so people can SAFELY charge in the middle of the night even if alone and not feel fearful. Especially in locations where there is no cell service.
246	No electric autos
247	No electric vehicles. It’s a scam.
248	No taxpayer money should be put into this plan. Only of a law is enacted to charge per mile on electric vehicles that is equivalent to the gasoline tax that we currently pay.
249	NO!! NO NO NO!!! I don't want to have to pay taxes to install, maintain, and gods knows what else, for someone else to use the electrical grid! Just... NO!! ENOUGH!! If they want to charge, let them use the ones at HEAT or their own houses! Just NO NO NO!! Half the ones in the country are shutting down due to maintenance costs and the costs of maintaining them! ENOUGH!

250	Nobody wants or can afford EVs
251	Non-electric vehicle users should not be punished for their choice!
252	Not doing any of this!!
253	Not doing it
254	Not doing it at all.
255	Not on my tax dollars!
256	Not pushing EVs on the public
257	Not spending our Tax Dollars on another useless project. Spend our taxes on securing our border, fighting against drug abuse, stopping human trafficking, and fixing our corrupt voting system!!
258	Not using taxpayer funding.
259	Of course, distance between charging stations. Number of ports per station.
260	Our electrical capacity as a state
261	Overall distance one can travel anywhere in AZ between charging stations
262	Overnight parking to charge vehicles for apartment and condo owners
263	Parking storage. Battery capacity. *Hydrogen gas fill stations.
264	Payson needs a non-Tesla high speed charger to make traveling from Phoenix to Show Low area possible.
265	People in Kingman fly in/out of Las Vegas airport. Populations of Las Vegas and Phoenix use Highway 93 (future I-11) exclusively. There are plenty of EVs in both cities.
266	People that go electric should get some sort of rebate federally or through the state.
267	People who cannot afford electric vehicles
268	People who live in apartments or condo who don't have a garage to install a home charger.
269	Personally, I doubt I own such as I take long road trips to see family and how far would I get before charging?
270	Please move the Green Valley location one exit to the north, at the Sahuarita Road exit.
271	Please seriously consider rest areas as locations
272	Popularity and overall high pollution of manufacture, use and disposal of electric vehicles and their components.
273	Population density and projected growth
274	Positive affect on the feasibility for low income and rural communities to own an EV
275	Potential funding sources and partnerships with Counties, Planning Organizations, Governments
276	Potential to improve local air quality
277	Power grid sustainability
278	Preparing for higher powered stations.
279	Private party interest and investment
280	Proven demand in specific areas for this proposed infrastructure.
281	Provide charging where commercial networks avoid. If ADOT doesn't do it - no one will. Example is North Rim of Grand Canyon. There is already ample charger access on interstates. I.E. I-40 - New Mexico to California has over 42 locations per plug store. The analogy that ADOT should entertain is currently there is an effort to provide formal areas

	with high speed internet. ADOT S/B providing formal, places where commercial networks won't go - with charging capabilities. If ADOT doesn't do it - it will not get done.
282	Provide Free Charging credits to "early adopters" who buy an EV in AZ
283	Providing connectivity for those of us who drive from the outskirts of the valley, I.e., Queen Creek, Gold Canyon, South Gilbert, Eastmark, etc. The main reason for us looking at electric for our next vehicle is not only the mileage but the fact that we spend the majority of time driving on highways just to get to places such as doctors, grocery stores, shopping, etc., and a hybrid would be using gas vs. an electric vehicle. The farther out one lives from services that necessitates freeway driving to get to places, the more economical an electric becomes.
284	Providing fast charging in major urban centers where tourists are staying
285	Proximity to Federal and State Parks and other publicly-owned
286	Put electric at every rest stop at every existing gas station
287	Putting an alternator in the EV to charge while rolling
288	Quick access on and off the interstate.
289	Quit shoving an unwanted EV system
290	Range anxiety is real, but I think a prudent placement of EV charging stations, with multiple chargers (minimum of six, up to 10 to 12 individual fast chargers) at each location.
291	Reachability of the state. The ability of an EV with modest range (roughly 150 miles real-world in adverse weather) to reach any point in the state that could be reached by a similar class of gasoline vehicle (e.g., small sedan, midsize sedan, small SUV/Truck, large SUV/Truck, etc...)
292	Reduce cost of purchasing a vehicle
293	Redundancies. We'll placed location are important, but if a site goes down, it could leave drivers stranded if they can't reach another location
294	Refueling of diesel generators.
295	Refusal to purchase EV
296	Regarding installation cost and feasibility, ADOT should consider the Boost Charger station built by FreeWire Technologies (I am NOT affiliated with the company). These charging stations employ an integrated battery energy storage system for lower-cost, low-voltage installation virtually anywhere.
297	Regardless of what the Fed and State gov's want - do the people of Az want this? No vote here.
298	Reliability and ratings of the charging network administrator. Some are exceptionally poor, so presence of their chargers is worse than having none.
299	Reliability and repair time - really doesn't matter how many there are if they aren't working
300	Reliability of chargers
301	Reliability of charging station operators in ensuring charging stations work properly and have a clean and safe environment.
302	require solar power and batteries to supply charging station
303	Require vendors to prove charging locations are up and running 365 24 x 7 and near a safe area while charge to complete

304	Residential rebates for multifamily housing that is operated by an HOA (I.e., not an apartment building, but condos/townhomes) :)
305	Rest Area stations.
306	Restrooms near EVSE. Incentives for 400 mi range vehicles or higher. Cell service at EVSE. Safety power cut off
307	Routes that are completely EV-inaccessible (for instance, Phoenix - Telluride via Kayenta). Mogollon Rim access is also fairly limited right now, nearest charger is Payson.
308	Rural areas like Safford and Duncan\Clifton\Morenci
309	Rural communities are already disadvantaged. Focusing on the more advantaged communities in the process places disadvantaged communities in an even more disadvantaged position. Please work to support implementation of EV charging stations near rural communities that are not on the interstate. Thank you
310	Rural communities are far from each other and most do not offer EV charging.
311	Safe areas for charging stations
312	Safe places to charge, well lighted, off the road with bathroom facilities, too. Maybe an attendant. Being alone somewhere charging doesn't appeal to me at all.
313	Safety for people issues, time issues, weather issues
314	Safety for stranded motorists. I am worried about crime, desert conditions, and have significant disability concerns
315	Safety in the area these stations are located.
316	Safety of locations
317	Safety. The locations must not be isolated.
318	Save the money
319	Security, low cost to charge, maintaining the chargers
320	Semi-Truck Traffic on ALL Interstate Highways is a major concern! And the potential answers are going to be costly!
321	Senior communities who can afford EV's like SUN CITY
322	Serious consideration of opinions expressed by those who oppose this plan altogether
323	Shelter for drivers from sun and elements provided by solar panel shade structures
324	Should not put them in at all
325	Site Security
326	Skiing
327	Slow down. We are way early on this whole electric car truck thing
328	Smaller Highways i.e.: SR87 to Payson
329	Solar panel shade structures over the chargers.
330	Spacing them out so people can take long distance trips instead of doing too many in densely populated areas. Tourism with EVs is essential for economic development so connecting to rural communities and public lands for recreation is very important.
331	Speed of re-charging
332	SR 195 is not on your list.
333	Stakeholder interest, safety, and social equity.
334	State-level encouragement/advertising to convince the general public that electric vehicles in Arizona are a feasible alternative to fossil fuel vehicles. Right now, many, if not most people here are unconvinced.

