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FINAL PROJECT REPORT

Tahoe-Truckee Plug-in Electric Vehicle Readiness Plan

A Road Map to Charging Infrastructure and Zero Tailpipe Emissions

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Prepared by: Tahoe Regional Planning Agency and ICF

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PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program, formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program. The statute authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to $20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about $100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance, and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued PON-14-607 to prepare the Tahoe-Truckee region for Plug-in Electric Vehicle readiness. In response to PON-14-607, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards May 1, 2015 and the agreement was executed as ARV-14-056 on June 30, 2015.

ABSTRACT

The deployment of plug-in electric vehicles has the potential to reduce petroleum consumption and greenhouse gas emissions dramatically. However, the success of long-term transportation electrification will depend in part on the near-term deployment of vehicles and charging infrastructure. The transition towards higher rates of plug-in electric vehicles adoption and deployment of the corresponding charging infrastructure requires a broad range of stakeholders to prepare and plan for deployment.

The Tahoe Regional Planning Agency has partnered with the Truckee-Donner Public Utility District and a regional coordinating council to accelerate transportation electrification in the Tahoe-Truckee Region. This report, which was created with the help of the ICF Consulting Firm, and the Tahoe-Truckee Regional plug-in electric vehicles Readiness Plan, is a critical component of this broader effort, and is an important example of local and regional planning agencies proactively engaging the community and developing a plan towards meaningful action. The Plan reviews the readiness elements associated with key actors in the plug-in electric vehicles' ecosystem–namely, local and regional governments, plug-in electric vehicles drivers (inclusive of residents, second homeowners, and visitors), tourist destinations and utilities. This report assesses existing trends, regional barriers to plug-in electric vehicles adoption, and future deployment projections. It includes short-, medium, and long-term readiness recommendations focusing actions related to local plans, policies, building and zoning codes, parking regulations, permitting and inspection, stakeholder outreach and training, regional coordination, and utility planning.

Keywords: Battery electric vehicles (BEVs), electric vehicles (EV), plug-in electric vehicles (PEVs), Tahoe Regional Planning Agency (TRPA), U.S. Federal Highway Administration (FHWA) zero emission vehicles (ZEV).

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EXECUTIVE SUMMARY

The Tahoe Regional Planning Agency has partnered with the Truckee-Donner Public Utility District, a consulting team, and a newly initiated Tahoe-Truckee Plug-in Electric Vehicle Coordinating Council to accelerate transportation electrification in the Tahoe-Truckee Region. Including participation from different localities and interests, the Tahoe-Truckee plug-in electric vehicles Coordinating Council was convened quarterly from 2016 to 2017 to garner support and advance recommendations and implementation.

Tahoe Regional Planning Agency strives to be a leader in promoting sustainability and environmental improvements in the Tahoe-Truckee Region. Most notably, Tahoe Regional Planning Agency is a member of the Tahoe Basin Partnership for Sustainable Communities and played a leading role in developing the Sustainability Action Plan, which includes strategies to reduce greenhouse gas emissions. In addition, Tahoe Regional Planning Agency has recently released the 2017 Regional Transportation Plan, referred to as Linking Tahoe, which includes a Sustainable Communities Strategy in accordance with Senate Bill 375 (SB 375 the Sustainable Communities and Climate Protection Act). In addition, the Sustainable Communities Strategy highlights how integrated transportation, land use, and housing strategies will help the region meet environmental goals, including greenhouse gas emission reduction targets.

While the Sustainable Communities Strategy is focused on a combination of reducing vehicle travel and enabling mobility, it is important to recognize that greenhouse gas emissions from vehicle travel are a major contributor to the region's footprint. As such, it is important that parallel efforts ensure that the vehicles that are driven are more efficient and lower emitting. For instance, Tahoe Regional Planning Agency and other agencies are working with the U.S. Federal Highway Administration to make I-80 and U.S. 50 electric vehicle ready since these corridors are designated as signage-pending Alternative Fuels Corridors.

The focus of this document is on plug-in electric vehicles because they play a critical role in the region's broader efforts to reduce the greenhouse gas emissions of vehicles. Tahoe Regional Planning Agency and other partner agencies have prioritized improving accessibility to infrastructure to facilitate the use of plug-in electric vehicles and other zero emission vehicles. The use of plug-in electric vehicles and other zero emission vehicles instead of conventional vehicles has the potential to dramatically reduce greenhouse gas emissions and petroleum consumption, improve water quality/clarity, reduce noise, and increase energy independence.

Readiness Planning

The demand for plug-in electric vehicles and the supporting charging infrastructure is pressing. The rate of adoption of plug-in electric vehicles is accelerating in the region and infrastructure providers have responded by deploying charging station. To date, however, much of the activity has occurred in an ad hoc and uncoordinated fashion. The objective of readiness planning is to identify, prioritize, and follow through on the actions required in the near to mid-term future that are required to unlock the long-term potential of transportation electrification as a sustainability initiative. More specifically, the plan lays out the path to make the Tahoe-Truckee Region "plug-in electric vehicles ready" by identifying the barriers to widespread deployment of charging infrastructure and outlining the actions that will reduce and resolve these barriers.

Tahoe Regional Planning Agency has partnered with the Truckee-Donner Public Utility District and a newly initiated coordinating council to accelerate transportation electrification in the Tahoe-Truckee Region. Including participation from different localities and interests, the Tahoe- Truckee Coordinating Council was convened to garner support and advance recommendations and implementation.

Statement of Goals

The coordinating council has outlined the following vision for the region:

Establish Tahoe-Truckee as a leader in mass plug-in electric vehicles deployment supported by robust plug-in electric vehicles education and engagement; a convenient network of charging infrastructure; streamlined charger installation; standardization of codes; and widespread use of renewable energy resources.

The Tahoe-Truckee Region has developed and prioritized the following three goals to help realize this vision. To help track progress towards these goals' performance metrics were also developed. More information, including metric tables, can be found on pages 42-44 of this report.

Goal 1. Maximize the share of electric miles traveled in the Tahoe-Truckee Region to achieve sustainability and environmental improvement objectives, especially reducing greenhouse gas emissions, and criteria air pollutant emissions.

This goal seeks to maximize the number of miles that can be traveled using electricity instead of conventional internal combustion engine vehicles because of its potential to reduce greenhouse gas emissions, criteria air pollutant emissions, and attain Tahoe Regional Planning Agency air quality thresholds. Furthermore, the increased mode share for zero emission vehicles has the potential to improve water quality by reducing atmospheric nitrogen deposition and gasoline flowing into the watershed, as well as reducing noise impacts from roadways. This goal emphasizes the planning role of Tahoe Regional Planning Agency and its partners to create the needed infrastructure, while not dictating the market for privately owned vehicles. The intent of this goal is to maintain flexibility with different vehicle architectures (such as battery electric vehicles and plug-in hybrid electric vehicles) and the supportive charging infrastructure and be responsive to market developments, rather than predict them.

Goal 2. Make it easier and less expensive to install electric vehicle charging infrastructure in the Tahoe-Truckee Region and make charging accessible to a broad range of users.

This goal focuses on accelerating the deployment of charging infrastructure by streamlining permitting and adding supportive incentives and policies. Local governments can help increase the number of new charger installations by reducing regulatory barriers and creating requirements or incentives for new development in zoning or building codes, or by installing chargers in key locations on publicly owned land. They can also conduct outreach, create guidance, or streamline permitting to educate landowners about the benefits of chargers. There is no one right way for local governments to increase the availability of charging; the best approach is to select the strategies that will be most effective at fostering charging opportunities where it is needed. This goal recognizes that local governments are responsible for regulating land use and development, and that local approaches vary based on agencies'

context and authority. Tahoe Regional Planning Agency's role is to help local governments identify and implement appropriate strategies.

Goal 3. Improve electric vehicle awareness among residents, second-home owners, and visitors to the Tahoe-Truckee Region.

Engaging public education and useful tools will help increase plug-in electric vehicles adoption among stakeholders, including residents, second-home owners, and visitors to the region. Consumer surveys, including a vehicle ownership survey conducted as part of the planning process, consistently show that plug-in electric vehicles awareness among consumers is lacking regarding issues such as availability of incentives, vehicle performance, and vehicle safety. This goal recognizes that changes in vehicle ownership do not occur in a vacuum, and that Tahoe Regional Planning Agency and stakeholders have a role to play in improving awareness to increase plug-in electric vehicles use.

TRPA's Electric Vehicle and Alternative and Renewable Fuel Infrastructure Targets
Increase access to fast charging infrastructure for electric vehicles and alternative fueling (natural gas and hydrogen fueling) opportunities and infrastructure along inter-regional corridors including the I-80 and U.S. 50 Signage-Pending Alternative Fuel Corridors, designated by the U.S. Federal Highway Administration, in the Lake Tahoe Region.

- Increase access to fast charging infrastructure for electric vehicles and alternative fueling (natural gas and hydrogen fueling) infrastructure along intra- regional corridors in the Tahoe Region that connect, for instance, to the City of South Lake Tahoe, Kings Beach, Stateline, Incline Village, Homewood, and Tahoe City.
- Coordinate the implementation of readiness actions identified in the Readiness Plan for electric vehicles and alternative fuels and track progress towards implementation across various segments of the planning. Continue to serve as the lead coordinating agency to facilitate stakeholder engagement and action, provide resources, and seek additional opportunities that will reduce the carbon intensity and greenhouse gas emissions from trips.

CHAPTER 1:
Regional PEV Market: Current Deployment and Forecasted Growth

Overview of PEV Market in Tahoe-Truckee

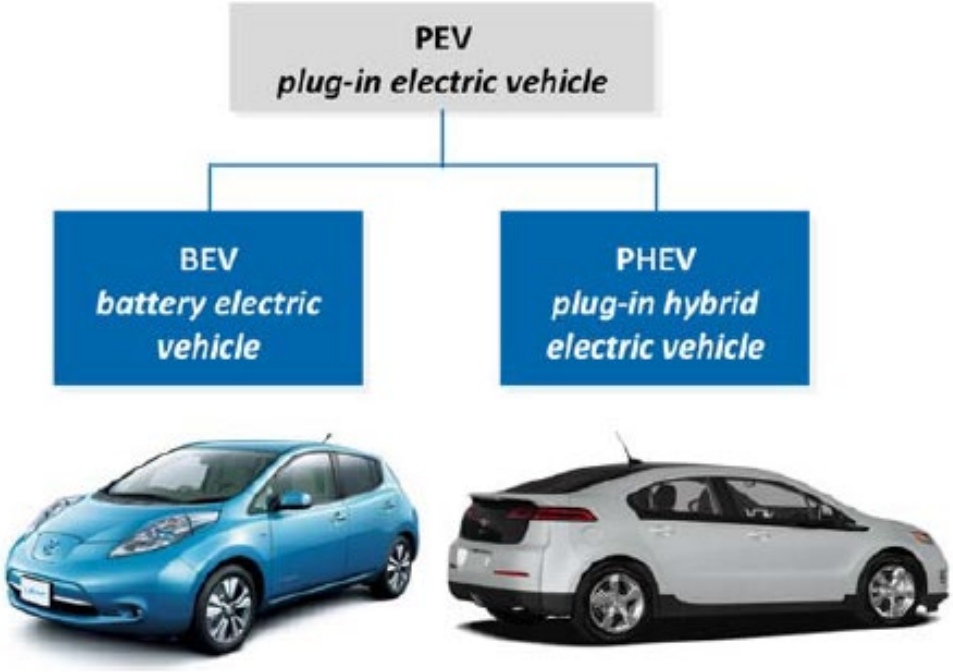
The PEV is in its nascent stages in the study region, particularly among residents. For instance, fewer than 500 residents have EV in the Tahoe-Truckee Region. Interestingly, residents currently have a propensity to purchase BEVs over PEVs by 3 to 1. As a point of comparison, the statewide market is about evenly split between the two vehicle types. This will be a key data point to track over the next several years, as it will have implications for the type of infrastructure needed to support drivers and corresponding planning focus.

Despite modest vehicle deployment to date, the Tahoe-Truckee Region as a destination for likely PEV owners has led to more aggressive penetration of charging infrastructure than what might be warranted when considering residential ownership on its own. The following sub-sections provide a brief introduction to EV and supporting charging infrastructure.

PEVs

The PEV readiness planning focuses on PEVS including PHEVs and BEVs. PHEVs have both a battery- powered motor and an internal combustion engine (that uses gasoline) capable of powering the wheels; BEVs are powered exclusively by electricity from the battery and do not use gasoline. Figure 1 shows the Nissan LEAF (BEV), and a Chevrolet Volt (PHEV).

Figure 1: One BEV and One PHEV Both Considered a PEV

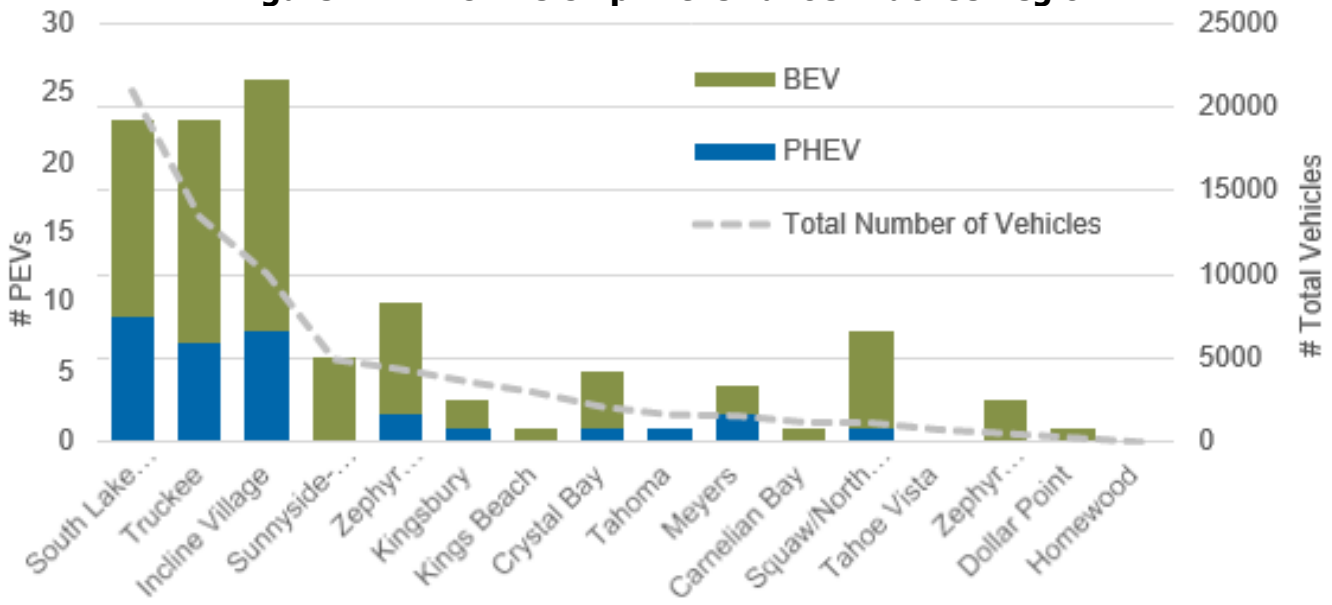


Source: ICF[1]

[1] ICF Consulting Group https://www.icf.com/

The Tahoe-Truckee Region has seen significant growth in PEV ownership over the past few years. As of March 2016, there were 115 PEVs registered by area residents, a 180 percent increase from the 41 PEVs registered in 2013. Please note that this does not take into consideration the visitors and commuters to the region. Figure 2 below shows the number of PHEV and BEV registrations by sub-region within the Tahoe-Truckee PEV planning area, from populations with the highest number of total vehicles to lowest. The Tahoe-Truckee sub-regions with the greatest number of PEVs include Incline Village, South Lake Tahoe, and the Town of Truckee. Incline Village has the highest PEV market share (0.26 percent of all vehicle types are PEVs), followed by Truckee (0.17 percent), and South Lake Tahoe (0.11 percent).

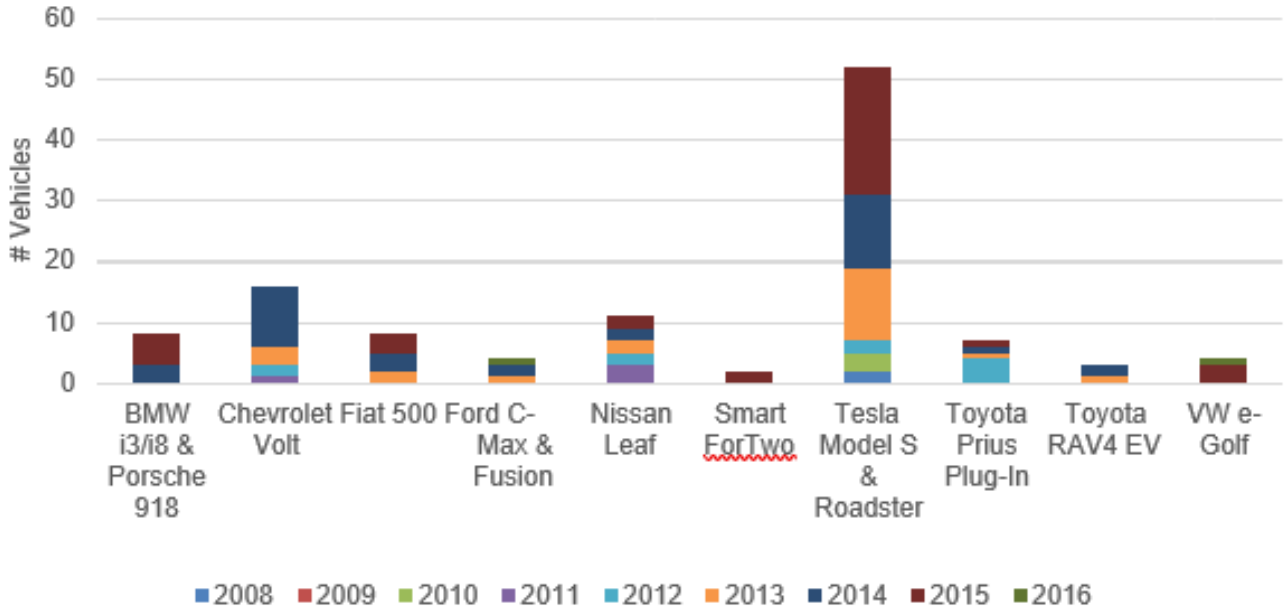
Figure 2: PEV Ownership in the Tahoe-Truckee Region



Source: ICF Analysis of data from IHS Automotive, March 2016.

Almost three quarters of the total Tahoe-Truckee PEV ownership is composed of BEVs, predominantly due to high rates of regional Tesla vehicle ownership. As shown in Figure 3 on the next page, Tesla vehicles represent 45 percent of all PEVs in the region; a trend that diverges from PEV ownership patterns in county areas outside the Tahoe-Truckee PEV Planning Area (Carson City, Douglas, El Dorado, Nevada, Placer, and Washoe) and the State of California both of which have Tesla vehicles making up 14 percent of their total PEV population.

Figure 3: Current Tahoe-Truckee Planning Area PEV Ownership by Vehicle Make/Model



Source: ICF Analysis of data from IHS Automotive, March 2016

In terms of overall market shares, the Tahoe-Truckee Region has made less progress toward hybrid and PEV adoption, particularly PHEV adoption, compared to county areas outside the PEV Planning Area and California as a whole. The data can be seen in Table 1 below. This can be attributed to a variety of factors including terrain, weather, and limited all-wheel drive PEV offerings by vehicle manufacturers.

Table 1. Market Share of Hybrid Vehicles and PEVs by Geographic Regions

Geographic Region	**Hybrid (no plug-in)**	**Total PEV (PHEV+BEV)**	**PHEV**	**BEV**
Tahoe-Truckee PEV Planning Area	1.25%	0.17%	0.05%	0.12%
County Areas Outside the Tahoe-Truckee Planning Area*	1.92%	0.28%	0.16%	0.12%
Carson City	0.90%	0.05%	0.03%	0.02%
Douglas	0.84%	0.07%	0.05%	0.02%
El Dorado	2.38%	0.61%	0.44%	0.17%
Nevada	2.25%	0.34%	0.25%	0.09%
Placer	2.86%	0.70%	0.49%	0.21%
Washoe	1.16%	0.15%	0.09%	0.06%
California Total	**3.04%**	0.62%	0.29%	0.33%

***These county area percentages exclude areas located within the Tahoe-Truckee PEV Planning Area. For example, vehicle ownership in the Town of Truckee is included in Tahoe-Truckee PEV Planning Area percentages (row 1) and excluded from the Nevada County percentages (row 6).**

Source: ICF Analysis of data from IHS Automotive, March 2016

Current Charging Infrastructure

Sixteen of the twenty-four direct current (DC) fast chargers (66 percent) are located in Truckee, and all but two of them are Tesla Super Chargers. These can only be used by Tesla vehicles, while the DC fast chargers at the Truckee Save Mart and South Lake Tahoe can be used by all BEV models. Figure 4 on the next page, shows one of the DC fast chargers installed at the Heavenly Village Parking Garage in South Lake Tahoe.

Figure 4: DC Fast Charger at Heavenly Village Parking Garage, South Lake Tahoe

Source: ICF

As shown in Table 2 on the next page, 61 percent of Tahoe-Truckee regional charge points are open to the public, as 34 of the 87 total regional chargers are for guest, employee, or private use only. Within County areas outside the Tahoe-Truckee PEV Planning Area, there are 95 charging locations with 196 Level 2 chargers and 29 DC fast chargers. Of the total 225 chargers, 89 percent are open to the public and only 19 percent are Tesla only. These trends reflect the fact that there is a larger share of Tesla BEVs in the study region than the County areas outside of Tahoe-Truckee.

