In the matter of possible modifications to the Arizona Corporation Commission's Energy Rules.

Docket No. RU-00000A-18-0284

SWEEP & WRA Comments on the Implementation of the Commission's Electric Vehicle Policy Statement


The Southwest Energy Efficiency Project (SWEEP) and Western Resource Advocates (WRA) appreciate the opportunity to provide these comments in response to the request for input on next steps to implement the Commission’s Policy Statement on Electric Vehicles (EVs).¹

Our comments address four areas:

1. The economic, ratepayer, and air quality benefits of increased EV deployment.
2. The role of utilities in EV advancement.
3. Implementation models from other states to help Arizona identify and implement best practices.
4. SWEEP and WRA’s recommendations for implementation of the Commission’s Policy Statement on EVs.

I. The Economic, Ratepayer, and Air Quality Benefits of Increased EV Deployment

The benefits of plug-in EVs (PEVs) are wide-ranging: They accrue to all utility customers, Arizona drivers, and the owners and developers of charging stations. PEVs also reduce air pollution, generating air quality and public health benefits for all Arizonans.

Arizona stands to benefit from increased transportation electrification in a number of ways:

- **Improved air quality and public health** - Because EVs have no tailpipe emissions, they can deliver significant air quality and public health benefits. As the emissions intensity of electricity production decreases due to higher levels of renewable energy penetration, these benefits will grow.

- **Reduced consumer fuel costs** - Because electric motors are much more efficient than internal combustion engines, the cost to fuel them is significantly lower. The average American household spent approximately $1,977 on gasoline in 2017.² In Arizona, EV drivers can expect to save between $515 and $730 annually on fuel and maintenance costs, totaling between $6,000 and $9,000 over the life of the vehicle³ - money that consumers can direct back into the Arizona economy.

- **Enhanced utilization of the electricity grid and potential to lower electricity rates for all Arizona ratepayers** - EVs offer utilities an opportunity to increase the demand for electricity, especially during off-peak hours when there is significant underutilized electric generating capacity. If underutilized capacity is used more frequently, the fixed capital costs of the system will be spread out over more generation and sales, which can reduce pressure on rates for all customers. Managed EV charging also has the potential to help align load with solar production,⁴ as EVs can be charged during the day (when there is excess solar production).

A recent economic analysis by M.J. Bradley & Associates quantified these benefits for Arizona under two scenarios:⁵

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² U.S. Energy Information Administration, "U.S. household spending for gasoline is expected to remain below $2,000 in 2017," [https://www.eia.gov/todayinenergy/detail.php?id=33232](https://www.eia.gov/todayinenergy/detail.php?id=33232)


1. A moderate PEV adoption scenario that modeled 400,000 PEVs on the road by 2030 and 1 million PEVs by 2050. And,

2. A high PEV adoption scenario that modeled 1 million PEVs on the road by 2030 and over 7 million PEVs by 2050 (or approximately 90 percent of passenger cars and light trucks by 2050).

The benefits of the high PEV adoption scenario for Arizona are summarized in Table 1.

Table 1: Example Economic, Consumer, and Air Quality Benefits of High PEV Adoption in Arizona

| Utility Customer Savings Benefits | - $176/year in 2050 to all Arizona utility ratepayers if EVs are charged off-peak.⁶ 
|                                | - $50/year in 2050 to all Arizona utility ratepayers if EV charging is not managed.⁷ |
| Air Quality Benefits            | - 2,900 tons/year of reduced nitrogen oxides (NOx) emissions by 2050.⁸ 
|                                | - 26 million tons/year in reduced CO₂ emissions equating to $220 million in reduced annual compliance costs in 2050 and $1.3 billion in avoided damages in the year 2050.⁹ |
| Plug-In Electric Vehicle Driver (PEV) Savings | - $591/year in savings per vehicle in operating costs 2050.¹⁰ 
|                                | - 370 million barrels of gasoline saved by 2050. |
| Public Charger Benefits         | - 440,000 Level 2 Chargers by 2050. 
|                                | - 23,000 DC Fast Charging stations by 2050. |

Under the high PEV adoption scenario, utility customer savings benefits, air quality benefits, PEV driver savings benefits, and public charger benefits provide a total net benefit of $31 billion by 2050. With this high adoption of EVs, all ratepayers, including