335	Stop accepting federal $ to push the EV agenda. EV vehicles are NOT green! The batteries are expensive and destroy the environment. EVs will strain an already maxed electric grid.
336	Stop the nonsense. Electric cars are a waste of resources
337	Stop using taxpayers' money for stuff we're never going to use
338	Stress on our already overloaded power grid during summer months.
339	Subsidies to bring down cost for some residents
340	Super (fast) chargers need to be along the highway where people can quickly charge and move on.
341	Support the most popular EV, the Tesla, as well as CCS
342	Supporting tourism
343	Taking into account the desolation/lack of Emergency Phone/Cellphone coverage along a route such as US93 between Wickenburg and Kingman adding to the criticality of having more than 1 DCFC in Wickenburg and no DCFC in Wikieup in order to safely make it between Wickenburg & Kingman
344	Taxpayers' money should not pay for electrical charging stations
345	Taxpayers who don't want their taxes going to federally funded electric charging stations
346	Terrain. Areas such as I-17 to Flag, US-89 to Page, or US-60 up Salt River Canyon need more coverage to account for extra energy usage going uphill.
347	Terrain; Ability of charging stations to boost commerce for surrounding businesses
348	Tesla chargers, not just EV.
349	Tesla has already beat you to the punch in some respects.
350	That electric vehicles are not what we need.
351	That electric vehicles are powered by electricity that is generated by fossil fuels and will not significantly reduce fossil fuel use.
352	That EVs are simply a fad and that the money being used comes from federal tax dollars. This will not last and either with the funding.
353	That many of us have NO interest in getting one of these things.
354	That not all EVs can travel more than 100 miles on a charge.
355	That retirees cannot afford EV.
356	That the charging stations are covered
357	the actual ability or estimate for how much the road will be used by EV
358	The amount of charging stalls per station. We need more than 4 stalls and LV 2 chargers while we wait for a stall to open. 4 stalls get packed quick during peak times.
359	The amount of energy consumed and pollution created to support battery fueled energy
360	The amount of time it takes to charge a vehicle.
361	The availability of power for the electricity.
362	The cost
363	The cost is it worth it
364	the distance between charging stations
365	The electrical grid and cost of electricity
366	The fact that the majority of Arizonans will not be owning Electric vehicles!
367	The fact that there is nothing on the way from West Phoenix to Vegas for charging

368	The federal and state governments should not be in the business of subsidizing or building charging stations. Let the manufacturers work it out, just like Tesla has done.
369	The focus on Electric Cars is ridiculous. We need to keep our Gas Vehicles!!!!!!!!! Permanently.
370	The infrastructure and the upkeep of these chargers. Also, education on who and when they can use the chargers. How much will it cost?
371	The intersectionalities that limit disenfranchised communities and could potential further disparities with future innovations.
372	The location of Tesla's chargers.
373	The long term cost to Arizona tax paying citizens who cannot afford an electric vehicle. Remember the Alternative Fuels fiasco?
374	The lunacy behind this whole project, what do you think powers the units??? FOSSIL FUELS... and the operational cost of these electric vehicles is 10+ times that of Gas/Diesel. this is complete foolishness and a political fiasco... PERIOD...
375	The NPS would like ADOT to consider Hwy 67 to the North Rim of the Grand Canyon from Jacob Lake as an alternative fuel corridor. Many tourists travel this road and there are no charging stations along it. Also, please ensure all of Hwy 64 is included as a candidate. The road travels north from I-40, through the South Rim of Grand Canyon National Park, east to Desert View and Cameron, where Hwy 64 intersects with Hwy 89. And please consider Hwy 89 and 89A as alternative fuel corridors. Again, many tourists travel along both roads, so having reliable charging stations along these routes is important.
376	The per capita of EV owners in an area.
377	The Planet The Planet The Planet
378	The projected amount of EVs over the next few years
379	The setup of the stations - hopefully can be protected from sun and wind and rain.
380	The state shouldn't be doing any of this. When autos came along, PRIVATE gas stations were put up. The states didn't have anything to do with it!!!!!!!!
381	The use by residents
382	The wasted tax dollars spent
383	The whole thing is a waste of time and money.
384	There are areas of the State that currently preclude visitation by an electric car owner. We had a trip planned to Globe this summer, but we couldn't take the electric vehicle and had to take our fuel powered vehicle.
385	There are clearly routes within Arizona that are not feasible with a normal (<150 mile) range EV. Phoenix to Show Low, Phoenix to Kingman. These would seem to be a priority. For example, notice the Tesla supercharger in Payson at full capacity, with 12 charging stations, several hours per week.
386	There are currently no charging stations anywhere near the White Mountains area
387	There need to be charging station options south of Lake Havasu heading to Phoenix area, besides Quartzsite. Parker would be an excellent location for those heading to the Phoenix area or California.
388	There should be a DC fast charging station installed in Kykotsmovi Village at the new gas station along Hwy 264. This is a massively underserved area and would be a boost to the Hopi tribal economy.
389	There should not be any moneys spent on this foolishness.
390	There will be plenty of interstate connections after this year.

391	These should not be combined with gas options. There are *often* gas vehicles taking up charging spots to use as parking so they can run in for food or snacks. This makes charging spots literally unusable.
392	These vehicles are NOT environmentally friendly - they are a joke! The lithium batteries needed for these vehicles are poisonous that when a bird lands on them they die almost instantly. Is that really "saving the environment?" Also, we don't need power outages on a regular basis. This has been done in tried in the biggest of states such as TX and CA and it IS NOT WORKING! Forgo the electric vehicles now because they are not the way to the future. They will eventually be listed as a huge failure in our history books!
393	They should consider propane as a power source as it is available most everywhere
394	They have to be fast charging stations
395	They should abandon any plans for electric charging stations. EV owners will soon learn that there is NO savings with EV vehicles and will do more harm than good for our environment.
396	They should consider NOT wasting taxpayer dollars on frivolous technology. This is a stupid waste of money to satisfy special interests and does NOT serve the public interest.
397	They shouldn't consider electric cars
398	This could be provided by free enterprise and not government (us pays for it)
399	This going to be a big failure and cost too much
400	This idea is Garbage! and should not even be in the works.
401	This infrastructure should be privately paid for and not with taxes
402	This is a federal gov't boondoggle. I love your comment ' receiving federal funds' -- just where does everyone think this money is coming from. the infrastructure to utilize these stations has to be built first. Hear NO info on the 1st step. You'll be drawing electricity of established businesses/homes etc. the cart is obviously put before the horse.
403	This is a total waste of taxpayer money. Electric cars use so much MORE energy than gas/diesel and the batteries are toxic! I don't want to pay for other people's travel through a raise in electric prices! Places to charge will become danger zones.
404	This is [redacted] ridiculous. Quit wasting tax money on the EV lie.
405	This is the biggest joke of all time. Anyone have a clue about where the electricity will come from? Or where the batteries will go when they die? Or how to deal with the fires from the batteries?
406	This money can be better spent in other places. I am NOT in favor of this at all.
407	Those of us living rural lyrics in AZ are located on dirt roads that could never accommodate EV. People who think EVs are not fossil fuel dependent are ignorant
408	Time needed for charging. Fast charging imperative regardless of where located.
409	Topography - as an EV driver I may go a different route that is slightly longer to avoid going up steep/long hills that lower range
410	Topography of our roads, using more electric per mile.
411	Total waste of funds
412	Totally stupid...I will NEVER own an electric vehicle!
413	Travel Corridors! I want to travel via Utah but cannot, forced to drive via I5/I10 due to missing chargers in Page.
414	Try improving the existing roads instead of wasting money on cars most are not interested in owing or can afford.