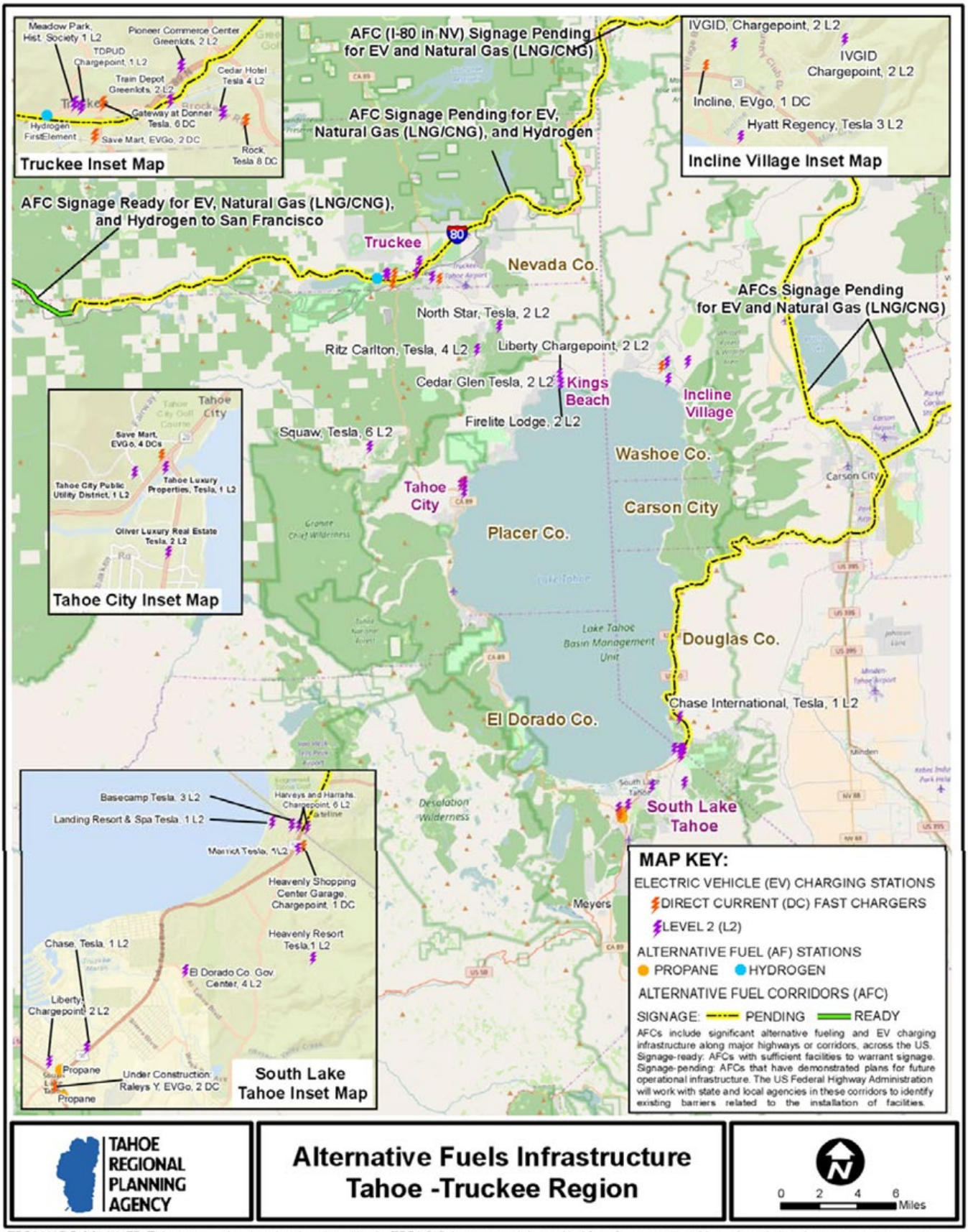
Table 2: Existing PEV Charging Infrastructure by Geographic Region and Type

Region	Charging Locations	Level 2 Chargers	DC Fast Chargers	Percent of Chargers Tesla Only	Percent Chargers Open to the Public
Tahoe-Truckee PEV Planning Area	35	63	24	45%	61%
County Areas Outside the Tahoe-Truckee PEV Planning Area	95	196	29	19%	89%

Source: ICF

Figure 5 on the next page presents a map of existing regional destination or opportunity charging stations these are charging stations that are accessible to the public or specific drivers (e.g., Tesla owners) and are used to charge a vehicle during a trip, while it is away from home. As of February 2017, there are 35 charging locations in the Tahoe-Truckee PEV Planning Area with a total of 87 chargers (i.e., plugs). Please note that charging locations often include multiple chargers or charging points– similar to a gas station with multiple pumps. The majority of these chargers (72 percent) are Level 2 connections and close to half (45 percent) can only be used by Tesla vehicles.

Figure 5: Existing Regional Charging Infrastructure



Source: ICF

Understanding Existing and Potential PEV Drivers

ICF and TRPA developed a Vehicle Ownership Survey for residents and visitors to learn more about current regional vehicle ownership trends in the Tahoe-Truckee Region. The questions were focused on current transportation needs and consumer car buying preferences (e.g., buying or leasing, vehicle manufacturers, and other considerations).

The survey was completed exclusively via the internet, and had a self-selecting sample population, rather than a random sample population. A detailed discussion of the survey methodology and results can be found in Appendix D of this report. In Table 3 we summarize the key themes and insights from the survey relevant to readiness planning, characterized as: potential for growth in the study region, challenges to growth in the study region, charging infrastructure needs, and potential areas of focus for outreach and education efforts. In Figure 6 on the next page, a summary of the key findings can be seen.

Table 3. Key Themes and Insights from the Vehicle Ownership Survey

Key Theme	Summary of Survey Findings
Potential for growth	▪ **Reported weekday travel patterns suggest that there is ample opportunity to electrify travel segments within the region.** Most survey respondents 56% reported that they typically drive less than 20 miles per day, and 25% drive 21 to 40 miles per day. For full- time residents, 87% typically drive less than 40 miles per day. These short distance trips have the potential to be electrified, as they are well within the electric range of most PEVs on the market today. ▪ **There is strong interest in electricity as a transportation fuel.** Of those survey respondents who currently drive gasoline or diesel-powered vehicles, almost half stated that they would prefer electricity as the fuel type of their next vehicle. ▪ **Eighty percent of survey respondents think that the price of gasoline will be somewhat or quite a bit higher in two to three years.** It is likely that current gasoline prices have negatively impacted PEV sales nationally and in California; however, the perception that gasoline prices will likely increase in the near-term future is likely an indicator that car buyers would be more willing to consider PEVs moving forward.
Challenges to growth	▪ **The majority of survey respondents currently drive sport utility vehicles (SUVs).** When asked what type of vehicle their next purchase or lease would likely be, almost half (48%) stated a preference for some type of SUV or all-wheel drive vehicle. These trends present a challenge for growth in short-term regional PEV adoption, as there are very limited offerings of electric SUVs or EV available with all-wheel drive. ▪ **Survey respondents' preferred manufacturers–Toyota, Subaru, and Honda –have limited PEV offerings today,** and none of these manufacturers are considered market leaders in electrification (Toyota and Honda, notably, are keen on hydrogen fuel cell vehicles as part of their respective strategies).

Key Theme	Summary of Survey Findings
	▪ **Survey respondents do not view EVs as affordable, nor do they anticipate owning one in the near-term future.** When asked whether they agree or disagree on various statements about PEVs, affordability of EVs was the least agreed upon statement, followed by the expectation to own or least an electric vehicle in the next one to three years.
Charging infrastructure needs	▪ **More public and workplace charging infrastructure in the region is needed to support growth in PEV adoption.** More than half of the survey respondents who commute into the Tahoe-Truckee Region typically drive more than 40 miles per day, presumably making it difficult to consider buying PEVs with range limitations. The lack of workplace chargers poses a challenge for PEV adoption. ▪ **Reported driving patters suggest that DC fast chargers along corridors will be needed to accommodate longer trips.** Over half of the respondents reported taking more than 10 trips per year that were at least 100 miles one-way. As expected, the rate is even higher for seasonal residents over 80%.

Source: ICF

Figure 6 on the next page, displays a summary of the Tahoe-Truckee Vehicle Ownership Survey's Key Findings.

Figure 6: Key Findings Summary

Source: ICF

Market Outlook

Electric vehicle ownership by residents of the Tahoe Truckee Region were projected over a planning horizon of 2017–2040. A methodology was developed to estimate the share of trips by residents that are likely to travel by EVs. ICF emphasizes that the forecasts are meant to be illustrative and conceptual because these will help guide the planning process.

Ultimately, the readiness planning process is not designed to predict the future of PEV deployment; rather, it is designed to help support deployment and give planning agencies the ability to react to market changes. Consider for instance, that the U.S. Energy Information Administration recently updated its Annual Energy Outlook, to include more than double the number of EVs sales by 2025 compared to last year's version, with the emergence of nearly 200,000 electric light trucks. The U.S. Energy Information Administration forecasts have long assumed that PHEVs would dominate the market; however, in the most recent version, longer range BEVs are leading the way. Regardless of the outlook or forecast, ICF emphasizes that the split of vehicles and consumer preference in the study region should drive the planning process, and that stakeholders should track these market movements closely.

To date, the rate of PEV adoption in the Tahoe-Truckee study region has kept pace with and is slightly ahead of where hybrid electric vehicle (HEV) adoption was at the same time of that technology's deployment in the mid-2000s.

PEV Forecasts: Tahoe-Truckee Residents

The deployment of charging infrastructure is linked to the number of PEVs expected to be on the road. PEV projections for the study region were developed out to 2040. ICF developed three PEV deployment scenarios for planning purposes, as highlighted in Table 4 below.

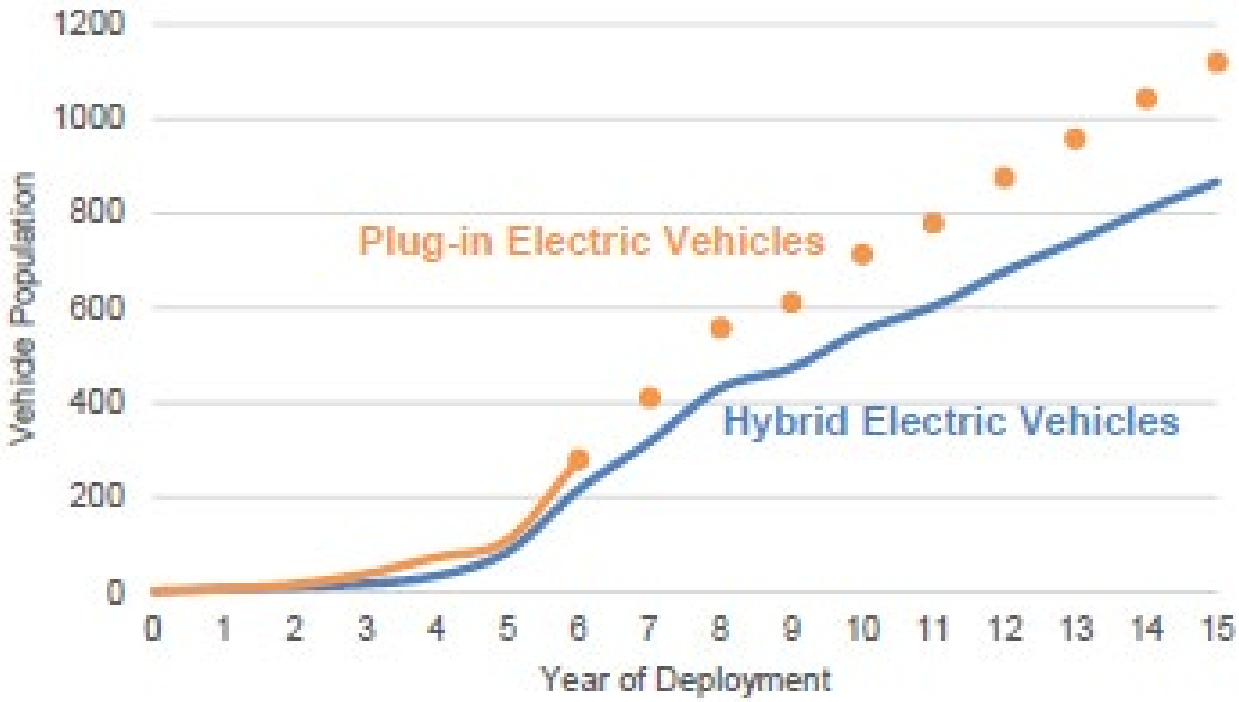
Table 4: PEV Projection Scenarios in Tahoe-Truckee Region

Scenario	Description
Low	Modified the default share of new vehicle purchases represented by passenger cars and light trucks included in the Emissions Factor (EMFAC) model to reflect current vehicle ownership in the region (which is skewed towards light trucks). The rate of new PEV purchasing is consistent with California Air Resource Board's most likely compliance scenario with the ZEV program.
Medium	Assumed fair share PEV adoption in Tahoe-Truckee Region consistent with likely compliance scenario for ZEV Program
High	Assumed 25% increase in new PEV purchases starting in 2018. This increase is a proxy for a) improvements to the technology (e.g., range) and performance of PEVs (e.g., operation in cold weather), b) increase in PEV offerings in the light truck sector, and c) decreases in the costs of PEVs and/or components.

Source: ICF

To date, the rate of PEV adoption in the Tahoe-Truckee study region has kept pace with and is slightly ahead of where HEV adoption was at the same time of that technology's deployment in the mid-2000s (see Figure 7 on the next page). For illustrative purposes, ICF included a trend (as a dotted line) assuming that the adoption of PEVs in the study region follows a trajectory identical to HEVs over the next 10 years.

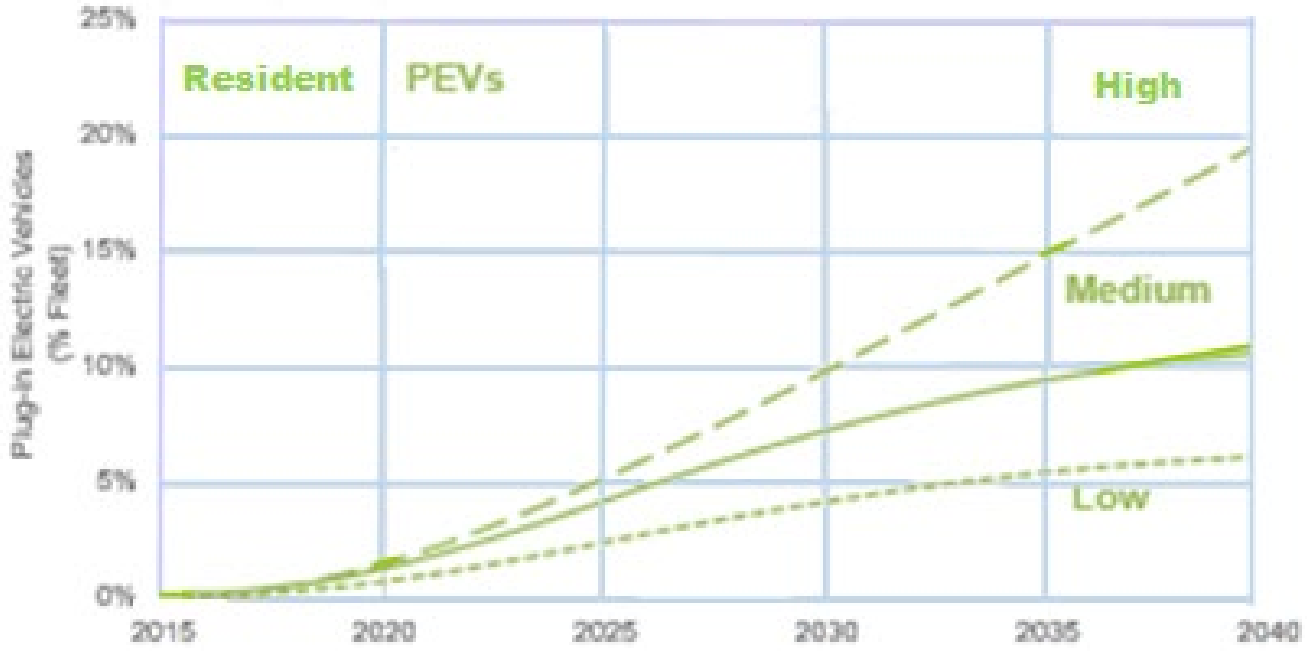
Figure 7: HEV and PEV Deployment in the Tahoe-Truckee Region



Source: ICF

Figure 8 on the next page shows the total number of PEVs included in the deployment scenarios out to 2040 as a share of total light-duty vehicles on the road.4 ICF's analysis suggests that PEVs will comprise about 2.5 to 5.3 percent of light duty vehicles on the road by 2025, and range from 6.2 to 19.9 percent by 2040.

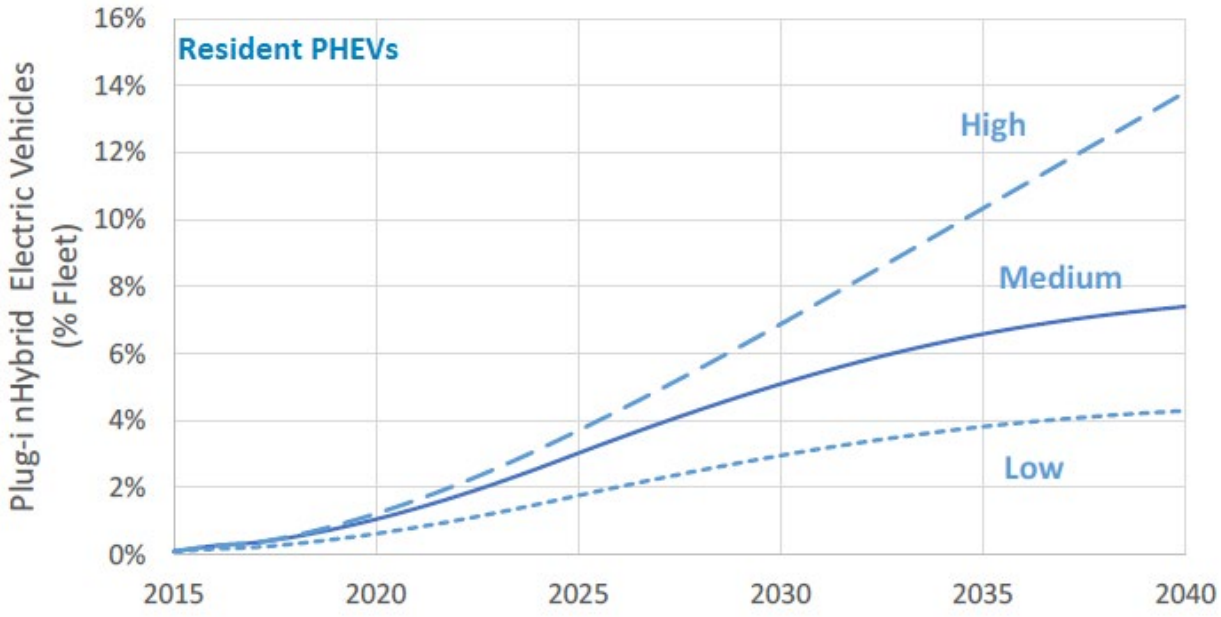
Figure 8: Forecast of PEV Deployment in Tahoe-Truckee Region to 2040



Source: ICF analysis, EMFAC2014

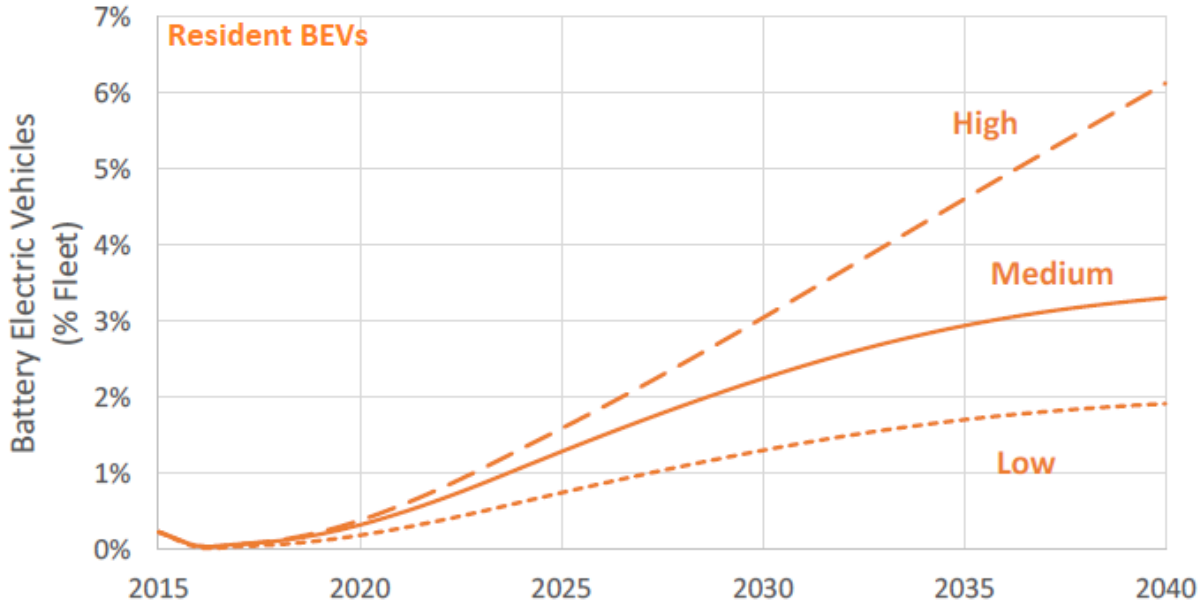
The PEV forecasts, shown in Figure 8 above, are the sum of PHEVs and BEVs. Figure 9 and Figure 10 on the next page show these broken out by vehicle type. ICF used the same proportion of sales included in the EMFAC model to distinguish between PHEVs and BEVs. It is important to note that the intent of these forecasts is to aid in the infrastructure and readiness planning processes. The breakdown of PHEVs and BEVs is salient to this process since the type of charging infrastructure that is required to support these two types of vehicle architectures is quite different. The objective of the planning process is to recognize these differences, while identifying flexibility in the planning exercise to account for different futures and enable planning agencies, such as TRPA, to modify their approach to supporting infrastructure if the market evolves differently than laid out here.

Figure 9: Forecast of PHEV Deployment in Tahoe-Truckee Region to 2040



Source: ICF analysis, EMFAC2014

Figure 10: Forecast of BEV Deployment in Tahoe-Truckee Region to 2040



Source: ICF analysis, EMFAC2014

For planning purposes, the medium deployment scenario is the most useful because it is linked to the EMFAC model, a tool developed by California Air Resource Board. Further, both the low and high deployment scenarios are based on data from the medium deployment scenario. The EMFAC model utilizes the likely compliance scenario associated with the ZEV program (discussed in more detail below). ICF extracted the vehicle ownership estimates of PHEVs and BEVs from the EMFAC model. For the sake of comparison, a similar number of PEVs are estimated to be deployed using the medium PEV deployment scenario (1,500 vehicles on the road by 2025) or if one assumes that PEVs will be adopted at a similar rate to HEVs for the region (about 1,100 vehicles on the road by 2025). ICF also notes the shape of the curve in the medium deployment scenario, which starts to plateau post-2030. This shape is a result of

how the likely compliance scenario is implemented in the modeling; the ZEV Program extends through 2025 and the EMFAC model is linked to existing policies that have been adopted. The model is not designed to be predictive in a post-2025 world. As such, the percentage of ZEVs sold annually post-2025 is fixed at about 15 percent.

The low deployment scenario was developed assuming that a lower share of passenger cars is sold in the Tahoe-Truckee Region than what is included as a default in the EMFAC model. The EMFAC model assumes a fixed ratio of new passenger car to new light truck purchases of about 65 percent. In other words, a fixed 65 percent of new vehicles sold each year are assumed to be passenger cars and the remaining vehicles are trucks (which includes SUVs, minivans, and cross-over vehicles). This is notable because the EMFAC model effectively assumes near-zero penetration of PEVs in the light truck sector. The number of PEVs deployed then is linked to the share of passenger cars in the light-duty sector. Table 5 illustrates the transition towards a greater share of light duty passenger cars over time due to this assumption in EMFAC.

Table 5. Passenger Cars, as a Percentage of Light Duty Vehicles in Study Region

Year	Percent Passenger Cars of New LDV
2000	50%
2005	45%
2010	40%
2015	38%
2020	45%
2025	52%
2030	57%

Source: ICF analysis of EMFAC2014 data

ICF modified the default share of light-duty vehicle sales (from 65 percent) and set it at a fixed rate of 38 percent for passenger cars, consistent with the current share of cars registered in the Tahoe- Truckee Region today, see Table 5 above, with 2015 value in bold font). ICF then used the same fleet turnover assumptions in EMFAC and estimated the corresponding number of PEVs in this modified scenario. As a result of this change in assumption, the number of PEVs deployed in the low scenario is about 40 percent lower than in the medium scenario.