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⁶ Ibid, Page 16.  
⁷ Ibid, Page 15, Figure 13.  
⁸ Ibid, Page 19. Ozone is formed when volatile organic compounds (VOCs) and NOx react in the presence of sunlight and vehicles are one of the largest sources, accounting for a third of the anthropogenic sources of VOCs and more than half of NOx. In 2018 Maricopa County had 40 days in a row when ozone levels exceeded federal standards. Tucson violated these standards for the first time in 2018. For more information on the health impacts of ozone see: United States Environmental Protection Agency, Health Effects of Ozone Pollution, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution  
⁹ These values represent the value in one year (2050), not the cumulative value over the 30+ year period. The damages estimate is based on the federal estimate of the social cost of carbon, using the median estimate of damages and 3% discount rate.  
non-EV drivers, can save substantially on their utility bills. See Figure 1. However, these benefits will only be realized if EV charging primarily occurs during off-peak time periods. While there will be times that EV drivers will have to charge during peak times, the study assume that 92% of EV drivers will charge their vehicle overnight during off-peak times, with 78% of EV drivers charging exclusively at home, and 22% of EV drivers charging both at home and at work.

Figure 1: Comparison of Ratepayer Savings With More Electric Vehicles

<table>
<thead>
<tr>
<th>For each electric ratepayer:</th>
<th>For each EV driver:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$176 in savings annually on their electric utility bill, even if they don’t own or drive an EV.</td>
<td>$590 (net of purchased price) in savings per vehicle per year in annual operating cost savings.</td>
</tr>
</tbody>
</table>

Figure 2 below provides additional illustration on how increased EV deployment can lower rates for all Arizona ratepayers. First, more EVs lead to increased electricity sales. Second, with managed charging, EVs are charged during off-peak periods, which leads to better utilization of grid assets. Third, with better utilization of grid assets, utilities can maintain revenue streams that grow faster than the cost to serve ratepayers. Finally, when revenues outpace costs, utilities can offer lower rates for customers because their revenue requirement will decrease. The model is a win-win outcome for regulated utilities and Arizona ratepayers. Importantly this outcome necessitates well-crafted rate design that provides the right price signals to “nudge” customers to charge their vehicles during off-peak times. For this reason, it is essential that regulated utilities design and implement effective rate designs and enhance customer education and understanding of EV rates.

11 Ibid, Page 8.
12 Ibid, Page 8.
II. The Role of Utilities in EV Advancement

In order to realize these substantial benefits of EV deployment, there will need to be a significant increase in the level of EV adoption in Arizona. It is also critical that EV charging infrastructure be sited and managed in ways that will maximize benefits to ratepayers and the grid.

Electric utilities, in partnership with charging companies, state agencies, federal government, and other stakeholders and partners, are uniquely positioned to address the barriers to increased EV deployment because they:

- Can serve as a trusted source of information about EVs and charging solution options.13
- Have established relationships with their customers.14
- Can communicate and educate on the benefits of transportation electrification.15

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14 Ibid.
15 Ibid.
Can steward the deliberate, careful planning necessary to direct EV charging load off-peak; to reduce the need for unnecessary, expensive distribution system upgrades; and to integrate variable renewable resources onto the electricity grid.\textsuperscript{16}

For these reasons, electric utilities are well poised to play a key role in both facilitating widespread electrification and helping to manage charging to maximize ratepayer benefits and minimize ratepayer costs. With a clear and defined role in the acceleration of electrification transportation, utilities have the opportunity to increase revenue, utilize grid assets in a more efficient manner, lower rates for all customers, and improve Arizona's air quality — among other benefits.

In particular, SWEEP and WRA note that electric utilities are in an important position to support increased EV deployment by investing in "make-ready" infrastructure. Make-ready infrastructure is all of the technology and electrical infrastructure needed \textit{before the meter} to ensure that EV charging stations are properly connected to the electricity grid. Figure 3 below illustrates the important difference between make-ready infrastructure, charging infrastructure, and EVs.