415	Type of chargers, high capacity
416	Types of charging available. For example, my EV is 11 years old and new chargers may not work in my EV charge outlet.
417	Underserved communities need EV chargers. Particularly Hopi tribal lands, US 264, US 85 between I-8 and the Mexico border
418	Upgrading high traffic and low uptime EV stations to more than four chargers, i.e., Quartzite.
419	US highways, like US 60
420	Use Electrify America as a provider
421	Using Tesla misread of other less effective companies
422	Utilize current and closed rest areas, Belmont, and Munds Park for example
423	Vehicle affordability to locale population
424	Volume of vehicles in the area. Need for the region. Hwy 60 Globe - Miami
425	Waste of money
426	Waste of taxpayer money!!!
427	Wasting money. EVs are ultra-expensive, not great. Folks unable to afford. Fix roads/bridges.
428	Water should be available at each station and bathrooms
429	Ways to work with Tribal Governments to discuss getting charging stations placed in the larger tribal communities.
430	We are not ready for this technology, not by a long shot. Invest in improving IC engines and other fuel sources
431	We don't need electric cars shoved down our throats and we don't need more traffic.
432	We had an eye opening experience on I-10 by Tonopah when a truck fire caused a 2 hr. shutdown of the freeway in 112 deg weather. We were very concerned that our battery charge would hold up as we sat in the air conditioned car. No charge stations in sight.
433	We need electrical charging stations leading to all the primary tourist areas like Prescott, Payson, and Show Low
434	WE PEASANTS KEEP HEARING THERE IS A HUGE WATER SHORTAGE I VOTE STOP GROWING STOP BUILDING STOP BRINGING IN ILLEGALS AND STOP WITH THE ELECTRIC VEHICLE BUILDING NONSENSE
435	West Mesa area needs coverage
436	What are we to do with all the dead batteries?
437	What land is available that is now not in use or empty for placing charging stations
438	What steps are being taken to insure both the battery charger and EV are kept safe from combustion of the batteries during the time of charging?
439	What to do with the expired batteries and getting those business that can deal with that up and running
440	What vehicle user types would be a use candidate (i.e. pickups, deliveries, hunters, travelers, vacationers, campers, boaters, vehicles towing trailers), gradient along roadway (increased battery draw along route), elevation and climate (temperature effects on batteries and energy draw for heat or cooling), traveler destination (i.e. rural home, town or national forest), distance to next charger, useable battery charge travel distance not just theoretical (i.e. 60% actual or recommended useable vs. 100% theoretical), number of chargers..

441	When gas stations were built in the 1900s, they were built by private companies. The government should not be involved in paying for electric charging stations! Electric vehicles are worse for the environment than gas powered vehicles. This is a scam.
442	When roads are widened or upgraded these should also be considered first for added charging sites, new interstates also like new I-11 in planning now
443	Where are Arizonans coming from and going to? Origin/Destination data should inform state route highway improvements based on how people already move in AZ.
444	Where are people going.
445	Where chargers can be easily monitored and maintained. Great to have chargers in remote areas, until they don't work. Then they are useless
446	Where charging stations will not be negatively impacted by extreme heat
447	Where EVs are currently driving.
448	Where is all the electricity being generated?
449	Where the EV owners reside
450	Where they will get the electricity for these vehicles
451	Where will we get the electricity for these vehicles and who is going to pay for the road taxes and use for electric vehicles
452	Which non-highway destinations do EVs would need to be charged at? Example, a lot of people take trips to Sedona but there are no chargers there (except Tesla supercharger but non-Tesla can't charge)
453	Who can afford electric vehicles
454	Who is paying, what are the costs, who's profiting from this, where are these batteries going to end up?
455	Why is private industry not pursuing this, rather than government?
456	Why is the government building charging stations? How many gas stations did the government build?
457	Why when it takes coal to create electricity efficiently How green is that
458	Will drivers of EVs be required to pay out of pocket for the service or will it be free?
459	With different manufacturers. How do you consider the difference of the power cords and the plug at the car or truck?
460	Work and business (retail and offices) charging stations availability and other parking lots in government buildings
461	Working with cities and local governments to determine more locations where EV charging stations would be more needed.
462	You MUST add grid capacity. The current grid has neither the intelligence nor the capacity for the EV plan

Appendix C: Full Text of Online Information Written Responses

Some comments have been lightly edited for coarse language and ease of reading without affecting the intent of the comment.

Number	Comment
1	1. It is very important to provide real-time availability. If all chargers are unavailable, it would be nice to show the wait time or length of queue (such as ADOT does at emissions

	stations). Video (live) of sites would be great! If this isn't possible, consider allowing users to post real-time comments. 2. It's important to know what payment methods are accepted.
2	100% accurate and current (real-time) availability of functional chargers. If a driver pulls up at 3AM in the morning with 5 screaming kids and an angry wife in the car, the last thing we need is a broken charger showing as functional :)
3	24/7 EVSE customer service. Photos of location. Place for updates
4	24/7 manned, on-site security
5	A map of the charging stations and distances between
6	A means to alert ADOT or a service provider if the charging equipment is malfunctioning and needs to be repaired. Any EV driver will tell you that today's poor quality, malfunctioning charging stations are a major headache.
7	A pin on a map for extra precise visuals for where the charger B at. Also, how accessible the stations are for those that are towing.
8	Abandon this stupid waste of money.
9	Actual cost of electric vehicles
10	ADOT needs an all of the above policy to ensure EV charging is accessible and affordable for all to ensure a just transition to electric vehicles. Before consumers will invest in EV's, they need to know that an affordable and accessible charging network is available state-wide.
11	ADOT needs to take a lesson from Tesla on how they were able to expand their charging networks along major routes and view what kinds of information they display for their apps. The key is competition. Show the people you represent the government can do it better. Because ADOT sure does abandon lots of the public roads as it is. SR-95 is a complete disaster.
12	ADOT should explore including route-specific distance information for each route, so road users can estimate time required for the trip, mileage between chargers, (Varies by vehicle specification)
13	ADOT should not be in the EV charging business
14	ADOT wake up. Look at the child labor in mines providing the batteries, look at the “electric shortage” but let’s go to electric cars? It’s to prevent travel. TOD cities- “you will own nothing & be happy” “we control them with video games & drugs” WAKE UP
15	Again - reliability and repair time
16	Aggregate charging station usage, for analysis and insights
17	All a waste of $. Too expensive. It's a rat trap.
18	All charging stations need to be open 24/7 Or don't do it at all. Safety is a huge concern.
19	All services, Cell reception,
20	All should be available 365/24/7
21	Alternatives to EV - EV's are a failed concept at inception.
22	Alternator's and how they work
23	Amenities in the area
24	And you're using taxpayers’ money to do all this what if you don't own an electric car
25	Any and all payment methods including cash if available.
26	Availability and station details via an API that any navigation and charging app can access in real-time