For the high scenario, ICF assumed that there would be an increase in the sale of PEVs to those living in the Tahoe-Truckee Region compared to the medium scenario starting in 2018. Furthermore, we assumed that there would be an increasing share of PEVs sold annually post-2025, hence the modified shape of the deployment curve shown in the figures above (with an upward slope in the out years, rather than a plateau). ICF increased the share of electric vehicle sales by 25 percent annually (e.g., 10 percent to 12.5 percent). This increase in sales of 25 percent is meant to serve as a proxy for a) improved vehicle performance (e.g., greater range), b) increased vehicle offerings (e.g., more all-wheel drive vehicles and more light-truck offerings), c) vehicle cost reductions, or d) some combination of these three potential market developments. Post-2025, ICF increased the annual share of PEV sales by the average annual increase included in the likely compliance scenario for PHEVs and BEVs from 2020 to 2025.

PEV Forecasts: Visitors to the Tahoe-Truckee Region

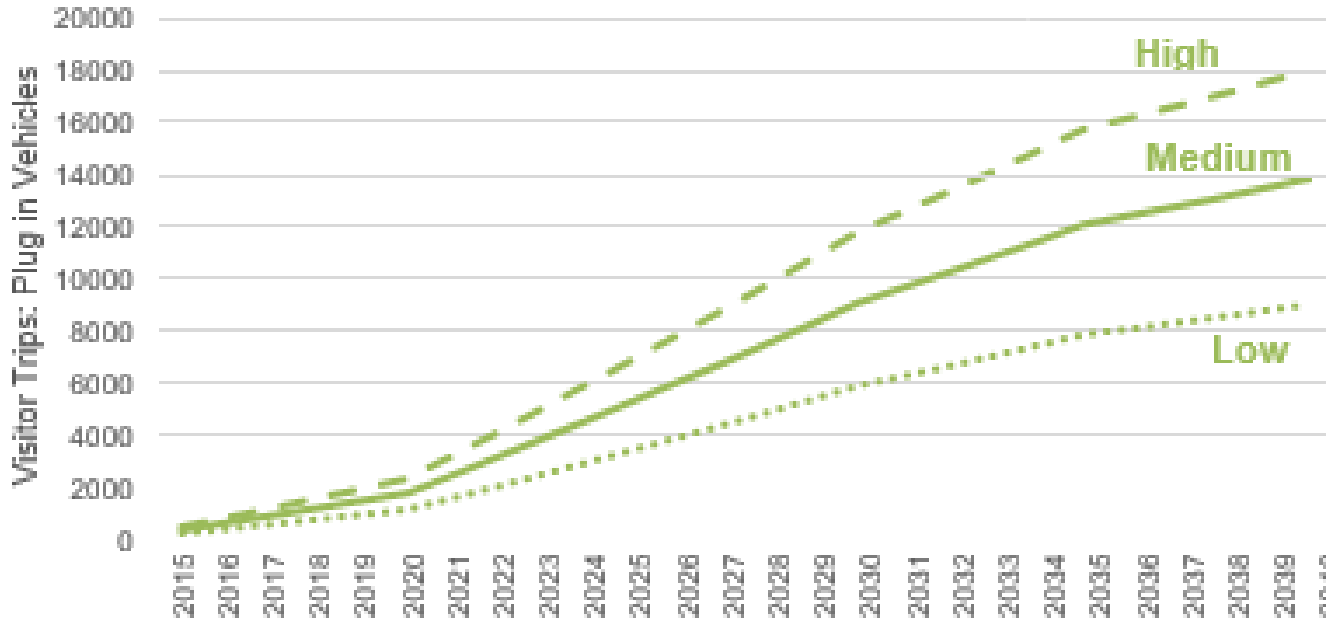
In peak tourism months, visitors account for more than a third of total vehicle trips made throughout the Tahoe-Truckee Region. Understanding how many of these trips will be made by PEVs is essential to the charging infrastructure deployment plan for the study region.

ICF developed a range of projections for PEV visitor trips low, medium, and high scenarios using data on regional travel patterns, vehicle purchasing trends, and likely compliance for regulations that are driving growth in PEV ownership (especially in California, slightly less so in Nevada). Broadly speaking, the methodology was developed over a series of three steps: 1) Travel modeling outputs from TRPA and the Town of Truckee were used to quantify the number of visitor trips (in the peak summer season), 2) data from AirSage[2] (a third party data aggregator) via TRPA were used to develop a profile of the visitors to the region, distinguished by county of origin, and 3) the share of trips from each county was assumed to be equal to its share of EVs. Those three steps led to the medium scenario for PEV visitor trips; ICF developed low and high scenarios. The low scenario assumes that visitors have a lower than expected PEV adoption rate due to factors such as lack of all-wheel drive capability, terrain and weather impacts, and potential range anxiety of drivers. The number of trips were reduced by 30 percent, and no trips to the region originating from more than 250 miles away were considered PEV trips. The high scenario captures a higher than expected PEV adoption rate amongst visitors to the study region. For instance, TRPA visitor surveys demonstrate that the median income of visitors is generally higher than the median income of their origin county. Since there is a positive correlation between higher income levels and PEV adoption, we assumed that the percentage of visitor trips made by PEV is 30 percent higher than the medium scenario, and that there would be no limitations on driving distance due to technological improvements and widely available charging infrastructure (presumably DC fast charging equipment).

Figure 11, on page 29, shows the results of the low, medium, and high visitor daily PEV trip projections scenarios through 2040. By 2040, PEVs are expected to make between 6.5 and 13 percent of total visitor trips to the Tahoe-Truckee Region. The contribution of BEV trips and PHEV trips to the total PEV projections is shown in Figure 12 and Figure 13, on pages 29 and 30. These estimates are linked to the previously discussed ZEV Program likely compliance scenario developed by California Air Resource Board. By 2040, we estimate that BEVs will represent 1.8 to 4.3 percent of total visitor trips to the region, while PHEVs will represent a greater share, 4.7 to 8.7 percent.

[2] AirSage Website https://www.airsage.com/

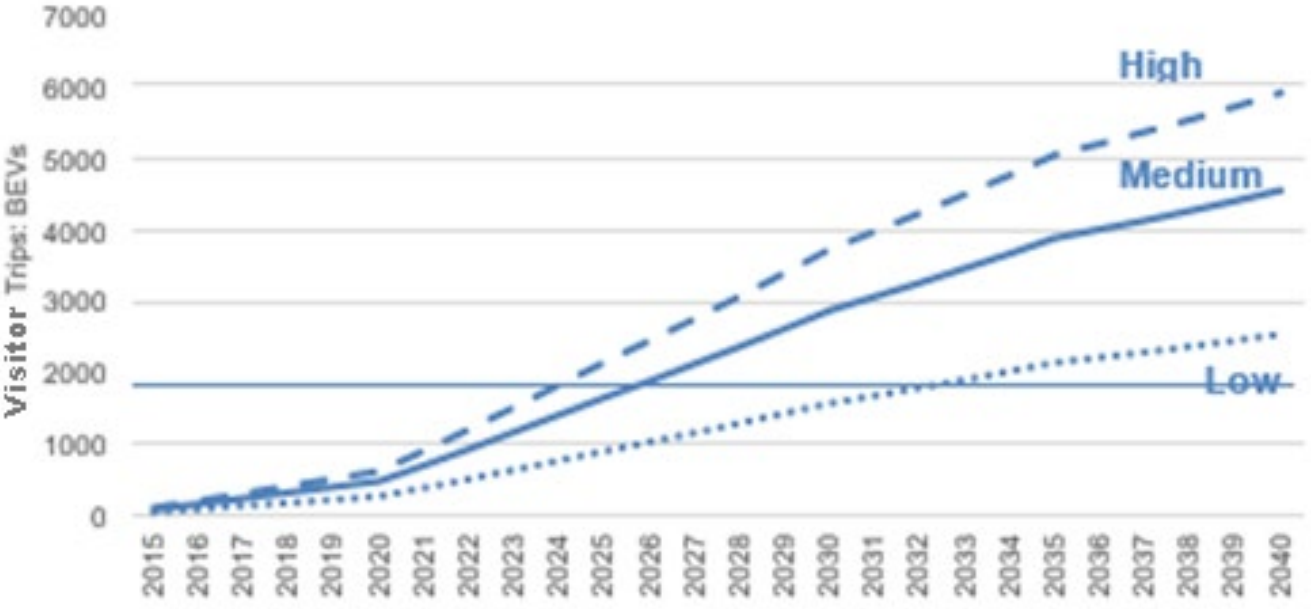
Figure 11: Regional Visitor PEV Trip Projections



By 2040, PEVs are expected to make between 6.5 and 13 percent of total visitor trips to the Tahoe-Truckee Region.

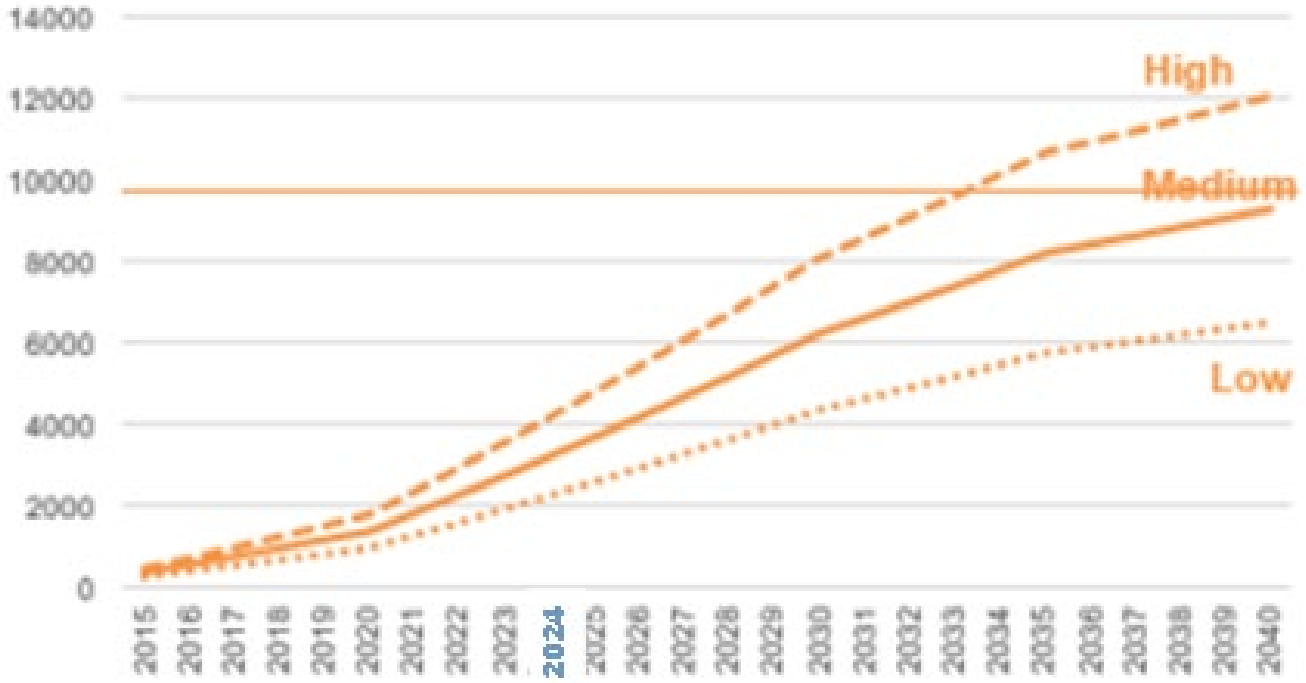
Source: ICF analysis, EMFAC2014

Figure 12: Regional Visitor BEV Trip Projections



Source: ICF analysis, EMFAC2014

Figure 13: Regional Visitor PHEV Trip Projections



Source: ICF analysis, EMFAC2014

CHAPTER 2:
Policies, Programs, Incentives, and Funding

The following section provides an overview of the existing PEV-related policies and programs throughout the Tahoe-Truckee and adjacent regions, with a focus on state- and local government-level efforts to increase PEV deployment and electric vehicle supply equipment (EVSE) infrastructure through clean transportation policies, building standards, zoning, and permitting and inspection.

Federal-level PEV Related Policies & Programs

Alternative Fuel Corridors

The FHWA has designated the first set of alternative fuel corridors as part of its effort entitled *Advancing America's 21st Century Transportation Network*. Both I-80 and U.S. 50 were selected by the FHWA as signage pending Alternative Fuels Corridors since they have demonstrated plans or are beginning to provide significant operational infrastructure for EVs and natural gas vehicles; I-80 is also recognized for hydrogen fueling stations. The FHWA intends to work with state and local agencies in these corridors to identify existing barriers related to the installation of facilities.

Alternative Fuels Innovative Finance Toolkit

FHWA and the Oregon Department of Transportation have developed an online toolkit[3] to provide a library of curated resources related to innovative finance mechanisms for Alternative Fuel Vehicles usable by transportation agencies and others. Resources include reports and case studies of past projects, as well as plans, guides, and tools that can assist in future development.

State-level PEV Related Policies and Programs

California ZEVs Program

The primary program driving PEV adoption throughout California is the ZEV Program. In March 2012, Governor Jerry Brown issued an Executive Order that set a target of 1.5 million ZEVs on California's roadways by 2025. The program today requires 15 percent of light-duty vehicles sold in California be ZEVs by 2025, which includes BEVs, fuel cell vehicles, and transitional ZEVs such as PHEVs. The Governor's Office followed up this Executive Order with its California ZEV Action Plan, which details more than 100 specific actions that state government is taking to accelerate the ZEV market. The ZEV program is largely responsible for the growing number of PEV models available on the market today.

California Low Carbon Fuel Standard Program

PEV drivers can also benefit from another complementary policy, the Low Carbon Fuel Standard Program in California[4]. This Program requires a 10 percent reduction in the carbon intensity of transportation fuels by 2020 from the baseline of gasoline and diesel fuels. This

[3] Online Toolkit http://altfueltoolkit.org/
[4] California Low Carbon Fuel Standard Program https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard

program is implemented using a system of credits and deficits: transportation fuels that have a higher carbon intensity than the compliance schedule yield deficits, and fuels that have a lower carbon intensity, such as electricity, generate credits. Under this program, electric vehicle service providers dispensing electricity as a transportation fuel in California are eligible to generate program credits.

These credits can generate revenue that provides a monetary incentive for the deployment of charging infrastructure throughout California.

Nevada and California, New Energy Future Accord

On the Nevada side, there are currently no comprehensive PEV-related state policies that are driving market changes similar to those in California. However, Nevada Governor Brian Sandoval recently signed the Governor's Accord for a New Energy Future, committing Nevada to support needed infrastructure development, incentives, and policies when appropriate to encourage expanded use of PEVs. Governor Brown of California also signed this accord.

Regional PEV-Related Policies and Programs

State and local governments play an important role in supporting PEV readiness in the Tahoe-Truckee Region by developing and implementing policies and programs that can help accelerate PEV adoption. The following section first describes state-level policies related to PEV-ready building codes and permitting processes, which is then followed by a discussion of local government efforts in these areas, as well as local zoning and parking ordinances. Figure 14 below shows a stripped parking stall according to the Tahoe-Truckee Region parking ordinances in place.

Figure 14: Completed PEV Parking Stall

Source: ICF

Building codes contain safety standards and specifications that guide new construction and renovations. There are two major opportunities to create building codes that support PEV deployment. The first is to specify standards for EVSE in the building code to ensure that any EVSE installations are safe and accessible. The second is to require pre-wiring for EVSE to lower the cost of future EVSE installations.

Pre-wiring refers to the practice of providing sufficient basic infrastructure, such as conduits, junction boxes, outlets serving garages and parking spaces, adequate wall or lot space for future EVSE, and adequate electrical panel and circuitry capacity to meet anticipated future demand for EVSE.

California's Building Code and Electrical Code both include specifications related to EVSE. These codes apply in all cities and counties, unless local governments acted to adopt their own codes that are more stringent. Thus, many local governments in California already have standards for EVSE in place, and those that use their own building codes can simply adopt the relevant sections of the state code into their own codes. Placer County, El Dorado County, Nevada County, the City of South Lake Tahoe, and the Town of Truckee have all adopted the current 2016 California Building Codes. This includes the 2016 California Green Building CALGreen Code[5], which requires that all new developments include pre-wiring for Level 2 (208/240Volt) charging, so any local government that adopts the state building code by reference will have pre-wiring requirements in place. Specifically, CalGreen's mandatory requirements specify that new single-family homes and townhomes with attached garages must pre-wire locations where vehicles will be parked, and that multifamily developments with 17 or more units must pre-wire at least three percent of total parking spaces. At non-residential developments, pre-wiring is required for a portion of total parking spaces, as summarized in Table 6.

Table 6: CalGreen Non-Residential EV Pre-Wiring Requirements

Total Number of Parking Spaces	Number of Required EV Charging Spaces
0-9	0
10-25	1
26-50	2
51-75	4
76-100	5
101-150	7
151-200	10
201 and over	6% of total

Source: ICF

Local governments can take additional action to exceed the mandatory requirements in CalGreen by mandating pre-wiring for a greater proportion of spaces or requiring actual

[5] California's' Green Building Codes https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen

charger installations in lieu of pre-wiring. This could be achieved by adopting all or part of the voluntary Tier 1 or Tier 2 sections of CalGreen through an ordinance amending the local municipal code.

Nevada does not have a state green building code. Washoe County, Douglas County, and Carson City have adopted the 2012 International Building Code and Energy Conservation Code, which does not include mandatory EVSE requirements.

Through zoning codes, design standards, and parking rules, local governments have the opportunity to ensure both that there are sufficient charging opportunities to meet projected PEV demand and that PEV parking spaces are effectively designed and regulated to accommodate charging vehicles. Zoning codes can allow, encourage, or require appropriate placement of EVSE in various land use designations associated with developed land. Zoning code provisions, design standards, and parking rules can also specify requirements for design and installation, signage, accessibility, fees, time limits, lighting, and maintenance. California recently adopted new accessibility requirements for EVSE into Chapter 11B of the 2016 Building Code (effective January 2017)[6]. The code requires that if EVSE will be available for use by the public, the installation(s) need to comply with the minimum designated accessibility requirements, as outlined in Table 7 on the next page, and the complete set up can seen in Figure 15 below.

Figure 15: Completed PEV Parking Stalls According to Recently Adopted California Building Codes

Source: ICF

[6] Chapter 11B of the 2016 Building Code https://www.dgs.ca.gov/DSA/Resources/Page-Content/Resources-List-Folder/Accessibility-Plan-Review

Table 7: Accessibility Requirements for Charging Stations

Total No. of EV Charging at a Facility	Van Accessible	Standard Accessible	Ambulatory*
1 to 4	1*	0	0
5 to 25	1	1*	0
26 to 50	1	1	1*
51 to 75	1	2	2*
76 to 100	1	3	3*
101 and over	1, plus 1 for each 300, or fraction thereof, over 100	3, plus 1 for each 60, or fraction thereof, over 100	3, plus 1 for each 50, or fraction thereof, over 100

The above table represents the min number (by type) of EV Charging Stations required to comply w/ Section 11B-812
***Accessible EVCS designed for accessibility but not reserved for exclusive use by the disabled.**
Source: California Division of the State Architect

Permitting and Inspection

Streamlined permitting and inspection processes are key to PEV planning. This can help expedite the installation of EVSE at appropriate locations, provide the service at a reasonable cost to consumers, and maintain the safety of consumers and the public.

California recently passed legislation to streamline EVSE permitting and inspection throughout the state.

California Assembly Bill 1236 (2015)[7]: Cities or counties with a population of 200,000 or more residents (such as Placer County) must adopt an ordinance that creates an expedited, streamlined permitting process for EVSE by September 30, 2016. A city or county with a population of fewer than 200,000 residents (including El Dorado County, Nevada County, City of South Lake Tahoe, and the Town of Truckee) must adopt such an ordinance by September 30, 2017. The city or county will consult with the local fire department or district and the utility director to develop the ordinance, which will include a checklist of all requirements for EVSE to be eligible for expedited review. The law requires the approval of an application consistent with the city or county ordinance, and notification of the required information for entities submitting incomplete applications who would like expedited permit issuance.
Nevada does not currently have any policies in place for streamlining EVSE permitting and inspection.

Local Government Readiness

Table 8 on the next page summarizes the findings from an email survey that ICF conducted with representatives from El Dorado County, Placer County, Nevada County, Douglas County, Washoe County, Town of Truckee, the TRPA, Truckee-Donner Public Utility District, and the City of South Lake Tahoe to assess the actions that public agencies in the region are taking to promote or prepare for EVs.

[7] California Assembly Bill 1236
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1236

Table 8: Summary Status of Current Tahoe-Truckee Region Readiness

Readiness Area	Summary of Responses
Adding Publicly Available Charging Stations at a Business	▪ All seven agencies require a building permit for installation of EVSE, typically showing the site details and wiring methods. ▪ The City of South Lake Tahoe requires that applicants first submit an application for a design review, and then once it is approved, they can submit an application for a building permit. ▪ Placer County requires a plan for a single line diagram and electrical panel calculations that show the EVSE location on the site and address any accessibility requirements. ▪ The Town of Truckee currently approves a Zoning Clearance for EVSE through the building permit process, but other permits may be required depending on whether the EVSE is located in a historic preservation overlay district or within an easement. ▪ At the regional level, if entities are installing an electric charging station on existing impervious surface and/or if they need to do grading under 7 cubic yards, TRPA asks them to submit a qualified exempt application without fee. If a host needs to do grading or trenching over 7 cubic yards, they will need a grading permit which currently is only approved through TRPA and the fee is $501. Lastly, if sites are adding coverage on an undeveloped site, more permitting is involved. ▪ Nearly half of the agencies noted that they have not encountered any challenges when working with businesses that have installed EVSE. However, a few agencies reported that there has been some discussion/confusion on how the ADA requirements relate to the installations. One respondent noted that the ADA compliance requires giving up a parking stall, which businesses do not like to do.
Installing and permitting a charging station at a private residence	▪ All seven agencies require a building or electrical permit to install a charging station at a private residence. ▪ Permit review periods range from two weeks (Nevada County) to express permits issued over the counter (Placer County). ▪ In most cases, the permits require applicants to submit a line diagram to show the electrical loads, typically performed by a certified electrician. ▪ Most agencies reported that they have not encountered challenges with residential EVSE installations. However, one agency did note that some homeowners are installing chargers without the benefit of the building permit. ▪ There has also been some effort with the Truckee planning division to make corrections on certain residential plan checks that require

Readiness Area	Summary of Responses
	220 volt garage outlets, since it isn't a standard requirement for all residences.
Adopted policies, plans, permitting procedures, code, design guidelines, or incentives related to EVs	▪ As noted previously, local governments in California are required to adopt the State CALGreen Code, which has mandatory and voluntary PEV readiness requirements. ▪ Many of the agencies noted these Codes, as well efforts currently underway to establish procedures or ordinances for streamlining permitting in accordance with Assembly Bill 1236[8]. ▪ On the Nevada side, Douglas County provides an incentive to applicants by giving a 50% discount on building permits for alternative energy projects.

Source: ICF

PEV Related Grants and Incentives

Incentives for Vehicle Purchasers

Incentives for PEV purchasers are offered at the federal, state, and local levels. These include tax credits, vehicle rebates, carpool lane access, insurance discounts, and charging rate reductions. Table 9 provides an overview of the available government incentives for PEV purchasers in the Tahoe-Truckee Region.