\textit{Figure 3: Illustration Depicting the Difference Between Make-ready Infrastructure, Charging Infrastructure, and EVs}\textsuperscript{17}

\begin{figure}
\centering
\includegraphics[width=0.8\textwidth]{make-ready_infrastructure}
\caption{Diagram showing the difference between make-ready infrastructure, charging infrastructure, and EVs.}
\end{figure}

\textsuperscript{16} Ibid.


Many states across the country have approved utility EV programs or are in the process of considering utility investments to spur EV deployment. Fifty-two filings on EV infrastructure and implementation have been approved for 35 utilities in 19 states, for a combined utility investment of $1.13 billion. Another 29 programs are under development. Table 2 provides example EV program budgets for multiple utilities across several jurisdictions. These examples are meant to illustrate the diversity of EV programs that have been approved. The average cost to the customer for these programs was $2.67 per year. Table 3 provides additional detail on select utility EV plans, and Table 4 provides descriptions of common EV plan components. We recommend that the Commission consider these examples to inform next steps.

Table 2: Examples of Utility EV Program Budgets

<table>
<thead>
<tr>
<th>State</th>
<th>Utility</th>
<th>EV Budget</th>
<th>Total Retail Customers</th>
<th>EV Plan Length (Years)</th>
<th>Cost to the Customer ($/Customer/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL21</td>
<td>Duke Energy</td>
<td>$8,000,000</td>
<td>1,800,000</td>
<td>5</td>
<td>$0.89</td>
</tr>
<tr>
<td>MA22</td>
<td>Eversource</td>
<td>$45,000,000</td>
<td>1,400,000</td>
<td>5</td>
<td>$6.43</td>
</tr>
<tr>
<td>NV23</td>
<td>NV Energy</td>
<td>$15,000,000</td>
<td>2,400,000</td>
<td>3</td>
<td>$2.08</td>
</tr>
<tr>
<td>OH24</td>
<td>AEP</td>
<td>$10,000,000</td>
<td>1,500,000</td>
<td>4</td>
<td>$1.67</td>
</tr>
</tbody>
</table>

18 Approved: AK, CA, FL, HI, IN, KS, KY, MA, MD, MN, NJ, NV, NY, PA, RI, UT, WA.
Table 3: Examples of Utility EV Program Details

<table>
<thead>
<tr>
<th>Utility</th>
<th>Program/plan Highlights</th>
</tr>
</thead>
</table>
| Eversource (MA)  | - Eversource plans to install make-ready infrastructure for 4,000 charging stations over the next five years, representing an investment of approximately $45 million.  
                   - Installations include charging stations at workplaces, multi-unit dwellings, and other long dwell time locations.  
                   - Ten percent (10%) of these charging stations will be installed in low-income communities.                                                                                                                                                                      |
| NV Energy (NV)   | - Shared investment program to support charging at universities, casinos, resorts, shopping centers, recreation destinations and airports.  
                   - Partnership with the Nevada Energy Office to develop fast charging along highways.  
                   - Developing comprehensive transportation electrification plans for Commission review.  
                   - Offers a rate comparison plan after the first 12 months of being on either the Electric Vehicle Time of Use Rate or the regular flat rate. If the Electric Vehicle Time of Use Rate was more costly during that period, NV Energy will credit the difference back to the customer and give the customer the option to move back to the flat rate. |

25 Rocky Mountain Power, Honk If You Love Electric Vehicles!, September 13, 2016,  
https://www.rockymountainpower.net/about/mr/mr2016/electric-vehicles.html. Utah Legislature approved $10 Million per year for 5 years within the Sustainable Transportation and Energy Plan Act.  
26 SWEEP's comments in Commissioner Dunn’s Docket: http://docket.images.azcc.gov/0000192469.pdf  
27 Make-ready infrastructure is all of the technology needed before the meter to ensure that EV charging stations are properly connected to the electric grid.  
28 https://www.nvenergy.com/account-services/energy-pricing-plans/electric-vehicle
California IOUs

- San Diego Gas & Electric (SDG&E), Pacific Gas and Electric (PG&E), and Southern California Edison (SCE) have plans that have been approved by the California Public Utilities Commission (CPUC). These plans include proposals for light- and heavy-duty infrastructure investment, and rate design for residential, commercial, and DC fast charging — together totaling approximately $738 million in investment. This investment will be implemented over five years.