27	Availability of resources at each charging station.
28	Available charging power
29	Bathrooms and water fountains
30	Bathrooms, amenities, well lit
31	Blink has very reliable charging stations as a provider.
32	Calendar of events
33	Cannot use phone apps in places with poor cell coverage.
34	Can't think of any
35	Charger connector type(s) available
36	Charger KW limits and available values
37	Chargers are able to handle extreme heat
38	Chargers not available due to maintenance, vandalism, accident, etc. Looking at long term non-availability
39	Charging network that administers the site. The network app will provide all of the needed info if AZ mandates up to date info AND high % availability of the chargers.
40	Charging specifications (e.g., how long to X %)
41	Charging speed
42	Charging speed (kw)
43	Charging speed (kWh)
44	Charging speed/voltage; Level 1,2, 3 charging, for example.
45	Charging speeds (72kw, 150, 250, etc.)
46	Charging times, waiting time to start
47	Clear and concise instructions in multiple languages that keeps things as simple and straightforward as possible.
48	Comparative costs by station to station
49	Congestion/ likelihood of availability given current demand
50	Consider mapping software making the stations easy to find.
51	Consider the cost of making those batteries, including the mining costs and environment destruction, and replacing them before promoting electric vehicles.
52	Constant maintenance of charging stations, for current charging stations, at least 2 of 4 on average are always non-functional, this is a big problem.
53	Copy the Tesla Network. Plug and play, your network knows the car and the car charges your CC on file
54	Covered stalls. Not only to provide shade for those charging, but to protect the equipment and hopefully make it more reliable
55	Current availability of charger (in use/available) - not clear if that was already on the list above. An API so vehicle OEM and map makers (like Google & Apple) can include the status in vehicle or on-map is absolutely required.
56	Current weather conditions and perhaps surveillance camera views of the area so people can decide if it is a safe area, or whether road conditions are safe.
57	Currently operational, i.e., not broken
58	Dependable and Reliable chargers
59	Disability access, emergency shelter

60	Disability accessibility
61	Distance between charging stations
62	Distance between charging stations
63	Distance from current location.
64	Distance from next available fast-charger.
65	Distance to nearby charging stations
66	Distance to station from current location.
67	Distances between charging stations
68	Do NOT PRIVATIZE this service for for-profit corporations
69	Do not use taxpayers' money to build electrical charging stations
70	Do NOT use taxpayer funds
71	Do Not Waste Our Tax dollars on this.
72	Do you provide that information about gas stations?
73	Don't stress our electrical grid. Don't use my tax dollars for something that the entire public can't use.
74	Don't want charging stations!!!!!!!!!!
75	Each station's uptime percentage
76	Easy use App. For all sites consider having Wi-Fi be available or close proximity to Cell platforms.
77	Eating and restroom facilities near charging. Your services near location not specific.
78	Ensure locations are on Google and Apple maps since many EV have built in maps.
79	Ensure there are clear maps as to where all charging stations are located and distance between them, so drivers can plan accordingly.
80	Estimated wait time (if chargers available is currently zero) Address of the location; ability to map directions to the location (click thru to Google or Apple Maps)
81	EV's are unsustainable and a waste of $
82	Fast chargers 150 kw/h. And 350 kw/h
83	Find closest station. Driving distance from user's current location to station. Shortest route mapping.
84	Fire safety equipment available to the EV market.
85	Fire suppression facilities that handle battery fires
86	Fix and police the roadways that are already in existence first. The lawlessness in AZ is despicable
87	Fix our interstates and roads with that $$$$ shameful
88	Fix our current interstates!
89	Food, ITS to show how many spaces available in advance.
90	For people not interested in electric vehicles at this time our inner structure is not advanced enough to support this system
91	Forget the whole plan!
92	Forget this service. I will never buy an electric car
93	[Redacted] electric cars
94	H2 power
95	Having charging stations on SR 264 from Ganado to Window Rock

96	Having no reason for any of this!
97	Historic data would be helpful, the way Google shows when a business is busy throughout the day/week, so you know if you're planning to be there at peak / off-peak times.
98	Hotels nearby
99	How far between charging stations in several directions
100	How fast the chargers are, if the chargers are down but this info might already be available through the partner selected to install the chargers.
101	How long it takes to achieve a charge sufficient to make it to the next station
102	How many local repair shops and tow companies in the area are available for EVs? Rural communities have zero resources to support broken down and stranded EVs. Stop supporting EVs and focus on fixing the horrendous highway conditions in northern AZ.
103	How much it cost per charging station was attributed through taxes.
104	How much it really costs to use an all-electric vehicle and the ACTUAL cost to the environment, as electric vehicles are NOT non-polluting, or zero emissions.
105	How much money ADOT will make per charge? Is this saving the consumer? We know it's not saving the planet or Arizonans' health!
106	How much power is used by these systems on a regular basis. If we educate the public in the truth, maybe they won't be so quick to buy and use the amount of electricity that it will take to run these vehicles. We are not California. Let them try it first and fail before AZ jumps in the "save the planet" bandwagon (which is not really saving the planet at all! You want to spend money? Do it educating the people first before implementing this literal garbage!
107	How not to support this outrageous fraud on the American population.....PERIOD.....
108	Hwy 86 needs charging station
109	I like using an app on my cell phone with an EV charging company to whom I have preregistered for service. I would prefer to be able to plug in and have a discounted charge cost billed directly to my credit card.
110	I think many people don't realize they'll have to pay to charge their vehicles. You need to make that very clear and what the price will be.
111	I thought that we lived in the United States. What happened to our rights? What happened to let people drive what they want or own what they want? You know everybody wants to change things around; I can't afford it, personally. I would not have an electric car. If I want to get in my car and go across States, I should be able to do that now. It's all about money: if you do this and if we can get you to do that, we get this kick back from the government. It's all about money. Does anyone even know how other people might feel that can't afford electric car? Think about it. What happened to our rights? We should be able to have what we want. It should be up to us. Nobody pays our bills and I'll be [redacted] if I do what the government wants. To [redacted] with them.
112	If any chargers are not functioning
113	If any of the chargers are non-functioning and need repair
114	if broken, estimated repair date
115	If charger is working or in repair
116	If chargers are out of service at any given time
117	If charging info and access will depend on online apps then there needs to be dependable cell service in all regions where people drive.