Table 9: Incentives for PEVs

Government Entity	Incentive Program	Funder/ Administrator	Available to	Available through	Incentive available
Federal	Plug-In Electric Drive Vehicle Tax Credit	Internal Revenue Service	Individuals, businesses, government entities	Not specified	$2,500-7,500, depending upon battery capacity; applies to vehicles acquired after December 31, 2009. Tax credit can be combined with State level rebates.

[8] Assembly Bill 1236 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1236

Government Entity	**Incentive Program**	**Funder/ Administrator**	**Available to**	**Available through**	**Incentive available**
State of California	Clean Vehicle Rebate Program	California Air Resources Board	Individuals, businesses, government entities in CA	2023	$1,500-4,000 for the lease or purchase of new, California Air Resources Board certified PEVs. Rebate can be combined with federal PEV tax credit.
State of California	Clean Air Vehicle Stickers	California Air Resources Board	Individuals in California	2019	Access to carpool lanes through January 1, 2019 for an unlimited number of BEVs and the first 40,000 PHEV applicants.
State of California	LCFS Credits	California Air Resources Board	Vehicle Employers, fleet owners in California	N/A since regulation extends beyond 2020	Utilities have different strategies to return the value of credits earned via residential charging. LCFS credits for the electricity used to supply EVSE.
State of California	Insurance Discount	Farmers Insurance, AAA	Individuals, businesses in CA	Not specified	Farmers Insurance provides a discount of up to 10% on all

Government Entity	Incentive Program	Funder/ Administrator	Available to	Available through	Incentive available
					major insurance coverage for PEV owners. AAA offers up to a 5% discount.
State of Nevada	Alternative Fuel Vehicle Parking Fee Exemption	Various local authorities	All Nevada PEVs owners	December 31, 2017	Free parking for PEVs at public metered parking areas. Each local authority is responsible for creating an application process

Source: ICF

In addition to government incentives, many of the utilities serving the Tahoe-Truckee Region also provide charging incentives for PEVs that allow customers to pay a discounted rate if they charge their vehicle during the utility's off-peak hours. Several regional utilities offer these rate reductions:

- Liberty Utilities offers a general discounted time-of-use (TOU) rate and is in the process of approving a PEV TOU domestic service tariff and a small general service tariff (for detached garages), which lower rates by 14 to 18 percent than the general TOU rate. No separate meter is required.
- Nevada Energy offers a special TOU rate for its northern Nevada customers, which includes a special rate for electric vehicle charging ($0.0538/ kilowatt per hour) from 10 pm to 6 am. The off-peak charging for EVs is about 12 percent lower than the off-peak rate for other electricity uses. As an added benefit, the discount applies to all the power used during those periods, not just the power that charges your car.
- Pacific Gas & Electric offers discounted residential TOU rates for electricity used for PEV charging.

Incentives and Financing for Charging Infrastructure Deployment

There are many incentives and financing options to help defray the costs of deploying charging infrastructure. Similar to vehicle purchasing, these incentives vary at the federal, state, and local levels. Table 10 on the next page includes an overview of the available government incentives for PEV charging infrastructure deployment.

Table 10: Incentives to Deploy Charging Infrastructure

Government Entity	Incentive Program	Funder / Administrator	Available to	Available through	Incentive available
Federal	Low and Zero Emission Vehicle Research, Demonstration, and Deployment Funding	Federal Transit Administration	Local, state, and federal government entities; public transportation providers; private and non-profit organizations and higher education institutions	Not specified	Financial assistance is available for research, demonstration, and deployment projects involving low or zero emission public transportation vehicles. Funding may cover up to 80 percent of project costs, with a required 20 percent non-federal cost share requirement. Eligible vehicles must be designated for public transportation use and significantly reduce energy consumption or harmful emissions compared to a standard vehicle.
State of California	EVSE Loan and Rebate Program-California Capital Access Program	CEC	Small businesses in California	Not specified	Provides loans for up to $500,000 for the design, development, purchase, and installation of

Government Entity	Incentive Program	Funder / Administrator	Available to	Available through	Incentive available
					EVSE at small business locations in California with 1,000 or fewer employees
State of California	Alternative and Renewable Fuel and Vehicle Technology Program	CEC	Businesses, workforce training partners, fleet owners, consumers, and academic institutions in California	2023	Competitive grant program that provides funding for EVSE infrastructure, light duty PEV deployment, workforce training and development, and regional PEV readiness plans.

Source: ICF

CHAPTER 3:
Barriers to Regional PEV Adoption

PEV sales in the Tahoe-Truckee Region have been modest to date and are out- performing hybrid electric vehicle sales at the same stage of deployment in the early 2000s. The readiness planning exercise is designed to help maintain and accelerate momentum related to electric vehicle deployment in the region. In the following subsections, ICF has identified critical market gaps and barriers to deployment of PEVs in the Tahoe-Truckee Region: charging infrastructure deployment, coordination among local stakeholders, streamlining charging infrastructure deployment, consumer vehicle preferences, and consumer awareness.

At first glance, the deployment of charging infrastructure in the Tahoe-Truckee Region is significant. There are already 18 DC fast chargers deployed in the region and more than 60 Level 2 charging stations. Furthermore, there are another 6 to 24 planned DC fast charging units and a similar number of planned Level 2 charging stations along the I−80 and U.S. 50 corridors, and at tourist destinations like NorthStar and Hard Rock Hotel and Casino. However, a closer look at current deployment reveals some significant gaps: Of the 18 DC fast chargers, 14 of them are Tesla Superchargers, which can exclusively be accessed by Tesla vehicles. Of the more than 60 Level 2 chargers, less than half of the stations are open to the public. Furthermore, those charging stations are located at 19 destinations. The remaining Level 2 stations have limited accessibility, typically to guests at resort facilities. Of the limited access, Level 2 stations, two-thirds are Tesla charging stations that do not have the standardized J1772 connector, which means that even if the limited access stations are included, only 65 percent of the Level 2 chargers can be accessed by non-Tesla vehicles. In figure 16, a Tesla vehicle is shown at a level 2 charging Station. There is a total of 6 charging stalls shown in this figure.

Figure 16: Tesla PEV Parked at a DC Fast Charging Station

Source: ICF

While the number of chargers increased, many stations lack public access and few support inter-regional travel or workplace charging.

The DC fast charging infrastructure deployed in the Tahoe-Truckee Region bodes well for the potential to support inter-regional and corridor travel moving forward, and more DC fast charging infrastructure planned. However, DC fast charging infrastructure is aligned with the deployment of 100 to 200-mile range BEVs. There is little charging

infrastructure that is designed to maximize the electric miles traveled intra-regionally by BEVs and PHEVs. In other words, there is limited workplace and destination charging infrastructure available. Although there is considerable interest in BEV deployment in the region, there is a lack of planning related to PHEV deployment. Because it is unclear how the PEV market is going to evolve among residents and visitors to the Tahoe- Truckee Region, the planned charging infrastructure deployment should be more responsive and flexible to market demands.

The definition of a utility acts as a barrier to the charging infrastructure deployment in the Tahoe-Truckee Region. In some jurisdictions, an entity cannot sell electricity (e.g., through electric vehicle supply equipment) without being a regulated utility, which entails the collection of fees and additional regulatory requirements. Although the California Public Utilities Commission has granted an exemption to electric vehicle supply equipment, the Public Utilities Commission of Nevada has not done the same.

However, the Nevada Public Utilities Commission is actively working on a proceeding that will grant the same exemption to electric sales via electric vehicle supply equipment as exists in California.

Coordination for Charging Infrastructure Deployment

The Tahoe-Truckee Region benefits from multiple agencies engaged in the deployment of charging infrastructure to support the nascent market for PEVs. However, there is little to modest coordination amongst agencies within the study region to date. The readiness plan is helping to improve this situation, especially through engagement with the coordinating council. There are myriad funding programs (e.g., via air pollution control districts) and planning efforts (e.g., via the Sustainable Community Strategy at TRPA) underway that can support charging infrastructure deployment. However, these efforts are not coordinated at a regional level beyond informal and ad hoc avenues.

One of the challenges associated with charging infrastructure deployment is aligning local and regional planning efforts. All land use planning and decisions in California will continue to be made by local jurisdictions. Meanwhile, regional agencies such as TRPA are responsible for long-term regional transportation plans, which are increasingly inclusive of alternative fuel vehicles like PEVs. It will be important moving forward to align these efforts to the extent feasible, ensuring that regional actions can help direct charging infrastructure investment without encroaching upon the local land use considerations.

Streamlining Charging Infrastructure Deployment

The history of PEV readiness has focused on issues that local jurisdictions can address to streamline charging infrastructure deployment, including permitting, building codes, and local zoning ordinances. In California, including in the Tahoe-Truckee Region, this is less of an issue resulting from local actions and the development of best practices. For instance, the newest

version of California's building codes (in effect January 2017) includes specifications related to charging infrastructure. While there are opportunities

to make the codes more stringent, the baseline for local governments in California on issues related to building codes and charging infrastructure is already quite clear.

Furthermore, ICF interviews with stakeholders indicate that local jurisdictions in the Tahoe-Truckee Region are on track to meet the requirements of Assembly Bill 1236[9] by September 2017.

Despite these advances, there will still be room for improved processes for streamlining charging infrastructure deployment, especially as more on-the-ground information is used to shape best practices. The streamlining process will require proactive engagement by local jurisdictions and frequent information sharing between agencies.

Consumer Preferences for EVs

The climate and the terrain in the Tahoe-Truckee Region presents a two-fold challenge to the expansion of the PEV market. The colder climate can limit the range of EVs considerably, impacting the performance of batteries in vehicles as well as requiring more cabin heating, which requires energy from the battery. Furthermore, consumers in the Tahoe-Truckee Region tend to favor SUVs and other larger vehicles with all-wheel or four-wheel drive, presumably to navigate snowy terrain in the winter months.

While a combination of longer range BEVs and improved consumer awareness of PHEVs may mitigate the impacts of cold weather on range, the lack of PEV configurations that satisfy consumer demand may hamper deployment moving forward. The survey that ICF and TRPA conducted, for instance, indicates that the top three customer preferred brands are Toyota, Honda, and Subaru and today, these manufacturers offer limited electric vehicle options. The EVs that are available from other manufacturers tend to fit in the category of the subcompact and standard midsize segments this makes sense, as it follows the trend that more than 60 percent of vehicles purchased in California are light-duty passenger cars and the balance (about 40 percent) characterized as light trucks. This imbalance of vehicle offerings, however, restricts purchasing opportunities for Tahoe-Truckee residents and visitors to the region (specifically those visiting during winter months).

Consumer Awareness

The introduction of new technologies like PEVs requires continuous outreach to consumers to deliver high-level messaging at the local and regional level to highlight PEV availability and benefits, including total cost of ownership, environmental, health, and community benefits. Furthermore, it is important to communicate the direct financial and non-financial benefits to drivers including tax credits, grants, and the PEV driving experience (e.g., fast acceleration and quiet vehicle operation) on a frequent basis and the differences associated with fueling from the grid rather than from a gas station.

Many of the respondents to the vehicle ownership survey conducted by ICF and TRPA (see Appendix D for more information) indicated that they were familiar with EVs. However, there was low familiarity with the incentives available to consumers. Without a better understanding of the financial incentives available, it is difficult for consumers to understand the potential total cost of ownership benefits associated with PEVs. With vehicle price playing an important

[9] Assembly Bill 1236 http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=199920000AB1236

role in consumer decision making during vehicle purchasing, it is critical that they understand how these incentives may reduce the overall cost.

It will also be important for consumers to understand PEV attributes and performance, as this may help improve vehicle sales in the region. The challenges regarding climate and terrain in the Tahoe-Truckee Region may be difficult to overcome; however, improved consumer education and outreach may help.

CHAPTER 4:
Charging Infrastructure Siting Analysis

As part of the Readiness Plan, ICF conducted a charging infrastructure siting analysis to assess the areas in the Tahoe-Truckee Region that are most likely to experience increased demand for electric vehicle charging. This analysis complements the vehicle forecasting exercise outlined previously and introduces an important geographic component that can help regional stakeholders understand the potential demand for charging infrastructure within the Tahoe-Truckee Region.

The siting analysis is an analytical exercise that looks at key PEV ownership indicators and regional travel patterns to identify areas where there will likely be demand for charging infrastructure. The results can be used to identify areas where the deployment of chargers will likely be the most cost effective, as chargers located in an area where PEV drivers are most likely to travel will be utilized more. Recent research by Idaho National Laboratory[10] for instance, demonstrated that charging equipment deployed in areas that fell within a planning process experienced nearly 90 percent greater utilization (as measured by charging events per week) compared to charging equipment deployed in unplanned locations. It is important to note that the results of the siting analysis are not a deterministic approach that excludes certain areas from charging.

The purpose of the analysis is to employ a flexible methodology that can be updated and used to understand where PEV drivers will likely live, work, and visit within the Tahoe-Truckee Region. It is best to consider the results of the analysis as a useful guide to coordinating and prioritizing investments in charging infrastructure at a high level for engaged stakeholders.

A nationwide assessment performed by the Idaho National Laboratory showed PEV owners on average charged 85 percent of the time at home and then when away from home, they tended to favor a select few public charging stations with workplace stations being the most frequented. ICF notes that this conclusion is based on PEV deployment projects at the early stage of the market for both vehicles and charging infrastructure.

With that in mind, there is potential for charging behavior to change as the deployment of vehicles and infrastructure evolves. The analysis presented here is split into three components: residential, workplace, and opportunity charging.

- **Residential Charging –** highlights areas in the Tahoe-Truckee PEV Planning Area that will likely experience high demand for residential charging. Because residential charging takes place at home, these are locations in areas where likely PEV adopters live.
- **Workplace Charging –** highlights areas that will likely experience high demand for workplace charging areas where likely PEV owners work and vehicles are parked for several hours during the day.
- **Opportunity Charging –** highlights areas that will likely experience high demand for opportunity charging areas where likely PEV owners' shop, dine, visit, and travel for recreational activities.

[10] Idaho National Laboratory https://www.cdc.gov/niosh/ocas/ineel.html

ICF notes two key considerations regarding the siting analysis. First, the nature of travel in the Tahoe-Truckee Region warrants re-thinking the type of charging required to maximize adoption and electric miles traveled. More specifically, because the region is a destination for so many non-residents including visitors and second homeowners the role of publicly available charging is more important than in other regions. Charging at public locations normally has a relatively small share of demand from PEV drivers who take the opportunity to charge at convenient locations to extend the range of their trips. Tahoe-Truckee is unique in that visitor trips make up a significant portion (nearly 40 percent in the summer months) of travel within the region. Therefore, demand for opportunity or public charging is much higher in the Tahoe-Truckee Region and is an important piece of this siting analysis. Second, the analysis presented here is geared towards Level 1 and Level 2 charging infrastructure, as grants from the California Energy Commission and other initiatives are supporting the deployment of DC fast chargers along major highway corridors in the region.

Residential Charging

ICF initiated the analysis by identifying where PEVs owners are most likely to live, which required identifying the most likely PEV adopters. Table 11 reveals the information available regarding the characteristics of initial PEV buyers from various surveys.

Table 11: Overview of Research on Early Adopters of PEVs

Data Source	Income	Home Ownership	Dwelling Type	Household Vehicles	Hybrid ownership
2012 California PEV survey vehicles: LEAFs region: California	54 %, $150k + 25 %, $100k-150k 18%, $50k-$100k 3%, <$50k	n/a	91% in single family w/ an attached garage 6% single family, detached garage 3% in apartment <1 % other	n/a	n/a
2013 California PEV survey vehicles: LEAFs, Volt, Prius Plug-in region: California	50%, $150k + 18% $100k-150k 10%, $50k-$100k 2%, <$50k, 20%, unknown	93% own their home	88% in a single- family detached home 7% in single-family attached home 4% in an apartment/ condominium 1% in other dwellings	n/a	n/a
Bay Area LEAF survey vehicles: all LEAFs	n/a	n/a	n/a	Nearly all households have at least 1 other vehicle 30%	34% had a HEV in their home

Data Source	Income	Home Ownership	Dwelling Type	Household Vehicles	Hybrid ownership
region: SF Bay Area, CA				have more than 2 vehicles	
Tal *et al*, California Survey vehicles: mostly LEAFs region: California	46%, $150k + 37%, $100k-150k 16%, declined	96% own their home	96%, single family house		32% owned a HEV before they purchased PEV 11% replaced a HEV w/ a PEV 25% own HEV and PEV
Chevrolet information	Average income, $170k	n/a	n/a	n/a	7% of buyers replaced a Toyota Prius HEV with the Volt
Nissan Information	Household income, $159k	Home value of $640k			

Source: ICF

Based on these surveys of initial adopters, ICF identified the key indicators for PEV ownership. We used these key indicators to develop a scoring methodology that estimates the likelihood of PEV adoption in a given census block group. The following parameters were selected for further consideration, with corresponding weighting factors highlighted below:

- **Income:** The most significant indicator for PEV ownership is, and will continue to be, income. For this exercise, ICF established a floor income of $100,000 and weighted the likelihood of PEV ownership towards higher incomes. This analysis weighted income at 60 percent of the score for a census block group.
- **HEV ownership:** Based on survey results, ICF gave HEV ownership a significant weighting factor. In addition to correlating with income, HEV ownership correlates well with influencing factors such as environmental stewardship and price sensitivity to gasoline, both of which are assumed to play a significant role in the level of interest in PEVs. ICF's analysis weighted HEV ownership at 30 percent.
- **Home Ownership:** Households who own their property are more likely to adopt a PEV than those who rent, according to market research by most major automobile manufacturers and the University of California, Davis. Home ownership reduces both financial and non-financial barriers to charging infrastructure deployment. The influence of home ownership will likely change considerably by 2020; however, in the near future, it will likely be a significant driver. There is already some correlation between home ownership and income, so the weighting for this parameter is designed to distinguish

between census block groups that are already likely to include PEV adopters based on the income profile. ICF only considered census block groups that had both an income greater than median income for the region and home ownership greater than the median level of home ownership for the region. This parameter was weighted at 5 percent.

- **Dwelling Type:** Dwelling type is an important parameter because drivers are expected to charge their vehicles at home. Many BEV and PHEV buyers are likely to install Level 2 EVSE at their homes. Only census block groups that were above the median income and above the median percentage of single-family residences were considered for this analysis. This parameter was weighted at 5 percent.

ICF used census data from the American Community Survey[11] an ongoing statistical survey that samples a percentage of the population every year. For the purposes of this exercise, ICF determined that the most complete datasets for census block groups were the 5-year estimates; ICF used data for years 2010-2014. ICF extracted demographic data on income, home ownership, and dwelling type in the Tahoe-Truckee Region. ICF analyzed vehicle registration data from IHS Automotive to establish hybrid vehicle ownership rates by census block group. Figure 17, on page 40, shows the results of the analysis; these are the areas in the Tahoe-Truckee PEV Planning Area that will likely experience high demand for residential charging. Since residential charging takes place at home, these are locations in areas where likely PEV adopters live.

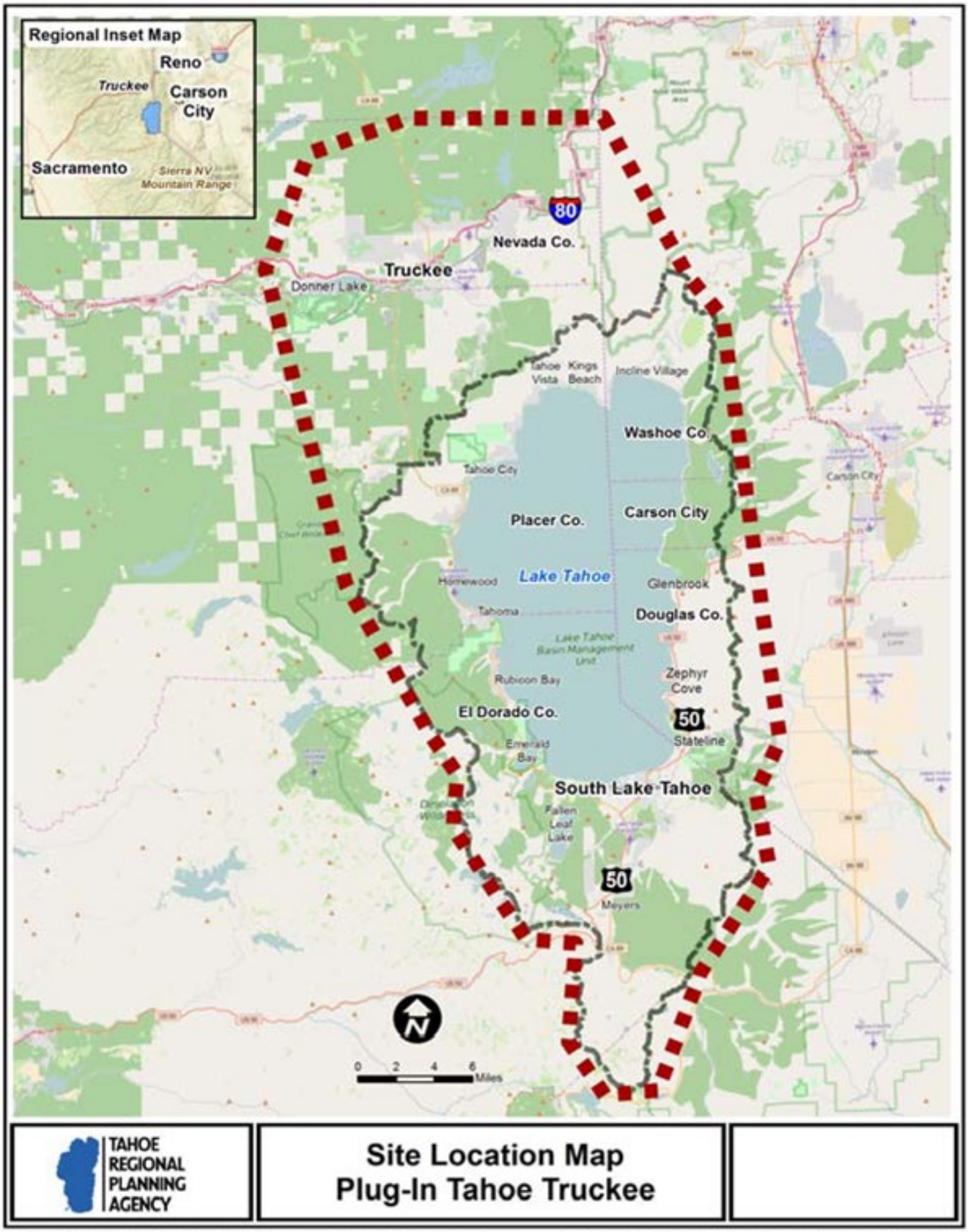
Tahoe-Truckee Planning Area

The study region for the project, referred to as the Tahoe-Truckee Region, as outlined in Figure 17 on page 41 and Figure 18 on page 42, show maps that are a critical part of the envisioned "electric highway" in the Sierra. The region is the gateway to the Northern and Eastern Sierra and inter-regionally connects to several major urban areas including Sacramento, CA; the Bay Area, CA; the City of Reno, NV; and Carson City, NV. The study region stretches from Interstate 80 to U.S. Highway 50 and includes the City of South Lake Tahoe, Town of Truckee, and portions of Placer, El Dorado, and Nevada, Douglas, Carson City, and Washoe counties.