- SDG&E’s Residential Charging Program was approved for up to $137 million. This investment will provide rebates to residential customers to install up to 60,000 Level 2 charging stations at home. SDG&E was also approved for a Residential Grid Integrated Rate that will allow customers to enroll in an EV-only rate that varies hourly based on day-ahead forecasts of grid conditions.

- PG&E was approved for two programs: (1) Its Direct Current Fast Charging Make-Read Program ($22 million), which will install the make-ready infrastructure at 52 sites and support 234 fast charging stations and (2) Its FleetReady Program ($236 million), which will install the make-ready infrastructure needed to support at least 700 sites for the electrification of at least 6,500 medium- or heavy-duty vehicles.

- SCE’s Medium-and Heavy-Duty Infrastructure Program was approved for $343 million. SCE will install the make-ready infrastructure for at least 870 sites to electrify at least 8,490 medium- or heavy-duty vehicles. Three new time-of-use rates for commercial customers with electric vehicles were also approved.

- The California Public Utilities Commission rejected SDG&E’s proposal to include existing EV customers in its program.

Table 4: Example EV Plan Components and Descriptions of Those Components

<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-of-use (TOU) rates/EV tariffs</td>
<td>Special tariffs to support EV adoption and encourage EV charging during times that maximize grid benefits.</td>
</tr>
<tr>
<td>Commercial tariff/demand charge optimization</td>
<td>Special tariffs designed for DC fast chargers to encourage charging station development and customer charging during times that maximize grid benefits.</td>
</tr>
<tr>
<td>Utility investment in charging infrastructure</td>
<td>Direct utility investment in charging infrastructure often with a focus on underserved markets including multi-family housing, low-income communities, workplaces, heavy-duty vehicle electrification, and highway corridors.</td>
</tr>
</tbody>
</table>

29 http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M215/K467/215467739.PDF
31 Ibid, Page 1.
32 Ibid, Page 1.
| Utility investment in electrical service to support EV charging (make-ready infrastructure) | Electric grid infrastructure upgrades and improvements on both sides of the meter to ensure that everything is “ready” for the installation of charging stations. |
| Public transit electrification | Investments to support airport, port and truck stop electrification and to help mass transit agencies accelerate bus electrification. |
| Utility rebates for charging | Utility rebates for chargers. |
| Utility rebates for vehicles | Utility rebates to assist with EV purchases often with a focus on underserved markets, including low-income communities. |
| Upstream and midstream incentives for car dealerships | Rebates to encourage car sales teams to actively market EVs.³⁴ |
| Car-share/taxi/ride-share pilot programs | Charging and incentives to support the conversion of car-share/taxi/ride-share vehicles to electric³⁵ and to educate riders when they are riding in an EV. |
| Group purchasing programs | Programs in partnership with municipalities and vehicle stores to offer special group purchasing discounts to increase EV uptake. |
| Research and development | Examples might include pilot programs to research vehicle-to-grid applications, charging behavior, optimal siting of charging locations, co-location of EVs with distributed energy resources and associated impacts to the distribution grid, etc. |
| Specialized trainings and education for key industry stakeholders | Training and education for key stakeholders including auto dealerships, fleet managers, car salespeople, builders/electricians/architects/engineers, facility managers, and sustainability managers. |
| Customer education & outreach | Robust marketing, communication and outreach efforts to educate customers about EVs, including partner rewards and recognition, ride and drive and workplace “pop-up” events, etc. |

³⁴ Dealerships and car salespeople can “make” or “break” an EV sale and it is critical to keep them engaged, educated, and motivated to spur EV adoption.

³⁵ Car-share, taxi, and ride-share vehicles are driven many more miles than the typical vehicle and therefore have the opportunity to deliver significant grid benefits if electrified.
IV. SWEEP and WRA’s Recommendations for Implementation of the Commission’s Policy Statement on EVs

To realize the substantial benefits of transportation electrification, SWEEP and WRA recommend that the following EV implementation topics be considered and addressed as part of the Commission’s efforts. Addressing these recommended topics and issues would authorize the Commission-regulated utilities to undertake activities in 2019 and 2020 in order to implement the Commission’s Policy Statement on EVs.