118	If membership based, which network?
119	If the chargers are currently occupied and when they will be available
120	If there is a queue for the non-available chargers.
121	If there is other service available like fast food places
122	If they are currently working or not. Possibly how many are in use at the time.
123	In use vs available
124	Information about how stupid an idea it is for electric cars because you're using fossil fuels to charge those cards not to mention you're ripping apart the Earth to getting out lithium from mine
125	Inoperable chargers
126	Instead of creating stand-alone solution, instead supporting and providing official info to PlugShare and ABRP apps.
127	If the charger is not in working order.
128	Is the charger working? Payment type? Ideally just credit card instead of downloading a new app without cellular connection
129	Is the station currently operational, or will you be stranded here because you didn't know....
130	Is Wi-Fi available @ the charging station.
131	It is not necessary. Many won't be buying these. They are not feasible now, maybe 50 years from now
132	It should be a requirement that public restrooms are available within 300 feet of the site and 24 hours of availability.
133	It's fine to provide information on charging stations and their costs and amenities. But don't subsidize such things, any more than gasoline stations were subsidized in the 1920s and onwards.
134	Just don't do this - feed and house the homeless veterans, individuals etc.
135	Just make sure everything is connected and compatible with Plug Share, and use that, don't reinvent.
136	Just… NO!! THIS IS GOING TO END UP COSTING US TAXPAYERS' MONEY! ITS WRONG! BLATANTLY WRONG! FIRES, AND OTHER HARMFUL DAMAGE! AND THE ELECTRICAL GRID CAN'T HANDLE IT!!! BIDEN SHUT DOWN ALL THE METHODS OF PROVIDING ELECTRICITY! HOW THE [redacted] ARE THEY SUPPOSED TO GET ELECTRICITY? ARE WE SUPPOSED TO GIVE UP OURS?!!
137	Keep it simple.
138	Knowing if the charger is available and FUNCTIONAL is vital. The worst is getting to a charger location just to find that is out of order.
139	Knowing the max charging capacity in KWH for the stations. Sometimes the level 3 charging stations don't have the output that drivers expect/need.
140	Last time location was verified as available and working
141	Last used stations. In use stations
142	Level of charger /charging times
143	Lighting at night, security
144	Live video from a camera showing area around the charging stations.
145	Load sharing charge stations might be worth looking into. Kempower has some in Europe. We need more plugs!

146	Local attractions and food venues.
147	Local attractions or local businesses nearby that welcome EV travelers.
148	Make sure chargers are working, type of charger i.e.: J1772, DC, CHAdeMO. Amount of power output i.e.: 50, 150,350.
149	Make sure it's also available through computers as not everyone can afford an expensive smart phone.
150	Making electricity source information available e.g., whether currently powered by renewable sources
151	Max charging speed of each plug
152	Maybe consider a fast pass, similar to toll road passes. Have a scanner at charging units. Less chance of fraud. Recharge when funds needed.
153	Milage between charging stations
154	Money should go to improving roads, mediums, and shoulders instead of wasting on electric stations
155	Most important to know that when one is planning a route there is a good chance there will be a functional unit upon arrival without a long wait
156	MUST HAVE SOME KIND OF ABILITY TO PAY CASH (PAPER BILLS)!! A LOT of people choose not to have bank accounts or may not have enough money in the bank but do have enough paper money to pay.
157	N/A
158	Nearby local destinations (parks, museums, etc.) Maybe combine with a place to hike while a vehicle is charging? Talk to County Parks departments for insight and ideas for how trails could provide active healthy alternatives to waiting in your vehicle or eating fast food.
159	Next charging station along route if long lines.
160	Next charging station and mechanics for any issues
161	Next EV services - number of miles - similar to what road signs show: "next rest area 24 miles"
162	No
163	No government involvement should be undertaken. Free enterprise, or nothing. Make EV evolve into the market on its own.
164	NO NO NO
165	No time or money should be wasted on any of this
166	NONE
167	None
168	Not doing thing EV charging stations
169	Not everyone goes online!!
170	Not for pushing electric cars on uninterested consumers
171	not just # of available, but if they are working or out-of-order. Many times, operational capability is unknown until you drive there to find out they are broken.
172	Not only the availability of services near a charger but the hours that the services are available, e.g., when facilities such as a mall are open in order to use restrooms; e.g. the Arizona Mills Mall isn't open until 10am, when charging at the EA station there one cannot use the restrooms in the mall nor at the Dicks Sporting Goods; the mall is closed & Dicks doesn't permit anyone other than employees to use the rest rooms!

173	NOTHING Google related. What about good old fashioned cash? Why aren't you letting private enterprise set up charging stations so they can decide what's best for the customer? How is this in any way a taxpayer problem? Capitalism will support this nonsense if it ever become viable.
174	Nothing! You are picking winners and losers. Only the rich will benefit at the expense of 98? of vehicle owners.
175	Number of chargers broken or not in service
176	Number of chargers not operating or not usable at a location. your criteria are confusing or incomplete— why would chargers have hours and why would charges vary by location?
177	Number of chargers out of order
178	Number/type of charges in working order (reflected in chargers currently available). Also, would be helpful if app could easily allow a driver to report a malfunctioning charger.
179	ONLINE/APP/PHONE PAYMENT is wise when the interface gets so hot it doesn't work, think of a gas station screen on a hot day.
180	Opposed to any ideology regarding the pushing of any EV vehicles!! Stop going woke!!
181	Out of order charging stations or a way to report out of order charging stations. Wait times or taking a number so we know who is next.
182	Payment types available at location and charging type (fast, slow, and connectors).
183	Peak and off peak times of use
184	Photos of charging station location, and a simple way to report chargers needing repair
185	Please provide data on which EV station operators are available at each site. For example, we have had horrible experiences with Blink chargers literally never working, and at one point left us stranded in 110+ degree weather. We would have opted to go to a different charger in that moment had we realized the charger we were traveling to was operated by Blink.
186	Please stop pushing EVs
187	Plug and charge (ISO 15118) technology should be a must
188	PlugShare already covers all these areas, so this seems duplicative.
189	Price breakdown, basic dollar/KWH, and fees. Types of fees, i.e., wait charge, credit card use fee etc.
190	Probable availability based on arrival time
191	Proposed charging locations
192	Provide 24 hour chargers.
193	Provide Free Charging credits to "early adopters" who buy an EV in AZ
194	Pull through charging spots for towing
195	Put electric at every rest stop, at every existing gas station
196	Quality of charge...fast or slow
197	Quit wasting our money!
198	Real time availability information
199	Real-time check-ins and feedback from users like Plug Share
200	Real-time inoperative charger status/ in-app problem reporting
201	Regular checking on them
202	Reliability and downtime
203	Reliability of charger