The high volume of trips that originate outside the region and the high number of second homes in the study region make for a challenging planning process. These characteristics reflect Tahoe's status as a prime travel destination. In many jurisdictions, it is sufficient for planning agencies to focus on the demand for PEVs that are owned and driven by residents. However, in the case of the Tahoe-Truckee study region, this approach will not satisfy a significant portion of the potential PEV-driving population, who may originate their travel outside of the region and seek charging infrastructure while in the region.

[11] American Community Survey https://www.census.gov/programs-surveys/acs/

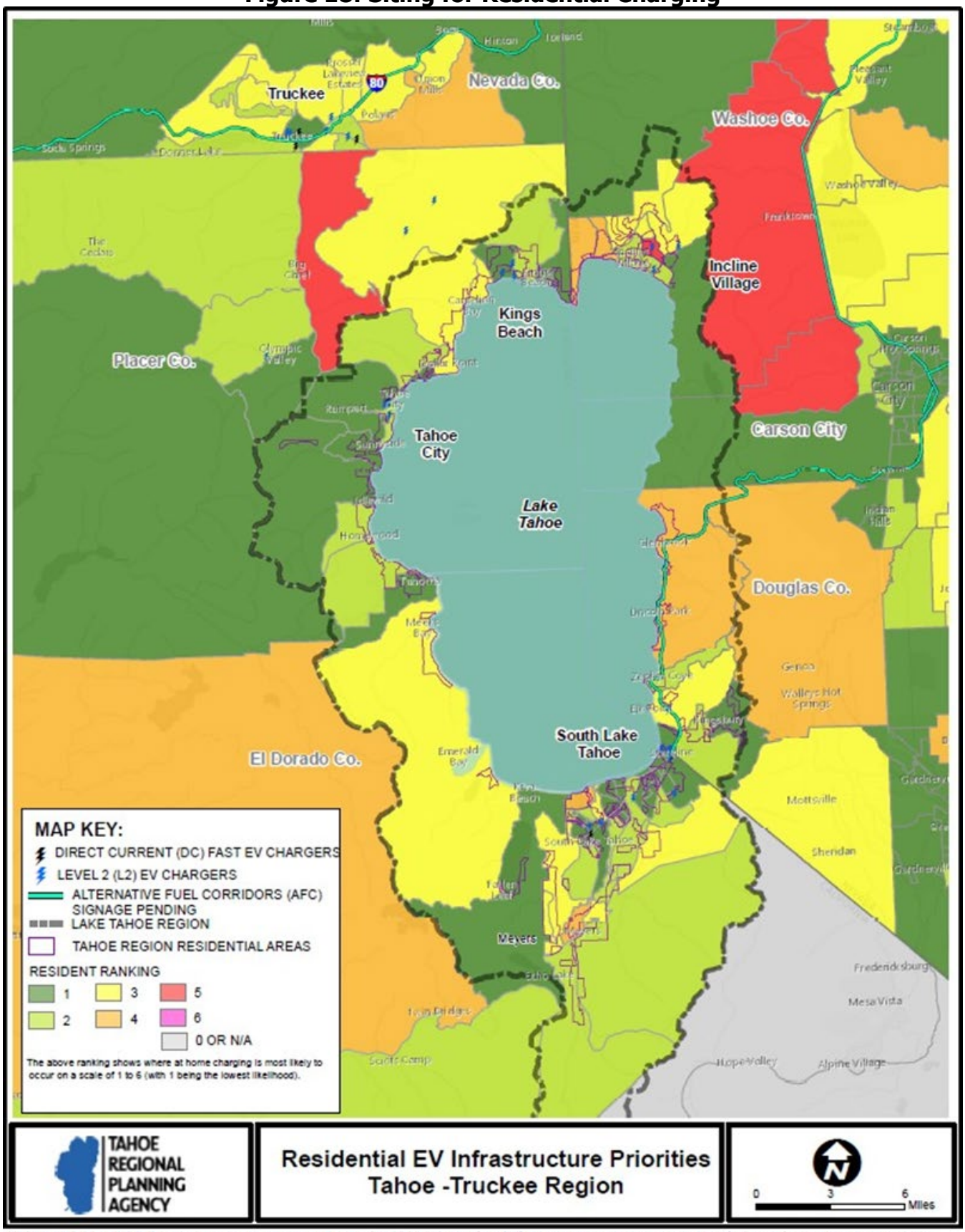
Figure 17: Map of Electric Highway through the Sierra Mountains



TRPA MAP DISCLAIMER: This map was developed and produced by the TRPA GIS department. It is provided for reference only and is not intended to show map scale accuracy or all inclusive map features. The material on this map was compiled using the most current data available, but the data is dynamic and accuracy cannot be guaranteed.
Document Path: F:\GIS\MXDS\PlugElectVeh\SITELOCATION_Report.mxd

Source: ICF

Figure 18: Siting for Residential Charging



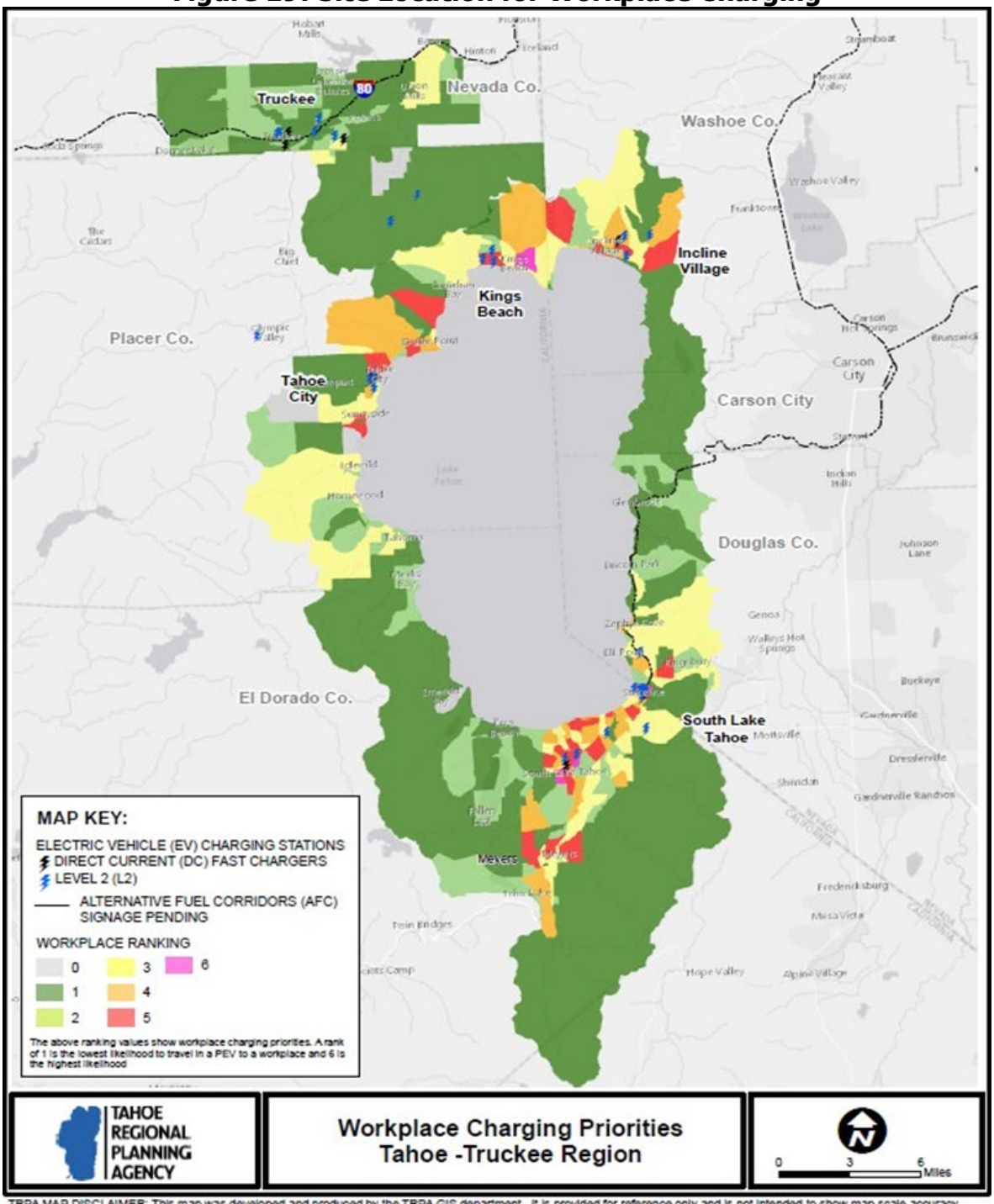
TRPA MAP DISCLAIMER: This map was developed and produced by the TRPA GIS department. It is provided for reference only and is not intended to show map scale accuracy or all inclusive map features. The material on this map was compiled using the most current data available, but the data is dynamic and accuracy cannot be guaranteed. EV and AF Station info is from the US Department of Energy Alternative Fuels Data Center Station Locater. Document Path: F:\GIS\MXDS\PlugElectVeh\SiteInfra\ResRanking_REVISED.mxd

Source: ICF

Workplace Charging

To identify likely areas for workplace charging, ICF used data from the TRPA and Town of Truckee travel models to identify the origin-destination pairs for home-based work trips made between various traffic analysis zones. Using the areas that have the most likely PEV adopters (see the previous subsection), ICF weighted trips based on the likelihood that it would be completed with a PEV. The map in Figure 19 shows the areas that will likely experience high demand for workplace charging areas where likely PEV owners work, and vehicles are parked for several hours during the day.

Figure 19: Site Location for Workplace Charging



Source: ICF

Opportunity Charging

Opportunity charging covers a wide range of situations where a PEV driver could potentially charge when away from home or work. Unlike residential and workplace charging, where vehicles are parked for long enough that they achieve a significant charge even with Level 1 charging, opportunity charging will take place at locations where drivers are parked for varying times; therefore, the level of charging bears much greater consideration when siting opportunity charging. Table 12 shows the preferred charging method based on the available charging time at different venues.

Table 12: Recommended Charging Level for Different Venues

Typical Venue	Available Charging Time	Charging Level (Primary/Secondary)
Shopping Centers	0.5–2 hours	Level 2/DC Fast
Other	< 1 hour	Level 2/DC Fast
Street/Meters	1–2 hours	Level 1/Level 2
Parking Garages	2–10 hours	Level 2/Level 1
Hotels/Recreation Sites	8–72 hours	Level 2/Level 1

Source: ICF

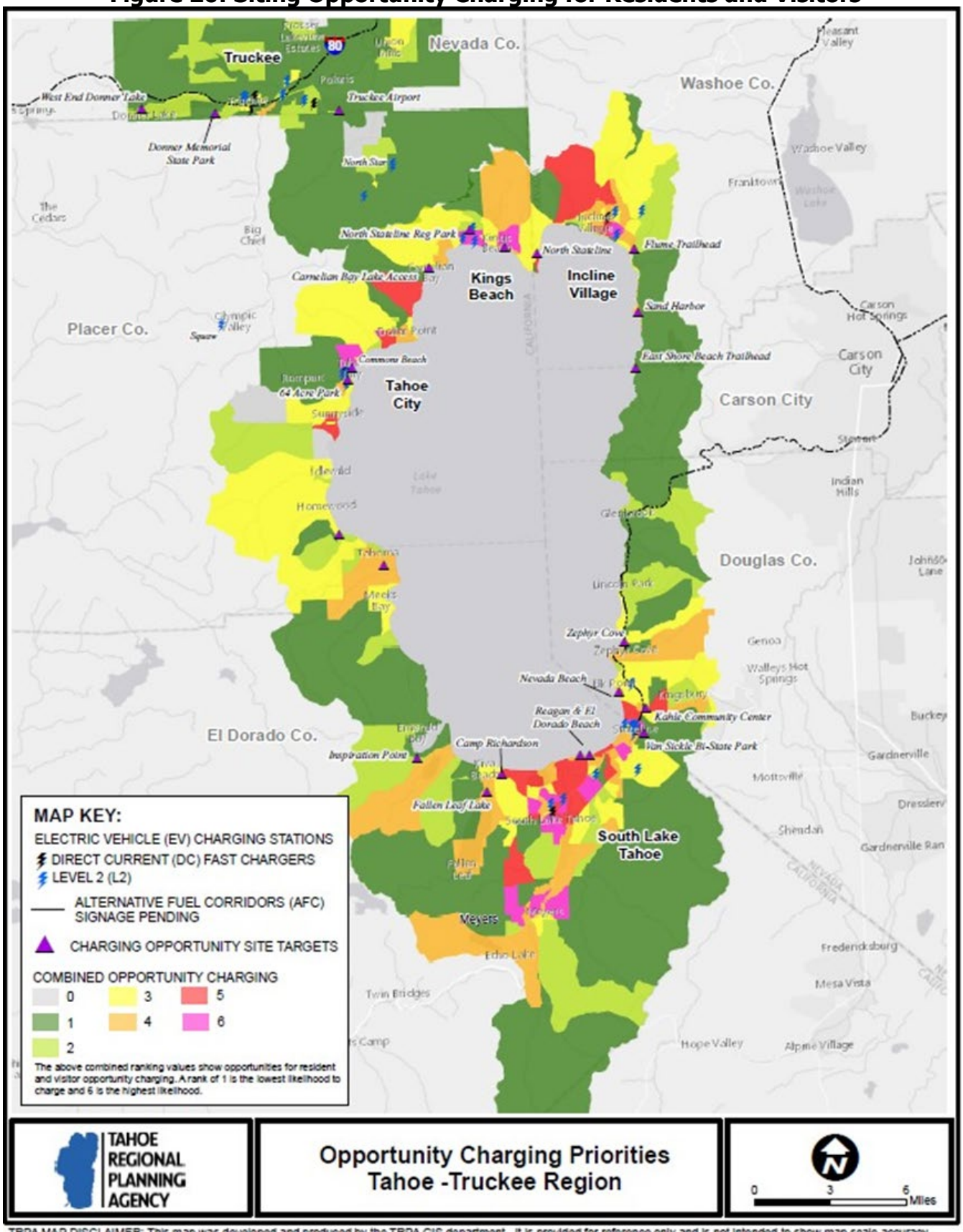
To identify likely areas for opportunity charging, ICF used data from the TRPA and Town of Truckee travel models to identify the origin-destination pairs for non-work-related trips, such as home to shopping and home to social or recreational activity.

Similar to the residential charging analysis, U.S. Census American Community Survey demographics on income, home ownership and dwelling type, as well a hybrid ownership rates were used to weight the trips on PEV likelihood.

For opportunity trips made by visitors, where the origin of the trip is unknown, but the destination traffic analysis zones is known, ICF used AirSage data to estimate the percentage of visitor trips that originate in various regions in California and Nevada. AirSage analyzes anonymous location and movement of mobile devices, which is derived from wireless signaling data, to provide insight into where populations, are, were, or will be, and how they move about over time. AirSage collected visitor device arrival and departure data over 13 days in July 2014. By analyzing the movement patterns of these devices, AirSage is able to determine the "home" or origin county of the 600,000-plus visitor devices detected in the region during that time period. ICF compiled American Community Survey demographic data and IHS Automotive hybrid ownership rates for each origin county identified in the AirSage data and then applied the percentage breakdown of visitor devices by county origin to estimate the likelihood of PEV ownership by visitors entering the region. The number of opportunity trips made by visitors (as provided by the travel modeling data) were then weighted by this likelihood score of visitors owning a PEV.

Figure 20 shows the areas that will likely experience high demand for opportunity charging areas where likely PEV owners' shop, dine, and visit for recreational activities.

Figure 20: Siting Opportunity Charging for Residents and Visitors



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Source: ICF

CHAPTER 5:
Transportation Electrification in Tahoe- Truckee: Goals and Implementation of the Plan

This section summarizes the three goals for the region's transportation electrification and lays out the roadmap and recommended actions to achieve these goals. We have identified the lead agency responsible for leading that action, distinguishing largely among local governments and agencies, regional governments and agencies, and utilities. The time horizon for the actions is 10 years: near-term (1 to 2 years), medium- term (3 to 5 years), and long-term (6 to 10 years) outlined in detail to ensure the Tahoe- Truckee Region is PEV ready.

Tahoe-Truckee Transportation Electrification Goals

The Coordinating Council has outlined the following vision for the region:

> *Vision for the Region*
>
> *Establish Tahoe-Truckee as a leader in mass PEV deployment supported by robust PEV education and engagement; a convenient network of charging infrastructure; streamlined charger installation; standardization of codes; and widespread use of renewable energy resources.*

The Tahoe-Truckee Region has developed the following three goals to help realize this vision.

Goal 1. Maximize the share of electric miles traveled in the Tahoe-Truckee Region to achieve sustainability and environmental improvement objectives, especially reducing greenhouse gas emissions (GHG), and criteria air pollutant emissions.

This goal seeks to maximize the number of miles that can be traveled using electricity instead of conventional internal combustion engine vehicles because of its potential to reduce GHG emissions, criteria air pollutant emissions, and attain TRPA air quality thresholds. Furthermore, the increased mode share for ZEVs has the potential to improve water quality by reducing atmospheric nitrogen deposition and gasoline flowing into the watershed, as well as reducing noise impacts from roadways. This goal emphasizes the planning role of TRPA and its partners to create the needed infrastructure, while not dictating the market for privately owned vehicles. The intent of this goal is to maintain flexibility with different vehicle architectures (such as BEVs and PEVs) and the supportive charging infrastructure and be responsive to market developments, rather than predict them. The Performance Metrics for Goal 1 can be seen in Table 13 on the next page.

Table 13: Goal 1 Performance Metrics

1a	Avoided environmental harms attributable to electric vehicle miles, including GHG emissions, and criteria air pollutant emissions.
1b	Charging stations deployed at select destinations in the Tahoe Region, for instance at popular sites such as in or near town and regional centers, retail centers, beaches, recreational areas, educational facilities, and large marinas.
1c	Charging stations deployed at workplaces in the Tahoe Region.

Source: ICF

Goal 2. Make it easier and less expensive to install electric vehicle charging infrastructure in the Tahoe-Truckee Region and make charging accessible to a broad range of users.

This goal focuses on accelerating the deployment of charging infrastructure by streamlining permitting and adding supportive incentives and policies. Local governments can help increase the number of new charger installations by reducing regulatory barriers and creating requirements or incentives for new development in zoning or building codes, or by installing chargers in key locations on publicly owned land. They can also conduct outreach, create guidance, or streamline permitting to educate landowners about the benefits of chargers. There is no one right way for local governments to increase the availability of charging; the best approach is to select the strategies that will be most effective at fostering charging opportunities where it is needed. This goal recognizes that local governments are responsible for regulating land use and development, and that local approaches vary based on agencies' context and authority. TRPA's role is to help local governments identify and implement appropriate strategies. The performance metrics of Goal 2 can be seen in Table 14 below.

Table 14: Goal 2 Performance Metrics

2a	Time period required to install charging infrastructure, defined as the time period between the agreement to host a charger at a site and the first charging event.
2b	Time required to issue permits for charging infrastructure.
2c	Costs of permitting charging infrastructure in the Tahoe Region.
2d	Availability of incentives for charging infrastructure in the Tahoe Region.

Source: ICF

Goal 3. Improve electric vehicle awareness among residents, second-home owners, and visitors to the Tahoe-Truckee Region.

Engaging public education and useful tools will help increase PEV adoption among stakeholders, including residents, second-home owners, and visitors to the region.

Consumer surveys, including a vehicle ownership survey conducted as part of the planning process, consistently show that PEV awareness among consumers is lacking regarding issues such as availability of incentives, vehicle performance, and vehicle safety. This goal recognizes that changes in vehicle ownership do not occur in a vacuum, and that TRPA and stakeholders have a role to play in improving awareness to increase PEV use. The performance metrics of Goal 3 can be seen in Table 15 on the next page.

Table 15: Goal 3 Performance Metrics

3a	Public awareness of the benefits of electric vehicles.
3b	Number of public participants reached during dedicated outreach activities.
3c	Number of impressions delivered via media coverage.

Source ICF

Implementation Plan: Short-, Medium-, and Long-Term Actions

Figure 21 on page 50 presents the key PEV readiness plan actions in this plan for regional agencies, local governments, and utilities over the next 10 years, organized into short-term, medium-term, and long-term actions.

The timeline in Figure 22 on page 51 represents general goals for implementation of these strategies across the entire Tahoe-Truckee Region. However, PEV readiness requires a comprehensive suite of actions, and there are often opportunities to implement some strategies ahead of others. ICF recognizes that many local governments and stakeholders have already completed or made substantial progress toward completing some of the actions ahead of schedule, and that proactive stakeholders will want to look ahead to future requirements to begin laying the groundwork for long-term PEV readiness.

Readiness Planning

The demand for PEVs and the supporting charging infrastructure is pressing: the rate of adoption of PEVs is accelerating in the region and infrastructure providers have responded by deploying charging station. To date, however, much of the activity has occurred in an ad hoc and uncoordinated fashion. The objective of readiness planning, that is shown in Table 16 below, is to identify, prioritize, and follow through on the actions required in the near to mid-term future that are required to unlock the long-term potential of transportation electrification as a sustainability initiative. More specifically, the plan lays out the path to make the Tahoe-Truckee Region "PEV ready" by identifying the barriers to widespread deployment of charging infrastructure and outlining the actions that will reduce and resolve these barriers.

TRPA has partnered with the Truckee-Donner Public Utility District and a newly initiated coordinating council to accelerate transportation electrification in the Tahoe-Truckee Region. Including participation from different localities and interests, the Tahoe- Truckee Coordinating Council was convened to garner support and advance recommendations and implementation.

Structure of Readiness Plan

The Readiness Plan is structured as outlined in Table 16 below.

Table 16: Readiness Plan

Plan Section	Description
Chapter 1 Regional Plug-in Electric Vehicle Market: Current Deployment and Forecasted Growth	The document starts with an overview of the PEV market today, including the type and number of PEVs deployed in the Tahoe-Truckee Region; the location, quantity, and level of charging infrastructure deployed in the Tahoe-Truckee Region; and an introduction to the market drivers for PEV ownership.

Plan Section	Description
Chapter 2 Policies, Programs, Incentives, and Funding	This section provides an overview of the existing PEV-related policies and programs throughout the Tahoe-Truckee and adjacent regions, with a focus on state and local government-level efforts to increase PEV deployment and charging infrastructure through clean transportation policies, building standards, zoning, and permitting and inspection.
Chapter 3 Barriers to Regional PEV	PEV sales in the Tahoe-Truckee Region have been modest to date, and are out-performing hybrid electric vehicle sales at the same stage of deployment
Plan Section	Description
Adoption	in the early 2000s. The readiness planning exercise is designed to help maintain and accelerate momentum related to electric vehicle deployment in the region. This section reviews critical market gaps and barriers to PEV deployment in the Tahoe-Truckee Region: charging infrastructure deployment, coordination amongst local stakeholders, streamlining charging infrastructure deployment, consumer vehicle preferences, and consumer awareness.
Chapter 4 Charging Infrastructure Siting Analysis	The siting analysis is an analytical exercise that looks at key vehicle ownership indicators and regional travel patterns to identify areas in the Tahoe-Truckee Region where there will likely be demand for charging infrastructure.
Chapter 5 Transportation Electrification in Tahoe-Truckee: Goals and Implementation	This section re-states the three goals for the Tahoe-Truckee Region related to transportation electrification and lays out the roadmap and recommended actions to achieve those goals. For each goal, the lead agency responsible for leading that action and corresponding time horizon for the actions are outlined to ensure that the Tahoe- Truckee Region is PEV ready.
Appendix A. Factsheets and Outreach Materials	This includes the factsheets and outreach materials that were developed as part of the planning process.
Appendix B. Outreach Strategy	This outlines the outreach strategy for coordination and messaging in the Tahoe- Truckee Region. It includes goals and performance measures; public outreach objectives and deliverables; and the program sectors or audiences to target.
Appendix C. Vehicle Ownership Survey Results	This summarizes the results from a vehicle ownership survey that was conducted as part of the planning process. TRPA disseminated the survey was in mid-2016 via an online questionnaire. TRPA collected 424 survey responses in total, 55% of which were full-time residents, 23% occasional visitors, 17% seasonal residents, and 5% from those who live outside of the Tahoe-Truckee Region but commute in to work.