Pilots, Implementation Plans, and Joint Comprehensive Plan

- Regulated utilities should operate pilot programs in 2019 focused on the deployment of EV infrastructure, EV charging, and effective rate designs, to gain information and insights on this growing load and the opportunities for Arizona. The utilities should file a description of 2019 pilot activities for Commission review by June 1, 2019.

- Regulated utilities should develop and file transportation electrification implementation plans for 2020 by September 1, 2019, for Commission consideration and approval.

- In order to plan ahead and assess the opportunities and issues for Arizona, the utilities should coordinate and jointly develop, with stakeholder input, a joint, long-term, comprehensive transportation electrification plan for Arizona, to be filed by December 31, 2019, for Commission review and approval.

- The Commission and the ACC-regulated utilities should work with the Governor’s Office, the legislature, the Associations of Governments, and other agencies such as the Arizona Department of Transportation, the Arizona Department of Environmental Quality, and Chambers of Commerce to enable and promote EVs, EV infrastructure, and the electrification of Arizona’s transportation sector. These agencies and stakeholders could provide input and review the utilities’ joint comprehensive transportation electrification plan (described above).

Rate Design, Authorized Activities, and Cost-Recovery

- Regulated utilities should maximize electric grid benefits through the design and implementation of appropriate rate designs applicable to EV charging. To accomplish this, ACC-regulated utilities should propose optional rate design tariffs to encourage customers to charge vehicles during off-peak hours and that create overall system benefits. Regulated utilities should also develop optional rate design tariffs for workplace and fleet charging, and for DC fast charging that addresses low load factor public charging without requiring high demand charges that would discourage the advancement of public fast charging.
- Public Service Corporation investments in EV infrastructure (and cost-recovery of any ratepayer funding for EV programs in 2019 and 2020) should be addressed in the next rate case for each regulated utility, similar to the treatment of other capital expenditures. In the period prior to the next rate case, the prudent capital costs of regulated utilities for EV make-ready infrastructure and chargers should be tracked for review and reconciliation in the next rate case.

- In the period until the next rate case, EV program costs in 2019 and 2020 should be addressed either through an accounting order with reconciliation and recovery in the next rate case, or through an interim incremental addition to the Demand-side Management (DSM) surcharge, which would result in an incremental increase in the DSM surcharge until reconciliation in the next rate case. EV program expenditures may include education and outreach activities, rebates and incentives offered to customers for make-ready equipment or for chargers, targeted support for buses and heavy-duty electric vehicles, and research, technical services, and administration. Limited income customers on low-income rates should not be required to pay the incremental costs for the EV programs since there are limited opportunities for low-income customers to benefit from EVs in the early years of the EV market.

- The mechanism for Commission authorization and cost recovery for EV programs in 2020 and future years should be addressed in the next rate case for each regulated utility or in Commission review of the 2020 transportation electrification implementation plans.

- Regulated utilities should not be prohibited from offering Electric Vehicle chargers to customers and may install and seek recovery for chargers owned by the utility, but only in a manner that is fair to competitive providers and the competitive marketplace. Utility efforts may be particularly important to ensure buildout in rural and low-income areas, for school buses and public transit buses, for multi-dwelling units, for interstate corridors or highways, and to fill other important gaps in the EV charging infrastructure market. Regulated utilities should be able to propose turn-key solutions for end users in other market segments, in a manner that supports consumer choice and helps to reach a wide range of utility customers while also ensuring and supporting a competitive marketplace. If a Commission-regulated utility deploys EV charging stations, the prudent costs of this charging infrastructure may be reviewed for inclusion in rate base in a future rate case.

Information and Future Stakeholder Workshops

- Regulated utilities should track and record valuable information on the deployment of EV infrastructure and charging stations, customer charging patterns, and rate designs and incentive programs.
- Commission Staff should continue discussions with the utilities and stakeholders on the issue of EVs, EV infrastructure, and the electrification of the transportation sector through future stakeholder meetings and report to the Commission on a regular basis with recommendations for the Commission's further consideration. One future workshop could be held to review and discuss the pilot plans for 2019. Another potential workshop could focus on opportunities for electrification of heavy-duty vehicles.

Thank you for the opportunity to submit these comments.

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