204	Reliability statistics (percent of time chargers are functioning and available over the prior 30 days), Charging rate (maximum amperes and kW rating) for each charger
205	Reliability!!! Chargers are so often broken, ...
206	Repair our Roads!
207	Repair status
208	Repairs of some kind for when the battery is dead and they get stuck holding up traffic. Moving one of those things when it has no power sucks
209	Reservations
210	Rest rooms, shaded picnic tables,
211	Restroom proximity / lighting for night-time charging / security
212	Roadway signs
213	Safety electric and storms don't mix well
214	Safety information - is it well lit? Significant traffic due to nearby business? Closest law enforcement office?
215	Save our tax dollars and forget this program! Electric vehicles are years away and the type of technology will change many times before electric cars become particularly!
216	Save the money
217	Security, status of chargers, condition of chargers, monitoring systems, service providers.
218	Serious opposing opinions
219	Service availability for EV's
220	Share your info with PlugShare, etc.
221	should explore using solar power to charge lights and actual charging stations themselves.
222	Should get rid of all charging stations
223	Should not be government paying for this, let free enterprise develop
224	Some way to verify that chargers are actually working.
225	Speed of charger (fast, faster, fastest?)
226	Status of chargers (disabled/inactive), ability to report if a charger is down through the app
227	Status of the chargers. We have encountered numerous chargers that are not operational
228	STOP FORCING UNITED STATES PEASANTS INTO THIS GARBAGE
229	Stop using taxpayer dollars to push this ridiculous and energy wasteful position!
230	Tax them the equivalent of the gasoline tax
231	Tesla vs other stations...maybe put a little pressure on tesla to open their stations to all?
232	Tesla. Harvest needed desperately. We drive to Havasu all the time and California. Wickenburg, Quartsite, and Kingman ate the only Tesla chargers. In the heat in going uphill we use more battery fearing last stop charge won't get us there.
233	That it is operational
234	The Cocopah Indian Tribe would like to see several EV charging stations installed at the casino.
235	The cost to the environment.
236	The KW rating of the site's chargers is Very important. Look at the info Tesla provides, that's what is needed

237	The number of miles to the NEXT chargers from the selected location, along various connecting routes, so that people can plan their trips more successfully.
238	The way this survey reads you have already made up your mind and you're going to shove it down our throats no matter what we say.
239	This is a massive waist of my tax payments. PLEASE STOP!
240	This needs to be stopped. It is the most ridiculous way to spend taxpayer money. Lobby instead for reopening the oil pipelines.
241	Time it takes to charge
242	Time of wait for availability of charging station.
243	Time since last successful charge
244	Tourism Route planning tools to show availability of charging infrastructure
245	Try the TRUTH about electric vehicles. Cost of a home charging station, battery replacement. Why phase out gasoline quickly from working people who will never want or afford electric vehicles? It's another plan by the wealthy for the wealthy with no consideration for people who can't or don't want to buy in. And I won't start on the funding. The Feds are printing money we do Not have.
246	Type of charger (Tesla vs non-Tesla)
247	Types of chargers if universal adapters not widely used in the marketplace.
248	Typical busiest hours for charging
249	Unsure about feasibility of providing this information with accuracy.
250	User experience, like "Plug Share"
251	User reviews
252	Users don't want to have too many apps; I don't want another app for each state. So ADOT should incorporate this into commonly used apps like PlugShare
253	Wait time until next available charging spot if possible; is the charging from a green resource (e.g., solar); also, can you put your name in a reservation for next available?
254	Wait time.
255	Wait times
256	Wait times and number of chargers down for maintenance.
257	Wait times at each charging facility.... length of time to charge car...what happens if line is so long that it negates the charging facility's usefulness.
258	Wait times to charge?
259	Waste of taxpayer money
260	Wasting money. 90% of population unable to buy expensive EVs (not great performance either)
261	Ways to contact vendors to get them repaired promptly. They are too often down and without care.
262	We do not need electric stations waste of our money for electric cars
263	We need EV charging in all resort towns that connect Phoenix and Tucson, also need towns like GLOBE, connect the EAST valley to Show Low and Pinetop, tons of visitors go to these towns they need the capabilities of charging the EV. Also, we need EV supercharging type stations in the East Valley like Power Rd and the 202 area.
264	Weather forecasts on route and free WIFI
265	Weather in the charging station area.

266	What charging network is the station affiliated with?
267	What do I expect at a normal gas station/ convenience store
268	When the charger was last used
269	When they will consider infrastructure in Santa Cruz County
270	Where all of our money goes. Complete transparency.
271	Where chargers are… in a parking lot, hotel property, food facility etc..
272	Where is all this electric coming from, what generates it?
273	Where the energy comes from? Is it green energy (solar, dam, wind, coal, etc.)?
274	Where you going to get your gas tax from?
275	Whether a station is unavailable due to outage
276	Whether any stations are out of order.
277	Whether chargers are solar powered, saving generations of future taxes for domestic energy production
278	Whether individual chargers are “in use”, “available” or “inoperable “
279	Whether portable/mobile charging apps/services are available in the area
280	Whether service stations are out of service or near road construction
281	Whether the station is solar powered.
282	Which ones are currently in use (is that the same as availability?)
283	Who is pushing this nonsense and who’s profiting from it?
284	Who to call if emergency
285	Why would you not accept cash?
286	Working order
287	Wrong for AZ

APPENDIX D: FULL TEXT OF COMMENT CARDS

Some comments have been lightly edited for ease of reading without affecting the intent of the comment.

Number	Comment
1	1) Emergency phone service at charging station locations 2) Flagstaff to Four Corners (Kayenta) 3) Flagstaff to Monument Valley 4) Charge station reservation for specific time 5) Convenient access to making reservation throughout the state. Hopefully interconnected to the entire interstate system.

2	Accessibility and cost are major concerns when working to improve EV adoption. Based on comments seen on NextDoor, the average citizen is extremely ignorant about EVS/PHEVs and seem to think charging is more costly than the equivalent in gas/diesel. Some bare bones education might go a long way in changing minds. Ensuring the bidding process is transparent and broad. My concern is that ADOT will be limited by certain groups or short lists as it is typical of how the state chooses the winning bid. This had led to a poor use of funds and shoddy work being allowed. Hopefully there will be oversight and due diligence involved when narrowing down the winning bids. End users should have reliability and affordability as is possible. Thanks!
3	ADOT should prioritize equitable access to EV charging. Currently Northern AZ is not covered or the proposed map. Also, ADOT should negotiate with Tesla to open existing Tesla chargers. For example, Winslow and Grand Canyon have Tesla chargers - so that would be great. In addition, along State Hwy 89 - 160 across the Navajo Nation would help cover N. AZ. Public outreach is also needed to ensure the public feel before investing in electric vehicles to avoid anxiety.
4	Are we considering putting EV charging stations closer to public roads? Will there be accommodations for trailers and newer vehicles in the future? How will we handle reliability and maintenance for new charging stations? How is ADOT planning to use the SWFCC Transportation Block Grants? When will we have 100% Level 3 chargers, what is the roadblock?
5	As a daily EV driver that commutes 100+ miles a day between Winslow and Flagstaff I would like to see more charging stations along 1-40 that are reliably working. It would be nice to see a charging point along 89 in Tuba City and Page to reduce range issues. I have seen many interstate drivers charge in Flagstaff thinking they can drive north and expect to have a level 3 charger for their CCS based car. As more people adopt EV, they will find areas in Arizona that are outside their range.
6	How will bids be evaluated? How will performance, including reliability, be monitored and assured over time? And how will that monitoring be funded? SR-87 Phoenix-Payson vote for
7	I am interested by the existing plans along the interstates. My concern is charging stations along 87 and 260. There are none in existence along route Phoenix - Payson - Herbert - Show Low - Geer route which is very well traveled.
8	I appreciate you taking the time to solicit input. As you move into the next phase of identifying EV charging locations, I ask that you include Highway 95 running through Bullhead City. This roadway is an important tourism route, connecting to both Las Vegas and Southern California. Including this roadway will have significant positive economic impacts for the state of Arizona.
9	I like your existing plans! Phase #2 should include Hwy 89 and 160 Good communication and signage are important. Ex: Charging Station 25 miles ahead. Thank you!