Plan Section	Description
Appendix D. PEV Toolkits	As part of the planning process, resources were developed for key sectors that play a role in PEV readiness in the Tahoe-Truckee Region, including residents and visitors to the region, local governments, fleet owners and operators, and utilities.

Source: ICF

Ongoing Actions

The actions listed in Table 17 below shows the requirements needed for ongoing engagement over the course of PEV readiness implementation.

Table 17: Ongoing PEV Readiness Recommendations and Responsible Agencies

Action Area	Recommendation	Responsible Stakeholders	Goal(s) Addressed
Accelerating regional PEV adoption	Identify grant funding for charging station deployment, including corridor network of DC fast chargers and L1/L2 workplace charging	TRPA, local governments	2
	Identify other PEV related funding opportunities and coordinate charging infrastructure deployment		2
Regional coordination	Monitor PEV and EVSE deployment	TRPA	1
	Monitor market opportunities and local government PEV readiness		1
	Create cross-jurisdictional opportunities for sharing lessons learned	TRPA in partnership with other regional planning agencies and local governments	2, 3

Source: ICF

Identify grant funding opportunities for charging station deployment

Regional agencies and local governments can play a critical role in accelerating regional PEV adoption in the Tahoe-Truckee Region by identifying grant funding opportunities for the purchase and installation of charging stations. One of the common barriers to PEV adoption is range anxiety the fear that a vehicle has insufficient range to reach its destination. This is of notable importance in the Tahoe-Truckee Region due to the large influx of tourists visiting the region who do not have the opportunity to charge overnight like they do at home. Developing a robust charging station network in the Tahoe-Truckee Region will ensure that visitors can easily reach and explore the region in their PEVs. Making it fast and convenient to charge away from home can also maximize the number of miles driven in electric mode for residents, second homeowners, and visitors. Serving as a clearing house for regional PEV Readiness, TRPA should track and share information on relevant grant funding solicitations offered by

government agencies (e.g., the CEC) and other funding opportunities such as Volkswagen's Electrify America program.

Identify other PEV funding opportunities and coordinate charging infrastructure deployment

Regional agencies and local governments can also help accelerate local adoption of PEVs by identifying and applying for other PEV-related grant funding opportunities. This could include funding for workshops, trainings, outreach campaigns and events.

Monitor PEV adoption, charging station deployment, and local government PEV readiness progress

TRPA should develop a system to monitor the region's PEV readiness by tracking PEV purchases, charging station installations, and local implementation of the actions shown recommended in this Plan. The uptake of PEVs should be continually monitored to determine which of the medium-term PEV readiness actions to implement and the appropriate level of additional funding that is needed to achieve the region's PEV goals.

Table 18 below includes proposed metrics for monitoring. TRPA will work to determine which metrics to measure and which agency is the most appropriate to collect the data.

Table 18: Proposed Metrics for Monitoring

Action Area, Goal	Proposed Metric
Infrastructure deployment Goal 1 (covers 1c and 1d)	Total number of charging stations, listed by level of charging: Level 1, Level 2, and DC fast chargers. Measure annually.
	Number of charging stations and number and type of chargers available at: residential, workplace, and destination charging (such as town centers and recreational facilities). Measure in 2021.
	Parking spots with access to PEV charging equipment. Measure in 2021.
	PEV charging equipment with ADA accessibility. Measure in 2021.
Supportive Planning, Goal 2 (covers 2a to 2e)	Number of jurisdictions and utility companies with policies, design standards, plans, incentives, etc. directly addressing electric vehicles in a supportive way. Measure four years from finalization of readiness plan of 2021.
	Time period required to install charging infrastructure, defined as the time period between gaining permission to use site and the first charging event. Measure in 2021.
	Time required to issue permits for charging infrastructure. Measure in 2021.
	Average cost of installing Type 2 and DC charging infrastructure in the Tahoe Region. Measure in 2021.
	Average cost of permitting associated with charging infrastructure in the Tahoe Region. Measure in 2021

Action Area, Goal	Proposed Metric
	Describe availability of incentives for charging infrastructure in the Tahoe Region. Ongoing measurement.
Outreach and awareness, Goal 3 (covers 3a to 3c)	Number of events (including training) providing information about PEVs and charging infrastructure. Ongoing measurement.
	Estimated number of public participants reached during dedicated outreach activities. Ongoing measurement.
	Number of impressions delivered via media coverage
	Assess public awareness of the benefits of electric vehicles. Ongoing measurement.
Environmental, Goal 1 (covers 1a and 1b)	GHG emissions as a part of the Tahoe Regional Transportation plan updates (typically occurs every four years).
	Electric vehicle miles traveled in the Tahoe Region. Measure during Tahoe Regional Transportation Plan update (typically occurs every four years).
	Assess avoided environmental harms attributable to electric vehicle miles, including GHG emissions, criteria air pollutant emissions, and water quality pollutants. Measure during Tahoe Regional Transportation Plan update (typically occurs every four years).

Source: ICF

Facilitate cross-jurisdictional sharing of lessons learned

The Tahoe-Truckee Region encompasses many local governments that each have their own challenges and experiences with PEV adoption. As a regional agency, TRPA can help facilitate coordination among all stakeholders in the region so that best practices and lessons learned by local jurisdictions can inform and benefit the region. Creating and sustaining a network of stakeholders who work on PEV related issues will help strengthen PEV readiness throughout the region.

Short-term (1 to 2 year) actions

It is anticipated that the number of PEVs will continue to increase over the next two years. During this period local governments, regional agencies, and utilities will need to continue laying the groundwork for successful PEV deployment by working to remove barriers to charging infrastructure installations and seeking opportunities to incentivize charging infrastructure and PEV purchases. Table 19 summarizes the short-term PEV readiness guidance in this plan.

Table 19: Short-term PEV Readiness Recommendations and Responsible Agencies

Action Area	Recommendation	Responsible Stakeholders	Goal(s) Addressed
Charging station design	Specify or adopt design guidelines for PEV parking spaces for both on- and	All local governments	2

Action Area	Recommendation	Responsible Stakeholders	Goal(s) Addressed
	off-street parking that is consistent throughout the region.		
Consumer Education and Outreach	Develop and continue to update a PEV resources website to educate consumers on the environmental and financial benefits of PEVs and provide an up to date list of available incentives.	TRPA	3
Incentives	Consider a PEV purchasing incentive program e.g., for fleets.	Local governments and air quality management districts	1,3
	Establish PEV program, including PEV rates.	Regional utilities	1,3
Permitting and Inspection	Develop process to streamline and expedite permitting for chargers in single-family residences that is consistent throughout the region. Make the process more predictable in terms of knowing the expected timeline and resources.	All local governments	2
Local Ordinances and Planning	Consider adopting the voluntary Tier 1 and/or Tier 2 CalGreen codes related to PEVs and electric vehicle supply equipment.	All local governments	2
Training and Education	Provide educational resources to local fleet managers regarding PEV and charging station deployment.	TRPA	2,3
	Conduct outreach and education efforts targeting businesses (e.g., hotels, restaurants, resorts, etc.) to encourage charging infrastructure deployment.	TRPA, Regional utilities, local governments	1, 3
Utility Planning	Create utility notification protocol for PEV purchases and EVSE installations.	Regional utilities	2,3
Regional Coordination	Integrate PEV readiness into local planning efforts— regional transportation plans and sustainable communities' strategies.	TRPA, local governments	1

Source: ICF

Integrate PEV readiness into local planning efforts

Regional agencies and local governments should integrate PEV readiness policies and goals into local planning efforts, such as regional transportation plans, general plans, or similar documents that require or encourage electric vehicle charging. These plans are broader and less detailed than building codes and zoning ordinances, so policies calling for increased charging opportunities typically do not contain specific details on where chargers are needed or on how much charging should be provided. However, even voluntary or vague policies can provide a basis for local governments to negotiate with developers to install chargers during discretionary review, as well as set the stage for more detailed implementation through building codes or zoning ordinances.

Further information and considerations for integrating PEV readiness into local planning efforts is provided in the Tahoe-Truckee Local Government Plug-in EV Toolkit.

Develop PEV resources website

The vehicle ownership survey conducted for this plan (see Appendix D. Understanding Existing and Potential PEV Drivers) revealed a need for consumer education on PEVs. To address this need, TRPA developed an electric vehicle website for engaging and informing regional stakeholders on all things PEV. The website includes information on the environmental and financial benefits of PEVs, incentives for purchasing PEVs and charging equipment, tips for charger installation, and tools for selecting the best PEV for their needs.

One of the barriers of accelerating PEV adoption is the high Develop a PEV purchasing incentive program

purchase price of PEVs. Currently, a combination of the federal tax credit and the state rebate helps to reduce the purchase price of vehicles significantly; however, the long-term availability of these programs is yet to be determined. For instance, the current federal tax credit is phased out by manufacturer once that manufacturer reaches a threshold of 200,000 in qualified PEV sales. This federal tax credit is estimated to phase out for the major automobile manufacturers starting 2018. There is uncertainty whether this federal tax credit will remain under the new Administration in 2017. The California Clean Vehicle Rebate Project was originally set to expire at the end of 2015; however, Governor Brown has extended the program with a similar structure through 2023. Therefore, in the near future, the Tahoe-Truckee Region may see limited purchasing incentives available for PEVs. Depending on vehicle pricing, this may be an opportunity for regional governments to offer more modest incentives that help continue the acceleration of PEV purchases in the middle- and low-income brackets.

The El Dorado County Air Quality Management District is the only local government in the region that currently offers a financial incentive for the purchase or lease of a new PEV. Other local governments should consider funding similar incentive or rebate programs through the use of Department of Motor Vehicles registration fees.

Establish PEV electricity rates

Regional utilities, including Liberty Utilities and NV Energy should continue to offer or enhance electricity rate structures that lower rates during off-peak hours through TOU tariff structures. TOU rates are advantageous for PEV owners, as they can charge their vehicles overnight during the cheaper off-peak hours. They also help utilities manage demand by minimizing the adverse impacts of having all PEV driver's plug-in their vehicles when they get home from

work during on-peak hours. To help make driving PEVs more affordable, utilities serving the Tahoe-Truckee Region should consider offering TOU rates.

Streamline and expedite permitting process

To remove barriers to residential charging station installation, local governments in the Tahoe-Truckee Region should create a permitting process that is easy to navigate, fast, and affordable.

We recommend that local governments implement the following actions to streamline and expedite their permitting and inspection processes. These recommended actions are mutually supporting; minimizing permit requirements will reduce staff time devoted to permit review, which will enable local governments to process permits more quickly and levy lower fees to recover costs.

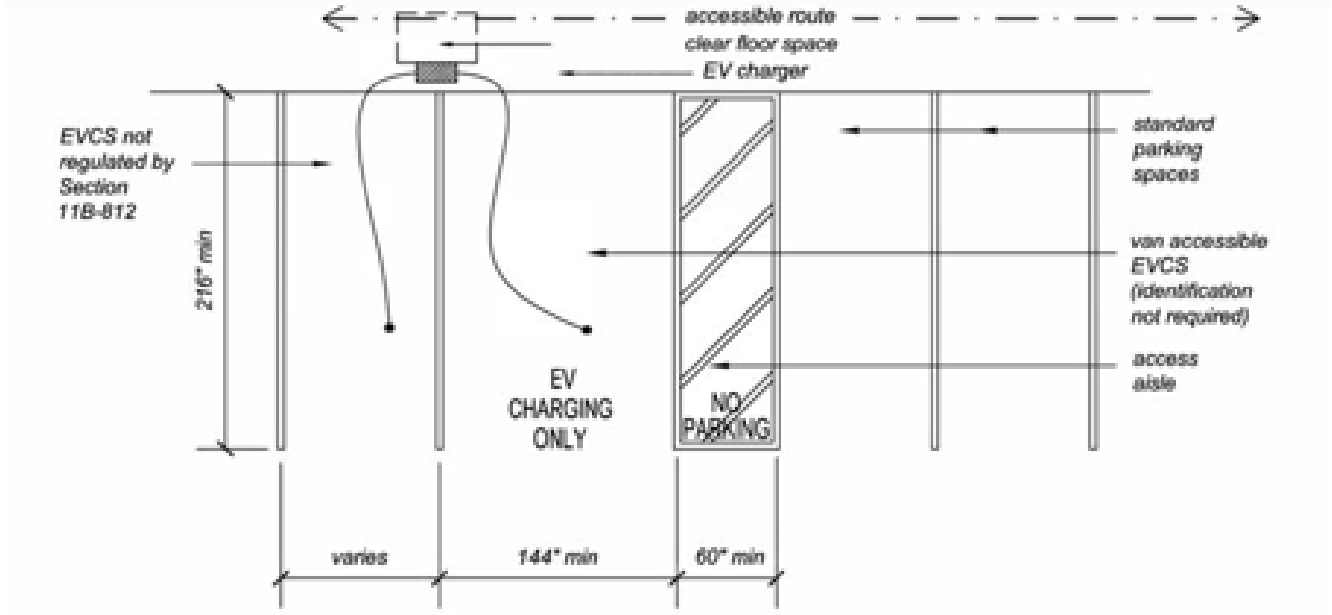
- Issue required permits in under 48 hours
- Levy fees between $100 and $250
- Issue supplementary guidance, such as a permitting checklist, to help applicants through the permitting process, and post this guidance online
- Limit the number of required inspections to one
- Minimize requirements for supporting materials to information about the EV charging system (i.e., level of charger, compliance with national standards, proposed location) and electrical service (i.e., existing electrical panel service information, load calculations, whether panel upgrades or a new meter installation are required).
- Do not require site plans for EV charging station installations in single family residences.

Where possible, local governments should work together to make their processes and requirements consistent, which will make it easier and faster for electrical contractors who work throughout the region to permit and install charging stations.

Develop charging station design guidelines

Recent additions to the California Building Code include detailed specifications for charging station design and accessibility requirements. These requirements can be seen in Figure 21 on the next page. To make it easier for charging station hosts to determine the best configuration of their installation while also meeting building code requirements, local governments could also adopt uniform charging station design guidelines that address the many unique considerations associated with PEV parking spaces.

Figure 21: A View of the Detailed Specifications for Charging Station Design and Accessibility Requirements in California



Source: ICF

Local governments will likely need to create multiple sets of PEV parking guidelines that apply to a wide variety of parking scenarios. Design guidelines will likely vary depending upon the configuration of the parking and upon the context in which parking is located. At a minimum, these guidelines should address the following issues:

- Minimum dimensions of PEV parking spaces.
- Parking configurations, including guidance on whether it is preferable to locate chargers in perpendicular, parallel, or angled parking spaces, and on the location of wheel stops, guard posts, and signage.
- Adopted technical standards that apply to electric vehicle charging stations.
- Regulatory signage and signs directing drivers to available PEV parking.
- Area lighting.
- Clearances, including minimum clearances around chargers to maintain access to controls, as well as on adjacent walkways to maintain pedestrian access. Pedestrian clearance guidelines should include recommendations for keeping sidewalks and walkways clear of cords and cables. Clearance recommendations should also address needs for snow plowing during the winter months.
- Location relative to other spaces, adjacent land uses, and electrical infrastructure. For example, guidance on locating on-street parking could include language such as "the last space on the block in the direction of travel will usually minimize cord management issues, and places user closer to crosswalks and curb ramps".
- Additional considerations that apply in overlay zones, such as flood control zones.
- Design of disabled access spaces, including requirements for the number of spaces in areas that must be accessible in areas with multiple PEV parking spaces and design standards for accessible spaces. These requirements are discussed in more detail in the Tahoe-Truckee Local Government Plug-in Electric Vehicle Toolkit.

Adopt the voluntary CalGreen codes related to electric vehicle supply equipment

The 2016 California Green Building Standards Code became effective January 1, 2017. There are several provisions related to PEV charging and parking spaces designated for PEV charging in the new building codes; these codes are automatically taken up by local jurisdictions. There are also residential and nonresidential voluntary measures that jurisdictions can adopt. These are summarized below.

The residential voluntary measures related to PEVs and electric vehicle charging include:

- Pre-wiring for Level 2 charging (at 240 Volts) for one-and two-family dwellings or townhouses with attached private garages.
- Reserve up to 5 percent, but not less than 1 percent of total parking spaces at multifamily dwelling units with more than 17 units.

The nonresidential voluntary measures related to PEVs and electric vehicle supply equipment include:

- Designated parking for clean air vehicles. Tier 1 sets a target of 10 percent of parking spaces and Tier 2 sets a target of 12 percent of parking spaces.
- Facilitate future installation of PEV charging infrastructure. Tier 1 sets an 8 percent target for EV charging spaces and Tier 2 set a 10 percent target for EV charging spaces.

Provide resources to employers and fleet managers

Information-sharing can encourage investment in PEVs among fleets. Fleets often require assistance navigating and weighing the various considerations associated with PEV ownership as compared to conventional vehicle ownership. TRPA should provide educational resources to fleet managers (such as a toolkit or guidebook) that provides information on the total cost of ownership, operating considerations, and charging station installation costs and guidelines. Since most PEVs available today are passenger cars the near-term focus should be on light-duty vehicle applications. As more medium and heavy-duty PEV technology is developed and are deployed in fleets, additional resources should be made available using best practices and lessons learned from local and regional case studies. Employers and businesses can also be targeted for education and outreach initiatives. These efforts can focus on a combination of reviewing existing incentives for deploying infrastructure, while also communicating the value proposition. Ultimately, the charging infrastructure market need to stand on its own, with or without the availability of incentives.

Create utility notification protocol

In order for utilities to minimize the potential grid impacts of charging PEVs, they should develop a notification protocol to understand where vehicles are being deployed and how they are being charged (e.g., Level 1 vs. Level 2). This information will allow utilities in the Tahoe-Truckee Region to evaluate whether the local distribution system is adequate to serve PEV charging needs.

Medium-term (3 to 5 year) actions

Over the next 5 years, we anticipate PEV adoption in the Tahoe-Truckee Region and PEV adoption by visitors to the region will increase, especially as the ZEV Program takes hold and battery prices continue to fall. Table 20 on the next page summarizes the medium-term guidance in the Plan.

Table 20: A Summary of the Medium-Term Guidance Given in the Plan

Action Area	Recommendation	Responsible Stakeholders	Goal(s) Addressed
Consumer Education and Outreach	Implement consumer outreach programs for special PEV charging rates and EVSE installations	Regional utilities	3
Incentives	Develop and implement a charging station rebate program	All local governments, regional utilities	2
Local ordinances and planning	Adopt regulations and enforcement policies for PEV parking spaces	All local governments	2
	Adopt ordinance that designates preferential or free parking for PEVs		2
Permitting and inspection	Train permitting and inspection officials in basic charger installation	All local governments	2
	Reduce permit fees for residential charging installations; make fees consistent among jurisdictions.		2
	Incentivize workplace and commercial charging installations by reducing permitting fees		2
Regional coordination	Work with local utilities to create a notification protocol for new EVSE through the permitting process	Local governments in areas with utility service	2
	Integrate PEV readiness into local planning efforts – transportation plans and sustainable communities' strategies	All local governments	1
	Update siting plan based on new market data	TRPA	2
Training and education	Provide technical assistance training to local fleet managers regarding PEV and charging station deployment	TRPA, Regional utilities	2,3
Utility planning	Evaluate impact of rate structures on PEV drivers	Regional utilities	2,3
	Upgrade distribution infrastructure and evaluate needs		2,3

Source: ICF

Utility Consumer Outreach Program

Regional utilities should consider taking necessary steps to ensure consumers are well informed about their PEV offerings. Customers should be provided with information about the availability and benefits of PEV rates, vehicle fueling costs and charging, as well as the utility role in the installation process. Utilities should consider implementing a consumer outreach campaign that presents a uniform set of PEV facts, utility rates, incentives, and program information to customers through a wide variety of media, including bill inserts, brochures, public events and presentations, online material, videos, school curriculum, emails and other media.

Evaluate impact of rate structures on PEV drivers

The availability and structure of a TOU or PEV rate can impact whether a PEV driver will save more, in terms of total cost of ownership, by driving a PEV compared to a conventional vehicle. Given the higher purchase price of PEVs compared to conventional vehicles, the most significant savings for consumers is from a reduction in fuel expenditures. Utilities serving the Tahoe-Truckee Region should consider evaluating their rate structures in the context of the potential impact on PEV consumers. This can include an analysis of secondary meter options, alternatives to the traditional tiered rate structure, and options for existing or future of TOU rates.

Further information and considerations for evaluating the impact of rate structures on PEV drivers is provided in the *Tahoe-Truckee PEV Toolkit for Utilities.*

Charging station installation rebate program

To incentivize the development of a robust regional charging station network, local governments should consider develop a charging station incentive program. This could include rebates for charging station equipment, waiving required permitting fees, or covering installation costs. Similar to PEV purchase incentives, a charging station rebate program could be funded by local air districts by allocating a percentage of annual DMV fee collection to PEV Readiness.

PEV parking enforcement

After establishing policies and strategies to encourage the deployment of PEVs, a next step for local governments is to amend parking ordinances to specify the regulations that apply to parking spaces designated for PEVs. The goal of these amendments is to ensure that PEVs have unobstructed access to PEV charging and to make sure that local governments can recoup the costs of publicly available charging in the event that the local jurisdiction owns and operates the equipment.

When designating PEV parking, local governments should consider applicable definitions, restrictions, enforcement policies, time limits, and fees. In general, it is a best practice to restrict use of EVSE to vehicles that are currently charging to ensure that the equipment is available for drivers who need them. This is supported by the California Vehicle Code, which allows only vehicles that are "connected for electric charging purposes" to park in spots designated for EVs and authorizes local governments to tow vehicles that are illegally using these spaces.

Further information and guidance on PEV parking considerations is provided in the *Tahoe-Truckee Local Government PEVs Toolkit*.

Preferential parking for PEVs

Local governments should consider offering additional incentives for drivers to purchase PEVs, by creating dedicated parking spaces or waiving parking fees for these vehicles. Local governments that are providing PEV parking that exceeds current demand may also consider specifying interim regulations that allow conventional vehicles to use these spaces to avoid under-utilization.

Permitting and inspection staff training

Training permitting staff in basic PEV charger installation will help staff process permits more efficiently and provide property owners with additional information about safety and the process of installing chargers. Local governments in the Tahoe-Truckee Region should consider organizing or funding a 6, 8-hour training session focusing on codes, safety, standards, site assessments, electric load calculations, permitting processes, and utility notification.

In order to streamline and reduce the cost of training local permitting officials, local governments are encouraged to work with organizations such as the Electric Vehicle Infrastructure Training Program to organize training sessions on charging station installations and outreach sessions for sharing local best practices among staff. Regional agencies should work to create a region-wide schedule of training and outreach events so that stakeholders can stay informed on opportunities across the region.

