Locating Electric Vehicles in Cooperative Service Territories

Key Findings

- With an increasing demand for electric vehicles nationwide, electric vehicles provide the potential for electric cooperatives' load growth. Predicting and managing this load growth provides opportunities and challenges for cooperatives.
- Understanding the number of electric vehicles in their service territories can help cooperatives to better plan for current and future impact to their electric load.
- Although there is no easy method of determining the exact number of electric vehicles currently in a service territory, there are several available options for electric cooperatives to gain insight into locating electric vehicles and to be able to track those numbers over time.

What has changed?

Electric vehicles (EVs) have increased in popularity nationwide in recent years. This popularity has grown for many reasons, including lower maintenance and fuel costs over the life of the vehicle, lower carbon emissions, and a more enjoyable driving experience. EV owners have the option to either charge their vehicle at home, work, or at public charging locations. Additional electricity demand from EVs will likely have a significant impact on utilities in coming years, thereby creating a challenge to serve this growing market. However, EVs also present an opportunity for co-ops to engage with their consumer-members in a positive and meaningful way.

What is the impact on cooperatives?

The rise of EVs presents an opportunity for cooperatives across the country to grow their electricity load after decades of fairly flat load growth. Proactively managing the potential load growth will be crucial for co-ops to best realize the benefits of this new load source. Without proper preparation, there could be negative impacts for co-ops and their members, such as higher electricity costs and higher peak demand. With proper preparation, electric vehicles can provide additional revenue, provide a flexible and reliable load, and can help add to cooperatives' financial strength and increase consumer engagement. EVs are a highly flexible load which allows co-ops to work with their members to plan and shift charging away from peak demand hours to hours of low usage.

Many co-op consumer members already own electric vehicles, and a growing number are interested in buying electric vehicles. As a starting point for cooperatives planning for future EV electricity load, there needs to be a way to accurately determine the number of vehicles currently in their service territory.

What do cooperatives need to know or do about it?

While there is no easy means of determining the exact number of EVs currently in a service territory, there are several options to help cooperatives gain insight into locating EVs, and to potentially track the growth of EV adoption over time. Each option provides reliable quantitative results, although these options have varying limitations. For example, some options only track EV deployment at the zip code level, rather than the more precise zip+4 level. The following is a non-exhaustive list, with additional information, of possible paths that co-ops can take to understand the number of electric vehicles in their service territory:

- Atlas EV Hub
- Advanced Metering Infrastructure (AMI) Data
- Electric Power Research Institute (EPRI) with IHS Markit Data
- Department of Motor Vehicles (DMV) State Registration Data
- Market Research and Surveys
- Cooperative Incentives for EV owners

Atlas EV Hub

What is it?

The Atlas EV Hub is built by Atlas Public Policy, a policy technology firm, which works closely with individual state DMV offices and state government offices to receive access to EV registration data by state. Atlas Public Policy then cleans the raw data to be posted online in two forms, as a dashboard on their "State EV Registration" page online and as a direct data download. The public dashboard and data can be found here.

Details

This option is free, publicly available, and includes information such as vehicle make and model for both Plug-in Hybrid Vehicles (PHEVs) and Battery Electric Vehicles (BEVs). However, the database only currently covers 14 states[1], and only specifies the location down to the zip code level for privacy purposes.

As an option for those with an EV Hub account through an annual subscription, Atlas EV Hub has a methodology in place to map utilities to zip code, however, the methodology may be biased towards mapping to large IOUs and municipal utilities in counties with more than one utility. Although utility territories are not neatly divided by zip code in the United States, Atlas EV Hub uses their methodology to best approximate the primary utility in specific zip code. The zip code is first compared to the utility-zip mapping from OpenEI[2] to identify the utility. However, if there is no utility defined on OpenEI, then the methodology calls to look at utility-county data from the U.S. Energy Information Administration (EIA). If there is more than one utility that operates in a given county, then the largest utility (measured in MWh

[1] CA, CO, CT, FL, MT, MI, MN, NJ, NY, OR, TX, VT, VA, WA, and WI.
[2] OpenEI is "a knowledge-sharing online community dedicated to connecting people with the latest information and data on energy resources from around the world." https://openei.org/doe-opendata/dataset/open-energy-information-openei-org

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served according to EIA) is chosen, which could bias the tool towards large IOUs or municipal utilities in metropolitan areas where co-ops serve suburban areas.