10	I really appreciate the efforts of ADOT in figuring this out. I would love to see an easy way to pay for the charging, specifically with a credit card. I think it would also be great to see larger and more signage for the EV chargers, kind of like gas stations. And while it could complicate the process, having covered, pull-through charging (again like gas stations) would be a great step in making it easier to use, especially when towing.
11	Infrastructure needs to prepare for charging and beyond 150 KW. At least 4 ports is important. Being able to support (MCS) megawatt charging system is up and coming.
12	It would be helpful for name tags to show which entity the person is with and their role on the project - or a list of those available for questions and their contact information.
13	It's very encouraging that you appear to be proceeding with charging stations in a timely manner. Is there any plan to actively encourage and/or facilitate the purchase of electric fleet vehicles for Coconino County, the City of Flagstaff, NAU, FUSD? That process needs to be sped up drastically! Thank you! Are ADOT fleet vehicles electrified? If not yet, when will they be?
14	Must provide equitable distribution of charging stations, especially in communities of color and on the reservations around the state. Make it easy for citizens and tourists to charge their vehicles. Keep politics out. All ADOT vehicles should be electric in the next purchases.
15	South of Yuma City, San Luis AZ is a border community to Mexico. We are a non-profit community based organization in the community for 40+ years. We own several buildings/facilities where we would like to have an EV charging station.
16	Thanks for sponsoring this event. Great public service. Very informative.
17	This is an exciting and important project to support a growing industry and Arizona's air and environment. While the locations largely make sense, I am concerned about the availability of charging in higher density areas, such as Tucson and Phoenix area. Many people will lack home charging and with traffic and more users the Tempe, Chandler, and Anthem stations may not meet the future needs of these areas. I also believe cash payment should be an option at charging stions as an equitable policy to meet the needs of diverse populations. I also think care and consideration should be given for the design of the stations for safety considerations. Additionally, safety information regarding the design should be given online as there should also be emergency safety buttons/alert systems for user safety.
18	This is an important direction for transportation. I feel Arizona will be best served by entertaining new small businesses in as many areas as possible in building out this network. EVGO, Blink, VW (Electrify AM) all offer developed ideas and plans from experience. However, new creative ideas from current and future Arizona small businesses will get us there faster, keep dollars locally, and most strategic to meet the Arizona EV driver's needs.

19	Very good visual and video presentations Venue close to work - west-side venue? How do EV fans stay involved? There is no "Type 3" charger standards - "High Voltage DC"

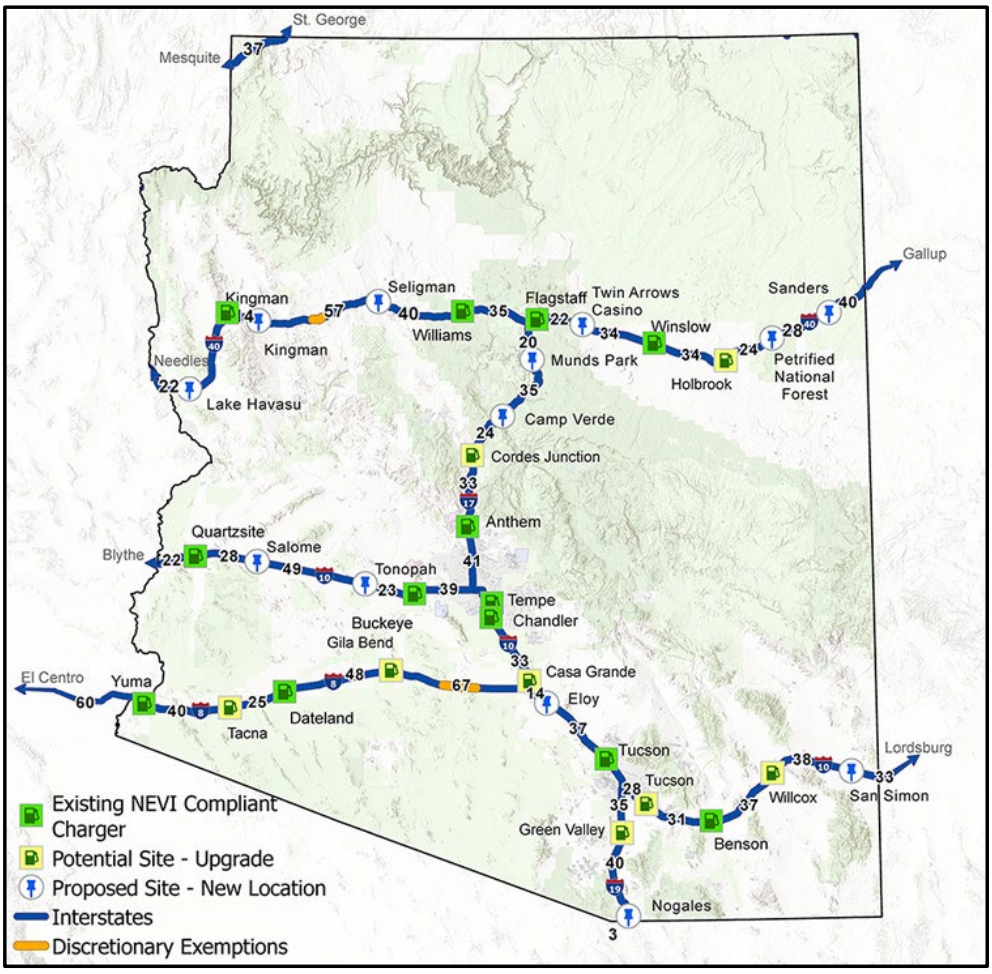
APPENDIX E – PUBLIC SURVEY

ADOT Electric Vehicle (EV) Infrastructure Deployment Plan - Public Survey

ADOT's Electric Vehicle (EV) Deployment Plan serves as a roadmap for electric vehicle charging infrastructure for the state. The initial plan, which received federal approval in September 2022, focuses on addressing gaps in the existing EV network along interstate corridors in Arizona, with the goal of locating EV fast-chargers every 50 miles. The plan identifies the locations of new charging stations and where existing chargers will be upgraded to meet the federal guidelines.