Reduce permitting fees for the installation of non-residential charging stations

To incentivize commercial property owners and workplaces to install electric vehicle charging stations, local governments and regional agencies should make the process more affordable by reducing permitting fees for non-residential applications.

Create a utility notification protocol through the permitting process

Regional agencies and local governments who issue permits should work together with utilities to create a protocol that notifies utilities when a charging station is planned for installation. Notification protocols can help utilities manage demand and also help charging station hosts avoid demand charges.

Update EV infrastructure siting plan

The goal of a siting plan is to help guide and coordinate future PEV charging infrastructure-siting efforts based on anticipated or projected demand for charging infrastructure. The siting analysis included in this Plan combines various parameters such as characteristics of PEV ownership and usage, land use, and regional travel patterns. As these characteristics change over time, TRPA should update the siting analysis with the latest vehicle registration, demographic, and travel demand data so the results remain current and relevant.

Provide technical assistance and training to local fleet managers

As mentioned in the previous section, fleets often require assistance navigating and weighing the various considerations associated with PEV ownership as compared to conventional vehicle ownership. Beyond providing educational materials to fleet managers, regional agencies and local governments should consider organizing or funding technical assistance and training workshops for local fleet managers in the Tahoe-Truckee Region. Local governments can take part in trainings offered by Clean Cities Coalitions. For example, the Sacramento Clean Cities

Coalition has hosted workshops on green fleet manager training and alternative fuel technologies and strategies.

Upgrade distribution infrastructure and evaluate needs

When utilities in the Tahoe-Truckee Region upgrade, or add, distribution infrastructure they should consider including the potential for PEV charging impacts as part of the analysis and, where possible, make strategic and cost-effective investments. Based on feedback, municipal utilities appear to be less focused on infrastructure upgrades related to charging infrastructure, in large part due to the small number of PEVs currently deployed in their service territories. However, all utilities should consider exploring vulnerable infrastructure, particularly in areas more likely to experience PEV clustering and large public infrastructure projects, such as DC fast charging corridors.

Long-term (6 to 10 year) actions

Most of the guidance in this Plan focuses on the short- and medium-term future to meet the growing demand for PEVs and charging infrastructure in the Tahoe-Truckee Region and build on the momentum established by the development of this Plan and the formation of the Coordinating Council. The long-term recommendations shown in Table 21 are designed to accelerate the current PEV adoption trajectory in the Tahoe-Truckee Region.

Table 21: Long-term PEV Readiness Recommendations and Responsible Agencies

Action Area	Recommendation	Responsible Stakeholders	Goal(s) Addressed
Regional coordination	Adopt a climate action plan, general plan element, or stand-alone plan that encourages deployment of PEVs and charging infrastructure	All local governments	1
Local ordinances and planning	Allow PEV parking to count towards minimum requirements	All local governments	1,2
Utility planning	Evaluate smart grid opportunities for PEVs	Regional utilities	1,2
Utility planning	Provide renewable energy options for PEV drivers	Regional utilities	1,3

Source: ICF

Adopt plans that encourage the deployment of PEVs and charging infrastructure

Local governments that have taken steps to amend their general plans and codes to encourage PEV deployment have found that adopting such policies is a critical first step in building consensus among policymakers and the public to support more specific PEV readiness implementation measures. The exact policies that local governments can choose to include can range from broadly encouraging increased adoption of PEVs to requiring or encouraging charging stations at specific land uses or sites where local agencies see development opportunities or anticipate high demand for charging. These policies build not only consensus, but also make it easier to fund plans and capital projects that accelerate the deployment of

PEVs. The incremental cost of PEV readiness planning is lower if it is part of a larger-scale effort. For example, tying PEV readiness to local policies can make it easier to allocate different funding streams toward PEV plans and projects. Incorporating implementation strategies related to PEVs in general plans or climate action plans can also streamline environmental review of these strategies in the future, since the CEQA Guidelines[12] allow lead agencies to streamline project-level environmental review off of these plans.

Further information and considerations for integrating PEV readiness into local planning efforts is provided in the *Tahoe-Truckee Local Government Plug-in Electric Vehicle Toolkit.*

Allow PEV parking to count towards minimum requirements

Many jurisdictions have minimum parking requirements specifying the number of spaces that developers must provide for new construction in different land uses. For these jurisdictions, if PEV parking is not counted toward these requirements it can discourage developers from installing charging infrastructure, since developers must either build more structured parking or reduce the amount of developed space to accommodate the extra parking needed for PEVs to access charging stations. Amending the zoning or parking code to allow PEV parking to count toward parking requirements would allow developers to provide PEV parking without increasing the total number of parking spaces required. This is similar to the way that many local governments currently treat accessible parking, allowing it to count toward minimum requirements in spite of the fact that it has additional design requirements and is restricted to certain users.

Evaluate smart grid opportunities for PEVs

In order to mitigate potential impacts of PEV deployment, municipal utilities should consider investigating opportunities for the smart grid, particularly as a way to potentially monitor and control charge events. As part of this planning effort, methods for ensuring the charging infrastructure and vehicles are able to send and receive information needed to interact with the grid and be compatible with smart grid technologies should be explored.

Further information on evaluating smart grid opportunities is provided in the *Tahoe-Truckee Plug-in Electric Vehicle Toolkit for Utilities.*

Provide renewable energy options for PEV drivers

Research shows that some early PEV adopters prioritize environmental benefits as a key reason to switch from internal combustion engine vehicles. By integrating renewable energy options into existing or future PEV rates, some utilities in the Tahoe-Truckee may see accelerated PEV adoption rates.

[12] The California Environmental Quality Act Guidelines https://www.opr.ca.gov/ceqa/

GLOSSARY

BATTERY ELECTRIC VEHICLE (BEV)—Also known as an "All-electric" vehicle (AEV), BEVs utilize energy that is stored in rechargeable battery packs. BEVs sustain their power through the batteries and therefore must be plugged into an external electricity source in order to recharge.

CALIFORNIA ENERGY COMMISSION (CEC)—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibilities are:

1. Forecasting future statewide energy needs
2. Licensing power plants sufficient to meet those needs
3. Promoting energy conservation and efficiency measures
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels
5. Planning for and directing state response to energy emergencies.

DIRECT CURRENT (DC)—A charge of electricity that flows in one direction and is the type of power that comes from a battery.

ELECTRIC VEHICLE (EV)—A broad category that includes all vehicles that are fully powered by electricity or an electric motor.

EMISSIONS FACTOR (EMFAC)—has been published since 1972 as the primary compilation of EPA's emissions factor information. It contains emissions factors and process information for more than 200 air pollution source categories. A source category is a specific industry sector or group of similar emitting sources.[13]

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)—Infrastructure designed to supply power to EVs. EVSE can charge a wide variety of EVs, including BEVs and PHEVs.

GREENHOUSE GAS (GHG)—Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (NOx), halogenated fluorocarbons (HCFCs), ozone (O3), per fluorinated carbons (PFCs), and hydrofluorocarbons (HFCs).

HYBRID ELECTRIC VEHICLE (HEV)—A vehicle that combines an internal combustion engine with a battery and electric motor. This combination offers the range and refueling capabilities of a conventional vehicle, while providing improved fuel economy and lower emissions.

PLUG-IN ELECTRIC VEHICLE (PEV)—A general term for any car that runs at least partially on battery power and is recharged from the electricity grid. There are two different types of PEVs to choose from pure battery electric and plug-in hybrid vehicles.

PLUG-IN HYBRID ELECTRIC VEHICLE (PHEV)—PHEVs are powered by an internal combustion engine and an electric motor that uses energy stored in a battery. The vehicle can be plugged

[13] Emissions Factor https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors

in to an electric power source to charge the battery. Some can travel nearly 100 miles on electricity alone, and all can operate solely on gasoline (similar to a conventional hybrid).

SPORT UTILITY VEHICLE (SUVs)— is a car classification that combines elements of road-going passenger cars with features from off-road vehicles, such as raised ground clearance and four-wheel drive.[14]

TAHOE REGIONAL PLANNING AGENCY (TRPA)—and the Placer County Building Division work together to process building permits in the Tahoe basin.[15]

TIME-OF-USE (TOU)—Electric utility rates that vary by time of day, in three categories, so that partial-peak and off-peak hours are lower than rates during peak hours (5-8 pm). On these rate plans some users can reduce expenses by shifting energy use to less expensive hours of the day.

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)— supports state and local government in the design, construction, and maintenance of the highway system.[16]

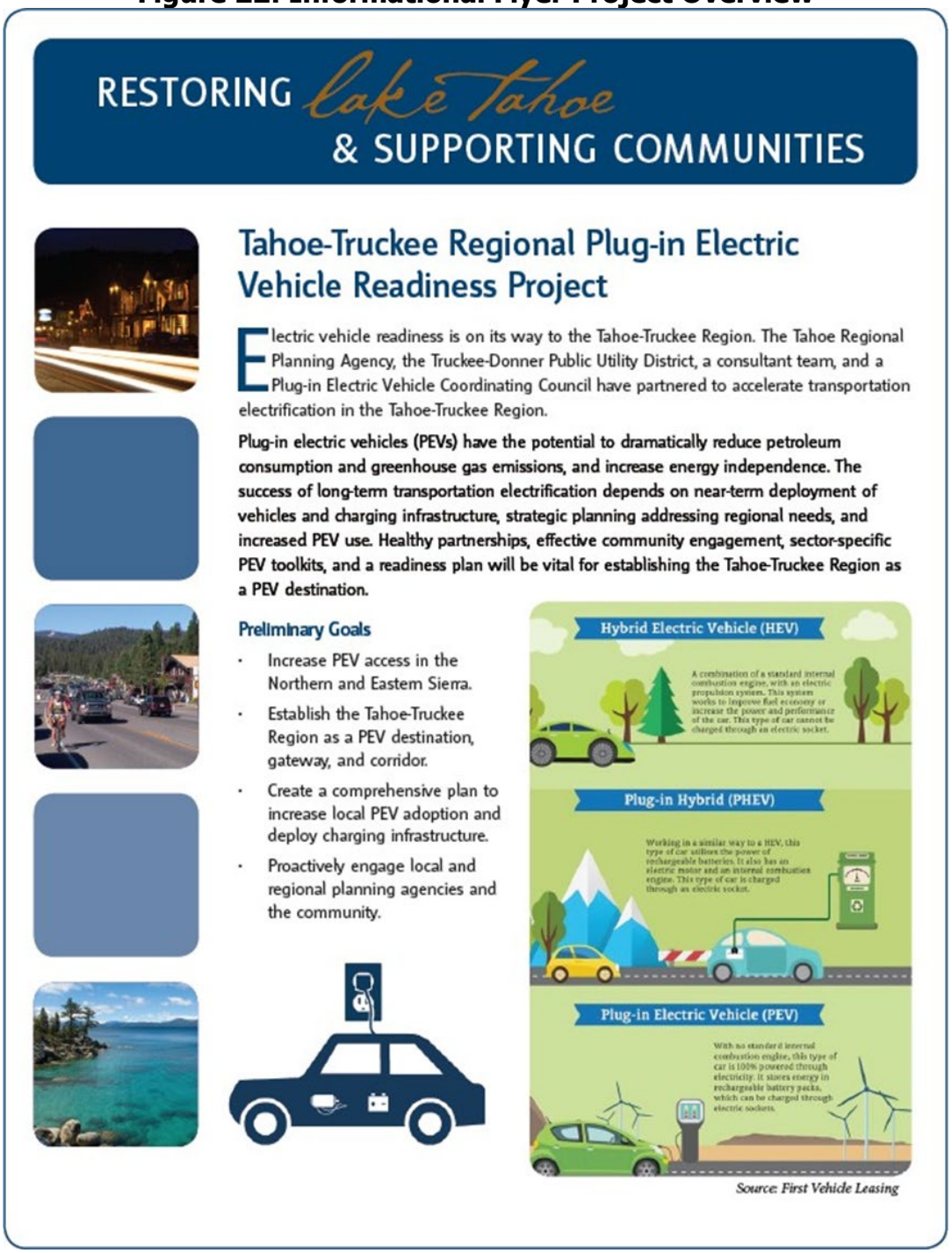
ZERO EMISSION VEHICLE (ZEV)—Vehicles that produce no emissions from the on-board source of power (e.g., an electric vehicle)

[14] Sport Utility Vehicle Definition https://en.wikipedia.org/wiki/Sport_utility_vehicle
[15] Tahoe Regional Planning Agency https://www.placer.ca.gov/2275/Tahoe-Regional-Planning-Agency
[16] U.S. Federal Highway Administration https://www.usa.gov/federal-agencies/federal-highway-administration

APPENDIX A:
Facts Sheets and Outreach Materials

Appendix A includes factsheets and outreach materials displayed in Figures 22-25.

Figure 22: Informational Flyer Project Overview



Source: Tahoe Regional Planning Agency

Figure 23: A Breakdown of Project Deliverables and Timeline

Project Deliverables

- PEV assessment report: includes an existing conditions report and PEV gap analysis. The regional infrastructure, policies, programs, PEV use, and behaviors/needs will be assessed.
- Outreach strategy and sector-specific PEV toolkits: addresses funding strategies, best practices, available training, and outreach materials. Sectors include local governments, fleet owners and operators, energy wholesalers/retailers, vehicle dealers, Tahoe-Truckee residents and visitors, second home owners, and tourist destinations.
- Tahoe-Truckee regional PEV readiness plan: includes a market overview, a regional siting analysis, recommendations, next steps, and readiness action items related to permitting and planning, training, and education. Public education workshops will be held.

Timeline

The Tahoe-Truckee PEV Coordinating Council will meet throughout.

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TDPUD Commitment to Conservation

TAHOE REGIONAL PLANNING AGENCY
trpa.org

Source: Tahoe Regional Planning Agency

Figure 24: Informational Flyer About EVs and Understanding the Cost of Ownership

RESTORING *lake Tahoe* & SUPPORTING COMMUNITIES

Why Drive Electric?

Owning an electric vehicle in the Tahoe-Truckee Region has never been easier. Save money in your wallet and help the environment by dramatically reducing gas consumption, greenhouse gas emissions, and noise. Plug-in Electric Vehicles (PEVs) are a type of zero emission vehicle designed to plug into the grid to use electricity for fuel. You may be surprised to find out that PEVs are fun and safe to drive, and financially smart. Dozens of different PEV models are now available, not to mention the ease with refueling at home.

Choosing an electric vehicle that fits your lifestyle

- Use the Pick-a-Plugin quiz (https://content.sierraclub.org/evguide/pick-a-plugin) to find vehicles best fitting your travel needs and budget. The diversity of models available is expanding rapidly. For instance, several manufacturers are introducing electric powered mini-vans, crossovers, and SUVs.
- Check out FuelEconomy.gov for the newest electric vehicle offerings. Plug-in hybrid electric vehicles (PHEVs), like the Chevy Volt, have both an electric motor and a gasoline engine. Battery electric vehicles (BEVs), like the Nissan LEAF or Tesla Model S, run solely on electricity.

Understanding the total cost of ownership

A common myth is that electric vehicles cost more than conventional vehicles. However, electric vehicle owners can take advantage of various incentives and long term savings by using a cheaper fuel (electricity) and lower maintenance costs that makes up for the up-front expenses. Lastly, local utilities offer discounted Time-of-Use (TOU) rates for electricity consumed during off-peak hours during the night.

- Liberty Utilities and NV Energy both provide reduced electricity prices with 19 to 47% savings.
- Want to see how much you could save on fuel costs if you drove electric? Check out the NREL Vehicle Cost Calculator at: afdc.energy.gov/calc.

When gasoline is priced at $3 per gallon, it costs 55 - 83% less to drive a mile in a 2016 Nissan LEAF than a 2016 Honda Civic gasoline vehicle.

Source: Tahoe Regional Planning Agency

Figure 25: Comparison Showing the Total Cost of Ownership

How do the costs compare?

To compare costs, this figure shows total cost of ownership calculations for vehicles owned for ten years. The following makes/models are compared: Ford Focus Internal Combustion Engine (conventional vehicle), Chevrolet Volt (PHEV), and a Nissan LEAF (BEV).

Above figure assumes that federal and California incentives were used in the purchase of the BEV and PHEV makes/models and that the 40-80% of the miles are driven on electric for the Chevy Volt PHEV. Other assumptions: 10,000 to 14,000 miles are driven per year, gas prices were $2.50 to $4.00 per gallon, and electricity prices are 5¢/kWh—13.2¢/kWh. Annual insurance costs: Ford Focus—$1,294, Chevrolet Volt—$1,273, Nissan LEAF—$1,165. Maintenance costs: Ford Focus—6.0¢/mile, Chevrolet Volt—4.9¢/mile, Nissan LEAF—4.5¢/mile.

Want to keep up to date on the latest incentives? Check out the ARB PEV incentive finder: driveclean.arb.ca.gov/pev/Incentives.php

Learn more about incentives and EVs at: tahoealternativefuels.com

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TAHOE REGIONAL PLANNING AGENCY
trpa.org

April 2017

Source: Tahoe Regional Planning Agency

APPENDIX B:
Outreach Strategy

Engaging public education and useful tools will help increase PEVs adoption among stakeholders. Providing resources to key sectors that play a role in PEV readiness in the region will be crucial for effective implementation of the Readiness Plan. As part of Task 2 of this project, ICF developed toolkits tailored to respond to the challenges of each type of sector/audience regarding PEV readiness in the Tahoe-Truckee Region. With input and support from TRPA, ICF developed the following Outreach Strategy to aid in the successful dissemination of the toolkits and implementation of the Readiness Plan. Overall, the project team will support various facets of this outreach plan iteratively throughout plan development to promote effective PEV readiness in the region and support the development of an adaptable system capable of integrating regularly updated market information. In addition, the vehicle ownership survey results, provided in Appendix A, will help to inform how best to accomplish outreach. Table 22 below outlines the overall goals and vision of the outreach strategy; Table 23 highlights the associated objectives and deliverables to reach different sectors; and Table 24 identifies the different program audiences/sectors.

Table 22: Public Outreach Goals and Performance Measures

Overall Goals	**Overall Performance Measures**
Facilitate Resource Development – Through the readiness plan, act as a clearinghouse for and "attractor" of federal, state, regional, and private investments and initiatives. Serve as a centralized forum for organizations in the region to leverage collaborative partnerships to acquire grants and other sources of funding to aid in the mass deployment of PEVs and charging infrastructure.	Total number of impressions delivered via media coverage. Total number of events (including training) providing information about PEVS and charging infrastructure.
Coordinate Stakeholder Engagement and Build Awareness – Establish a centralized space in the region for strategy development, coordination, and input. Proactively engage local and regional planning agencies, public and private fleets, and the community to develop an actionable plan.	Describe range of material available distributed. Estimated number of public participants reached during proactive outreach activities.
Promote a Regional PEV Charging Network – Provide centralized planning resources to establish an efficient, context-sensitive, and	

Overall Goals	Overall Performance Measures
user-friendly PEV charging network for the region and transportation corridors. Coordinate, facilitate, and monitor the implementation of this plan.	Total number of public participants reached through quantitative methods (such as surveys).

Vision: Establish Tahoe-Truckee as a leader in mass PEV deployment supported by robust PEV education and engagement; a convenient network of charging infrastructure; streamlined charger installation; standardization of codes; and widespread use of renewable energy resources.

Source: ICF

Table 23: Public Outreach Objectives and Deliverables

Objectives	Outreach Tools and Deliverables
1. Provide a list of financial incentives and support resources.	• High Priority (TRPA): Develop a toolkit/factsheet covering loan and rebate programs, purchase vouchers, incentives, grants, charging rate reductions, and insurance discounts. The factsheet content could also be used to develop an easy to navigate website tool.
2. Through outreach events, education/awareness tools and materials (brochures, factsheets, etc.), educate residents about PEVs to encourage regional adoption. TRPA, TDPUD, and HBA will be responsible for many outreach events. TRPA disseminates updates to the Tahoe Truckee PEV List Serve. The education and awareness should address challenges and themes identified from the vehicle ownership survey (results summary provided in Appendix A) and by the TTPEVCC and stakeholders.	• High Priority (ICF): Produce 'PEV Myths vs. Reality' and 'Frequently Asked Questions' content for the website and a factsheet. This should address challenges and themes identified from the vehicle ownership survey (results summary provided in Appendix A). • Low Priority (after plan drafted, ICF/TRPA): Create a responsive microsite (website) that will act as a hub for program information: tahoealternativefuels.com/ • Medium Priority (after plan drafted, ICF): Design a 'Pick a PEV' quiz to upload to the website, displaying the many types of EV's available, as well as tailoring it to the customer's needs. When possible, integrate relevant tools already available such as the National Renewable Energy Laboratory (NREL) Vehicle Cost Calculator, the Sierra Club Pick a Plug-In tool, the UC Davis Electric Vehicle Explorer, or the ARB DriveClean Buying Guide into the existing TRPA PEV website or new responsive microsite. • Ongoing (TRPA/Team events): TRPA has created presentations for community associations to facilitate awareness of PEV readiness. • Ongoing (TRPA): Provide regular project updates to the Tahoe Truckee PEV Email List Serve.

Objectives	Outreach Tools and Deliverables
	• Ongoing (TRPA): Provide information to the media to support newspaper reporting on PEVs and provide article contributions to raise PEV awareness and education.
3. Offer targeted training to increase PEV adoption.	• Priority Dependent on Council (after plan drafted): Provide training documents and materials as identified by the TTPEV Coordinating Council. Training opportunities are listed in Appendix B. • High Priority (after plan drafted, ICF): Provide a list of training options available through programs such as the Alternative Fuel and Advanced Vehicle Career Training Program or the Electric Vehicle Infrastructure Training Program. Add this to the website.
4. Learn from best practices and promote the regional implementation of EVSE policies, siting and design guidelines.	• High Priority (before plan drafted, ICF): Research and provide findings of how other communities overcame barriers to implementing PEV networks that are highly utilized (emphasize success stories and lessons learned). • High Priority (after plan drafted, TRPA): Arrange workshop and invite local jurisdiction representatives (such as transportation agencies, local entitlement companies, etc.) to provide training on the PEV recommendations related to station design, policy development, etc. and gain collaboration and consistency in the region. Provide materials and present the readiness plan.

Source: ICF

Table 24: Program Sectors/Audiences for Toolkits

Audience	Influencers	Gatekeepers
Local Tahoe-Truckee Residents and Second Homeowners *(Motivation: Performance, Savings, Environment, Convenience, Style)*	• Trusted Neighbors • Community Organizations • Coworkers or Colleagues • Employers • Local Media • Local Celebrities	• Local Media • Community Leaders • Elected Officials • Homeowners Associations • Realtors

Audience	**Influencers**	**Gatekeepers**
Primary messages: 1. EVs deliver value 2. Others locally are having success 3. EVs are an intelligent choice 4. This is an easy, feasible option 5. You can easily take your EV to Tahoe	*Potential tactics:* • Ride and drive events • Local news articles • Case studies • YouTube interview/ FAQ • Outreach at local events • Local EV "club" with added value (discounts, event invites, etc.) • HOA outreach; Realtor engagement/workshop • Direct mail; Seasonal online content and promotions	*Potential tactics:* • Ride and drive events • Local news articles • Case studies • YouTube interview/ FAQ • Outreach at local events • Local EV "club" with added value (discounts, event invites, etc.) • HOA outreach; Realtor engagement/workshop • Direct mail; Seasonal online content and promotions
Visitors to the Tahoe-Truckee Region *(Motivation: Performance, Savings, Environment, Convenience)*	• Friends and Family • Fellow PEV drivers • Regional Media	• Online resources (Trip Advisor, etc.) • Ski Resorts and Hotels

Source: ICF

APPENDIX C:
Vehicle Ownership Survey Results

ICF and TRPA developed a Vehicle Ownership Survey for residents and visitors to learn more about current regional vehicle ownership trends in Tahoe-Truckee. The questions were focused on current transportation needs and consumer car buying preferences (e.g., buying or leasing, vehicle manufacturers, and other considerations).