Tracking growth

The frequency of data updates depends on the state, either annually, bi-annually, quarterly or monthly. To continue tracking the growth of EV adoption, it will be useful for co-ops to understand the frequency of updates in their state and have a standard methodology in place to process the data for cooperative analysis.

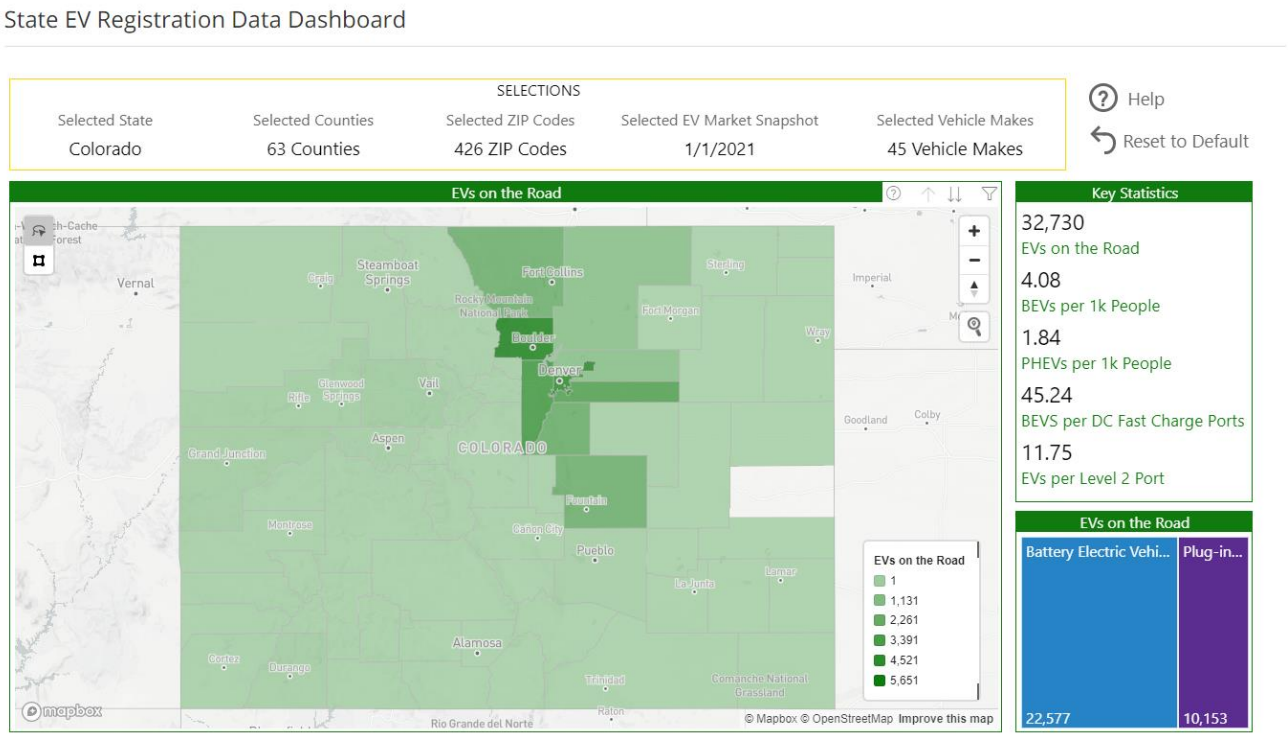

Figure 1: Portion of Atlas EV Hub Dashboard
(Credits: Atlas Public Policy Website)

Advanced Metering Infrastructure (AMI) Data

What is it?