In total, ADOT will receive $76.5 million in federal funding for the program in Arizona over the next five years, and has received a portion of the federal funding to begin implementation. ADOT anticipates beginning work to upgrade existing stations in 2023. Work on new stations will follow.

ADOT's EV plan will be updated annually as new alternative fuel corridors are added and charging stations are identified. Information about these activities will be provided on the study web page and updates will be sent to those who sign up for the study mailing list.



Take Our Survey

Public input is a vital part of plan development and implementation. Please complete this survey to help guide the implementation of the Arizona's EV Deployment Plan.

1. **Please provide your zip code:** _____

2. **Please tell us about yourself (Check all that apply).**

- ☐ Arizona resident (full or part-time)
- ☐ Non-Arizona resident
- ☐ Live in urban/suburban area
- ☐ Live in rural area
- ☐ Electric vehicle industry representative
- ☐ Construction contractor, subcontractor or supplier
- ☐ Local municipality, regional, state or federal agency
- ☐ Tribal member
- ☐ Other: _____

3. **My interest in ADOT's electric vehicle plan is:**

- ☐ Personal
- ☐ I represent a company or organization that is interested in ADOT's EV plan/charging network

4. **Which of the following options best describes your vehicle usage?**

- ☐ I own at least one battery-powered electric vehicle (EV)
- ☐ I only own other types of vehicles (gasoline, diesel, hybrid, etc.) but **I am interested** in owning a battery-powered electric vehicle
- ☐ I only own other types of vehicles (gasoline, diesel, hybrid, etc.) and **I am not interested** in owning a battery-powered electric vehicle
- ☐ None of the above

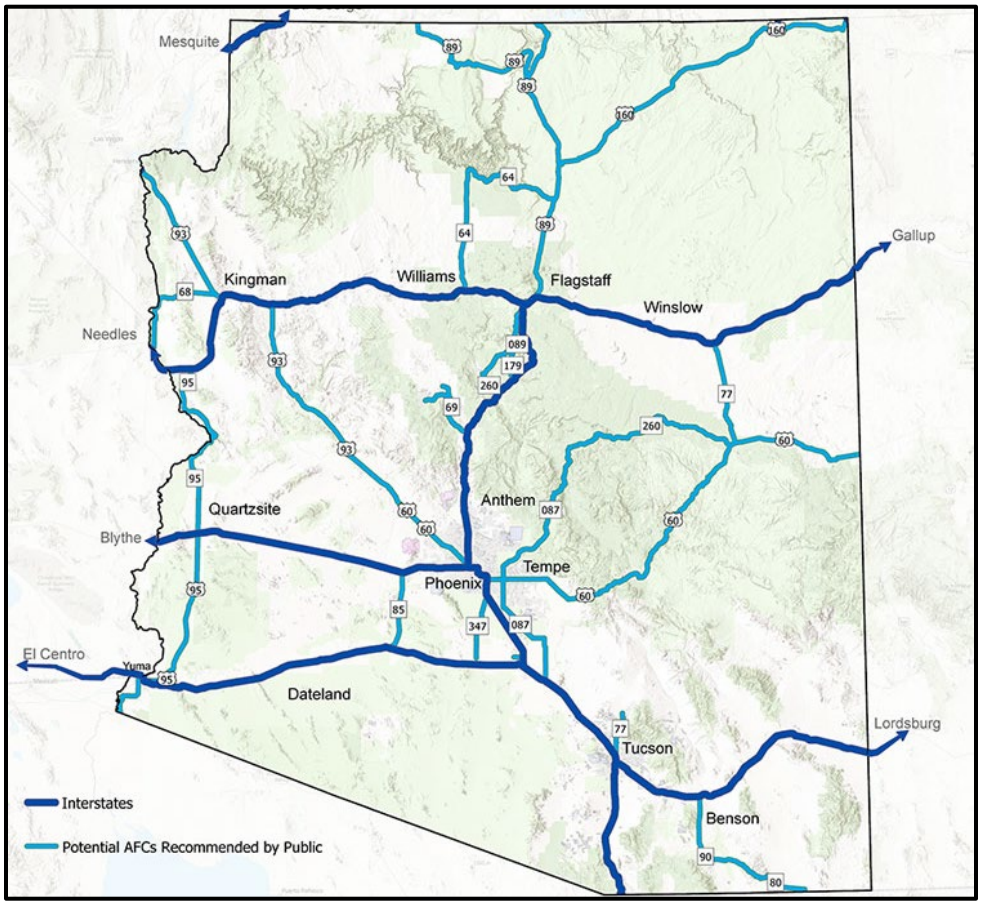
1. Once the initial charging stations planned for the interstate highways are built, ADOT will be able to recommend other state highways as alternative fuel corridors. This would allow for additional stations to be built on those highways based on future federal funding. Some criteria for recommendation have already been identified, like the need to benefit underserved/disadvantaged communities. The list below represents some additional considerations. **Please rate the following factors based on how important they should be in choosing and prioritizing additional highways for fast-charging stations.**

	1 – Less Important	2	3	4	5 – More Important
Providing connectivity along non-interstate highways in Arizona that connect with other states					
Accessing major parks and tourist attractions/destinations					
Connecting rural and tribal areas					
Connecting the Phoenix and Tucson metro regions with other communities in the state					
The amount of vehicle traffic currently using the highway					
Availability of existing services (e.g., gas stations/convenience stores, fast food, etc.) along a route for potential charging station sites					
How feasible and cost-effective implementation would be					

What other factors should ADOT consider?

1. The following sections of the state highway system were included in the initial Plan as a preliminary list of potential new candidates for alternative fuel corridors. **Please select the top five locations you would like to see added to the statewide electric vehicle charging network.**

- ☐ US 60 – Phoenix to Wickenburg
- ☐ US 60 – Phoenix to Globe
- ☐ US 60 – 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
- ☐ SR 77 – 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
- ☐ US 89 – Flagstaff to UT
- ☐ SR 90 – I-10 to Bisbee
- ☐ US 93 – Wickenberg to I-40
- ☐ US 93 – 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
- ☐ SR 260 – Camp Verde to Sedona
- ☐ SR 287 – Casa Grande to I-10
- ☐ SR 347 – Maricopa to I-10



1. ADOT is currently exploring which payment methods should be available at EV charging stations built as part of this program. **Please rate the following payment methods based on how important you feel they are to include at EV charging stations.**

	1 – Less Important	2	3	4	5 – More Important
Chip-and-pin credit and debit cards					
Contactless payment (tap-to-pay cards)					
Phone-based payment like Apple Pay or Samsung Wallet					
Vehicle-based payment					
App-based payment method through charger network operator					

2. ADOT is considering making station information available online through websites or phone apps. **Please rate the following information based on how useful it would be to EV drivers who need to charge their vehicle.**

	1 – Less Important	2	3	4	5 – More Important
Number and type of chargers installed at the location					
Number and type of chargers currently available					
Charging pricing					
Availability and hours of operation at location					
Availability or services near the location					

What other information should ADOT explore making available online?