Electric cooperatives can use AMI data to help locate electric vehicle load on the most granular level at the electric meter. When charged at home, electric vehicles are a major residential load and likely use more electricity than any other device for an entire home. Looking at changes in home load patterns and meter data over time can give insight into whether a homeowner has an electric vehicle. There are certain "fingerprints" that stand out to potentially identify if someone is charging their electric vehicle at home and can be isolated using modeling techniques.

EV owners have two options when charging at home, Level 1 charging or Level 2 charging. Level 2 chargers can fully charge an EV much more quickly than Level 1 chargers (up to 5 hours vs. up to 24 hours), because of a higher voltage circuit (240-volt vs. 120-volt). When EVs are plugged into a Level 2 charger, the jump in

residential demand is easier to detect than for Level 1 charging. For more information on EV charging strategies, see our related report: Electric Vehicle Charging Control Strategies and the Additional Resources listed at the end of this document, as well as other information on our website www.cooperative.com.

Details

NRECA is currently developing a model to disaggregate residential electric load that can help to separately identify electric vehicle load. The model is built around power flow simulations and are being validated with real-world data from three cooperatives, Holy Cross Energy, Poudre Valley Rural Electric Cooperative, and Rappahannock Electric Cooperative, which makes this model especially applicable for cooperatives. NRECA expects to complete the model in the next few months and to have the model available for use on our Open Modeling Framework website: www.omf.coop. If interested, please contact David Pinney, NRECA Principal – Analytics, Tools & Software, at David.Pinney@nreca.coop with any questions or comments.

Tracking growth

To track EV growth over time, cooperatives can periodically use updated AMI data to run through a load disaggregation tool or other EV detection tool to observe any changes in the results between each update.

Electric Power Research Institute (EPRI) with IHS Markit Data

What is it?

EPRI, a non-profit organization that conducts research on issues affecting the electricity utility sector, purchases a dataset from the firm IHS Markit that includes data on all registered vehicles in the country. Cooperatives that are members of EPRI have access to the data and can analyze it to sort through electric vehicles in their service territory. EPRI is also working to make the data more user-friendly by developing an EV dashboard on their website and expects to finish this dashboard in the next year.

Details

Dairyland Power Cooperative (Dairyland), for example, is a member of EPRI and was able to analyze and sort through EPRI's data to identify electric vehicles in the service territories of their three distribution cooperative members that serve electricity in Iowa. Through a series of steps to sort the data using Microsoft Excel, Dairyland found records of EVs that could belong to consumer-members of one of their distribution co-ops. Dairyland could then provide this data to the distribution co-op, and the co-op could then look at the zip+4 code of each EV record and determine if the owner is a member.

Distribution cooperatives that are not members of EPRI will not have direct access to this data, however distribution co-ops can check with their G&T to see if they are a member and request access to the data through their G&T.

Tracking growth

EPRI will continue to have this data available to co-ops that need it. Cooperatives that are members of EPRI can reach out to their EPRI contact representative periodically to update their EV data and observe any

changes. When analyzing and sorting through the data the first time, writing down all steps of the process will be useful for future data updates.

Department of Motor Vehicles (DMV) State Registration Data

What is it?

Every state DMV office has data on all state vehicle registrations at the zip code level, which includes EVs. Electric cooperatives can directly request this data from their state DMV for the purposes of locating EVs in their territories, if this data is not already included in public databases such as the Atlas EV Hub. Having the data on all types of vehicles, not just EVs, can also help cooperatives to predict which types of cars are most likely to be replaced with EVs in the future.

Details

Many states have privacy restrictions, and some state DMV offices may not be able to provide any data. Typically, state DMV offices that do share the vehicle registration data with cooperatives already have an agreement for data sharing with the utilities in the state. Depending on the upkeep of the data, the registration data may not include all important information, such as distinctions between Plug-In Hybrid EVs (PHEVs) and Battery EVs (BEVs). Cooperatives may also need a Vehicle Identification Number (VIN) decoder as a way to distinguish between PHEVs and BEVs in the registration data.

Tracking growth

The state vehicle registration data can be periodically requested from the state DMV office to observe any changes. The cooperative can also ask upfront for periodic updates from the state DMV office.

Figure 2: Chevrolet Bolt EV by Holy Cross Energy and Charging Station in Eagle, Colorado
(Credits: Joey Calabrese, Holy Cross Energy)

Market Research and Surveys

What is it?

Cooperatives that wish to collect EV data solely within their service area can utilize market research and send out surveys to consumer-members. NRECA Market Research Services provides a wide range of different services to help cooperatives engage with their consumer-members. Using surveys to collect data can provide the cooperative with much more information on EV owners beyond just the question of ownership and can get into more behavioral questions that can be crucial to cooperative electric load planning. For additional information on NRECA Market Research Services, contact Mike Sassman, NRECA Manager – Market Research, at Mike.Sassman@nreca.coop.

Beyond market research, NRECA also provides several EV-related consulting services that can help cooperatives to better engage with their membership and plan for EV growth. These services can also help to identify EV owners within a service territory. Topics covered include:

- Strategic Planning
- EV Pilot Management
- Dealer Engagement
- Grant Writing
- Consumer Engagement Design

For information about these service offerings, please contact Brian Sloboda, NRECA Director – Consumer Solutions, at Brian.Sloboda@nreca.coop with any questions.

Details

This option ensures that responses are solely within a co-op's territory, rather than database options that provide information only at the zip or zip+4 levels, which can leave room for uncertainties. Those that respond to the survey, or another EV-related service, also provide a direct contact with the cooperative, which allows the cooperative to promote specific EV programs to those consumer-members. However, not all consumer-members may respond to the survey, thereby leaving the cooperative without a complete picture.

Tracking growth

Cooperatives can use shorter and more frequent surveys related to EV ownership questions to best track any changes in EV ownership or behavioral patterns over time.

Cooperative Incentives for EV Owners

What is it?

Cooperatives can use incentives or other similar programs to help identify EV owners in their service territory, which motivates EV owners to contact the co-op themselves. This option is particularly helpful if the cooperative wants to work directly with their consumer-members.

One example of an incentive the cooperative can offer is an EV rebate, which encourages EV owners to contact the cooperative. Rebates as low as $50 per vehicle can be enough for EV owners to contact their cooperative. When the EV owner applies for a rebate the cooperative can include a brief survey, with questions such as “Is this your primary or secondary vehicle?” or “Where do you plan to charge your vehicle?” which provides the cooperative with valuable information.

Another example is an EV rate incentive, motivating consumer-members who would like a special EV rate to contact their cooperative. A pricing mechanism can incentivize EV owners to match their charging behavior with an off-peak period, thereby benefitting to both the consumer-member and the cooperative. Other programs such as offering rebates or selling/leasing Level 2 chargers to residential members can also motivate consumer-members to contact their co-op. This approach allows the co-op to educate the consumer-member on optimal times to charge their EV.

Details

This option establishes direct contact with consumer-members and the opportunity to personally interact with them in the future. Additionally, when developing survey questions for an EV rebate or rate incentive, it may be necessary to work with a legal team to ensure that the appropriate questions are asked to avoid any privacy concerns. This option requires more hands-on effort on the part of the cooperative, which should be considered when deciding on different paths locating EVs in a service territory.

Tracking growth

For tracking EV adoption over time, the incentive could be made available for a relatively long period of time to have a continuous stream of consumer-members reaching out to the cooperative. Alternatively, the incentive could be made periodically available for a shorter time frame.

Additional Resources

- Atlas EV Hub – State Registration Data
- EPRI
- NRECA Market Research Services
- Planning for Electric Vehicles – PHEV mapping distribution and workplace charging in NJ and PA
- Consumer Expectations of Electric Vehicle Owners
- Gearing Up for Electric Vehicles: Residential Electric Vehicle Service Equipment (EVSE) Program Design for Co-ops
- Electric Vehicle Charging Control Strategies

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