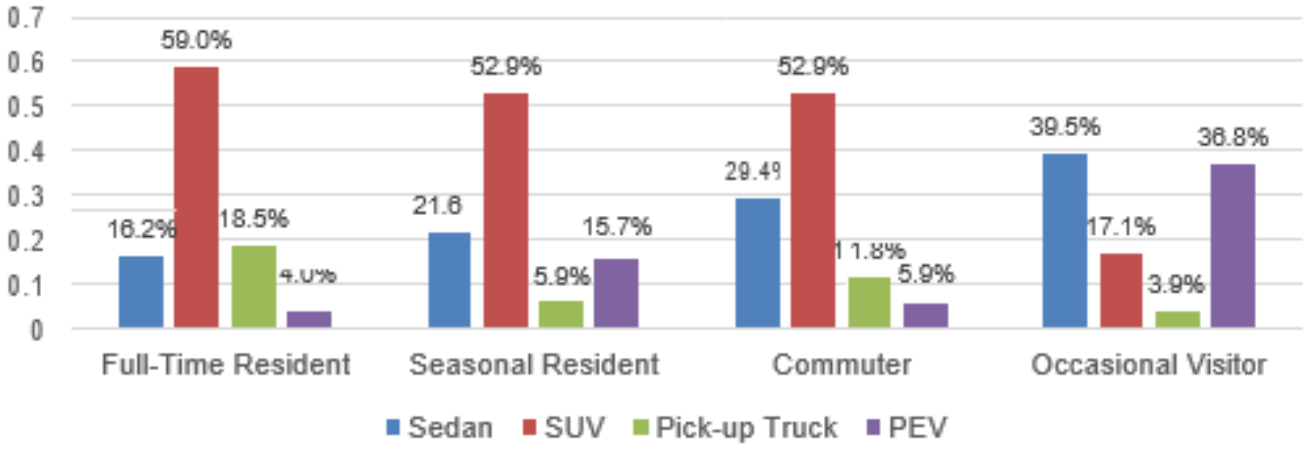
The survey was disseminated by TRPA in June and July of 2016 via an online questionnaire. TRPA led the promotion of the survey through email outreach to their list serves and transportation newsletter and the Town of Truckee advertised the survey opportunity to their list serve and on their website. Members of the PEV Coordinating Council also helped to promote the survey through their own outreach channels including email, word of mouth, and local radio. TRPA collected 424 survey responses in total, 55 percent of which were full-time residents, 23 percent occasional visitors, 17 percent seasonal residents, and 5 percent from those who live outside of the Tahoe- Truckee Region but commute in to work. ICF notes that the data presented here have not yet been statistically weighted to appropriately represent the socioeconomic profile of Tahoe-Truckee residents and visitors. For instance, the number of respondents who report owning an electric vehicle is quite high (about 20 percent), which is a clear indication that our survey sample was skewed by existing PEV owners.

The Vehicle Ownership questionnaire is included in Appendix A. The full results of the survey will be included in the Tahoe-Truckee PEV Readiness Plan (Task 3 deliverable). The following sections present the results of key survey questions that help inform the PEV Readiness Planning process.

Current Vehicle Ownership Trends

The majority of survey respondents currently drive SUVs. Figure 26 on the next page displays the percentage of respondents who currently drive either a sedan, SUV, pick-up truck, or PEV, broken out by residency status. Full-time residents have the highest percentage of SUVs and pick-up trucks, while occasional visitors have the lowest. Occasional visitors also have the highest percentage of PEVs. Most PEV drivers (64 percent) also have a second vehicle that is either gasoline or diesel powered.

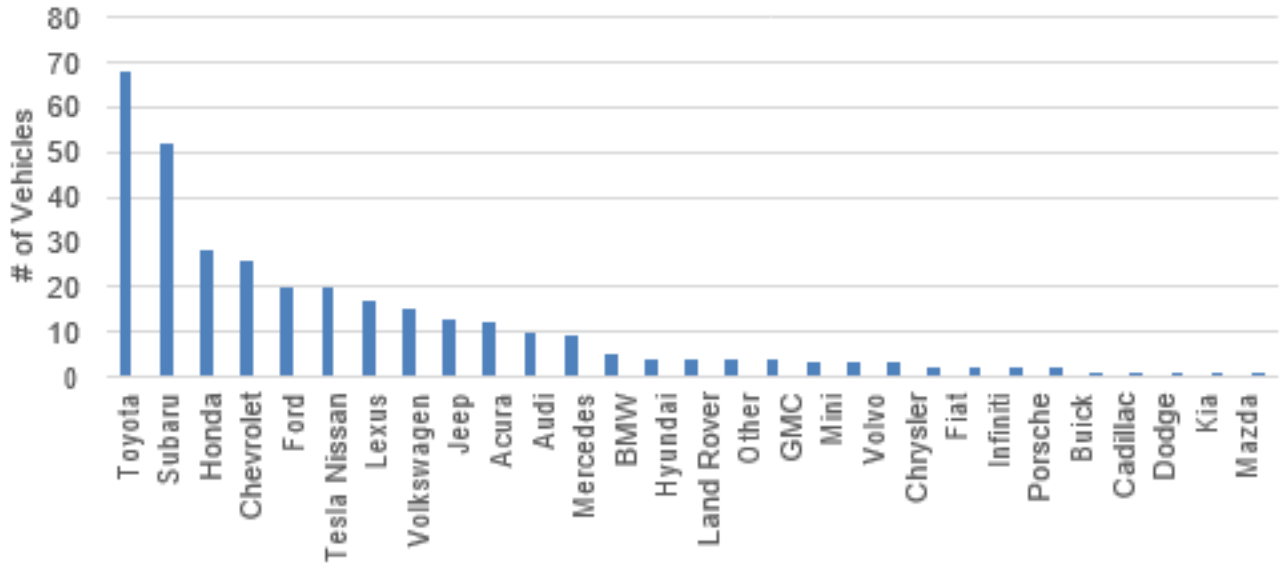
Figure 26: Vehicle Class of Survey Respondents by Residency Status



Source: ICF

The most popular brands of cars amongst survey respondents are Toyota and Subaru, followed by Honda, Chevrolet, and Ford. Figure 27 shows the survey data in a colored graph.

Figure 27: Brand of Respondents' Primary Vehicle



Source: ICF

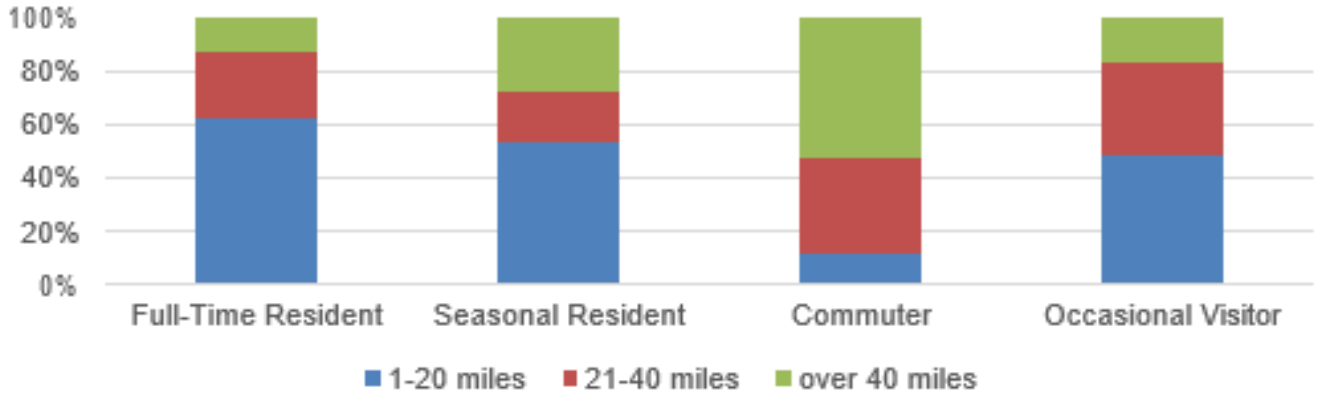
Potential for Growth in Regional PEV Deployment

There were many aspects of the survey results that point towards potential growth in regional PEV deployment, including weekday travel patterns, interest in electricity as a transportation fuel, and the perception that gasoline is going to be more expensive in the near-term future.

Regional transportation needs how often people need to drive and how far – is an important factor in understanding the potential for electrifying travel segments. When asked about weekday travel patterns, the majority of survey respondents (56 percent) reported that they typically drive less than 20 miles per day, and 25 percent drive 21 to 40 miles per day.

Figure 28 shows the percentage of survey respondents who reported their typical driving distances, broken out by residency type. For full-time residents, 87 percent typically drive less than 40 miles per day. These short distance trips have the potential to be electrified as they are well within the electric range of most PEVs on the market today.

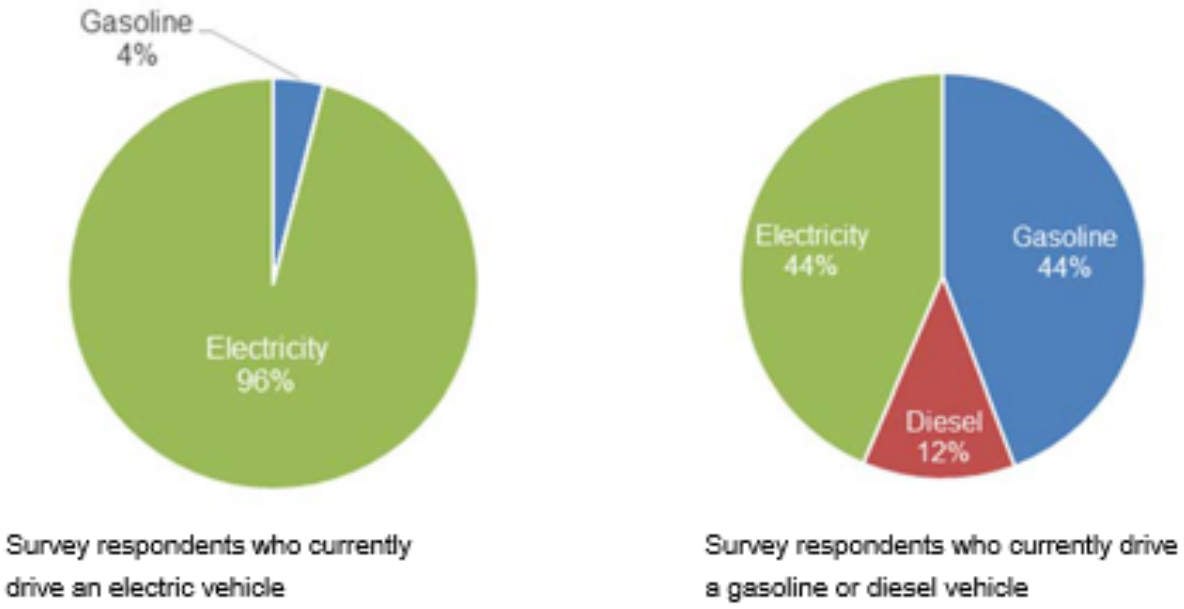
Figure 28: Miles Driven on a Typical Weekday, by Residency Status



Source: ICF

There is also strong interest in electricity as a transportation fuel in the Tahoe-Truckee Region. Figure 29 shows the percentage of respondents who would prefer gasoline, diesel, or electricity as the fuel type for their next vehicle, separated out by those who currently drive an electric vehicle and those who do not.

Figure 29: Preferred Fuel Type for Next Vehicle



Source: ICF

Of those survey respondents who currently drive gasoline or diesel-powered vehicles, almost half stated that they would prefer to have electricity as the fuel type of their next vehicle. There is also loyalty among current BEV drivers–almost all respondents who currently drive a BEV would prefer to stay with electricity as the fuel type of their next vehicle.

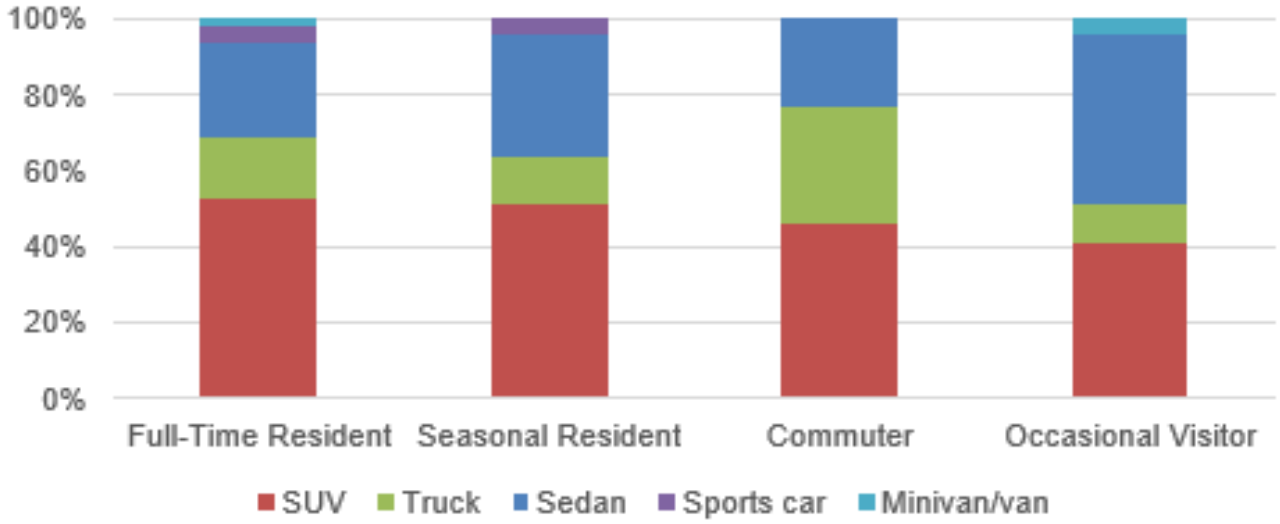
When asked about how they think fuel prices will change, 80 percent of survey respondents think that the price of gasoline will be somewhat or quite a bit higher in 2 to 3 years. It is likely that current gasoline prices have negatively impacted PEV sales nationally and in California; however, the perception that gasoline prices will likely increase in the near-term future is likely an indicator that car buyers would be more willing to consider PEVs moving forward.

Challenges to Growth in Regional PEV Deployment

The large percentage of short trips made by residents and their general interest in electricity as a transportation fuel suggests that the Tahoe-Truckee Region could potentially see growth in regional PEV deployment. However, the survey results also indicate that there will be some challenges to this growth, largely due to preferences for SUVs and all-wheel drive vehicles.

When asked what type of vehicle their next purchase or lease would likely be, almost half (48 percent) stated a preference for some type of SUV. Figure 30 shows that the preference for SUVs is higher for full-time and seasonal residents than those that commute to the region or visit occasionally.

Figure 30: Type of Vehicle Preferred for Next Purchase or Lease

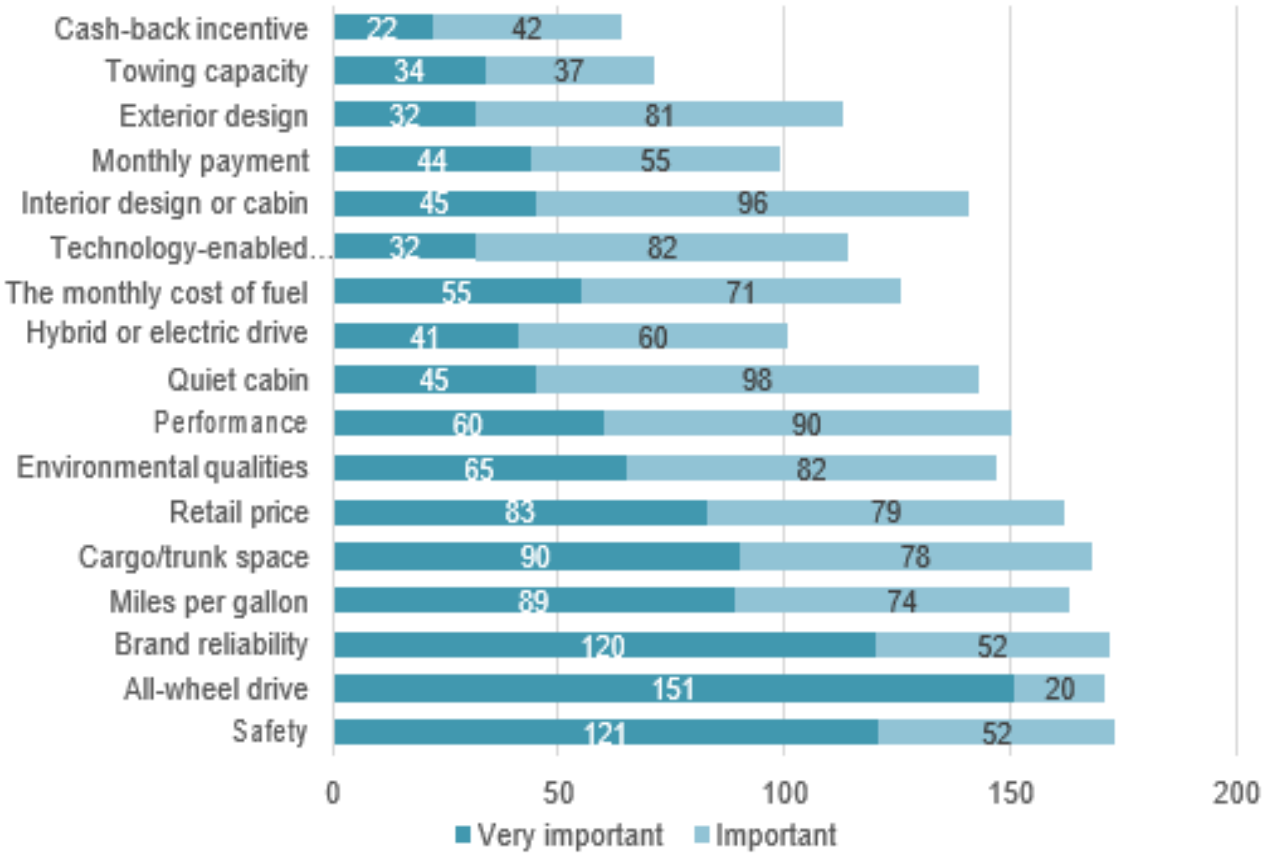


Source: ICF

Respondents were asked to rate how important various vehicle features and amenities were in their decision to buy or lease a new vehicle. Second to safety, all-wheel drive all-wheel drive capability is the vehicle feature considered most important to all survey respondents when deciding what type of vehicle to buy or lease. This is followed by brand reliability, efficiency, cargo/truck space, and price. On the next page, Figure 31 shows how full-time residents rated

various vehicle features as important or very important. all-wheel drive capability was the most important feature considered for full-time residents, followed by safety and brand reliability.

Figure 31: Vehicle feature preferences (full time residents only)

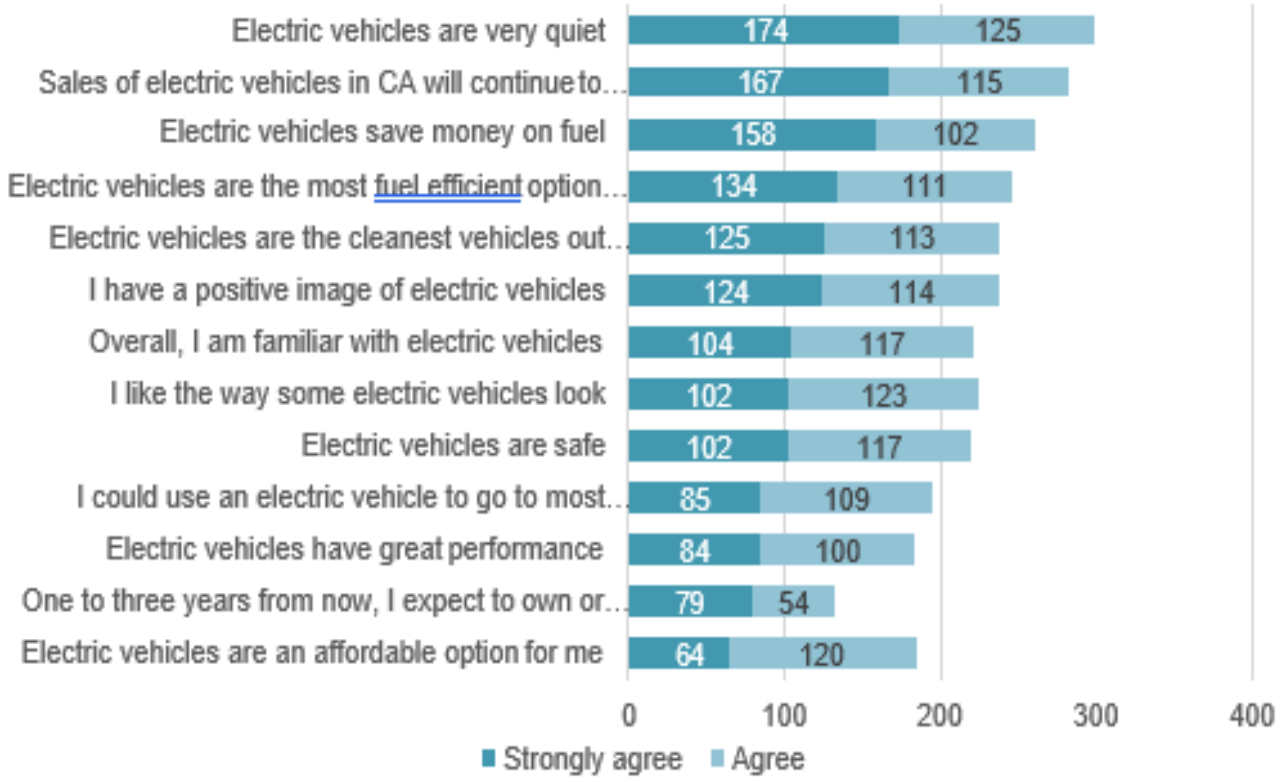


Source: ICF

The survey also asked about which brands respondents would consider buying or leasing a vehicle from. Across the board, there is a strong preference for Toyota, Subaru, and Honda. These trends present a challenge for growth in short-term regional PEV adoption, as there are very limited offerings of electric SUVs or EVs available with all-wheel drive. Furthermore, survey respondents' preferred manufacturers Toyota, Subaru, and Honda have limited PEV offerings today, and none of these manufacturers are considered market leaders in the area of electrification (Toyota and Honda, notably, are keen on hydrogen fuel cell vehicles as part of their respective strategies).

Survey respondents were also asked whether they agree or disagree on various statements about PEVs. Affordability of EVs was the least agreed upon statement, followed by the expectation to own or least an electric vehicle in the next one to three years. Figure 32 on the next page shows the survey data that was collected on respondents views on EV's.

Figure 32: Respondents' views on EVs



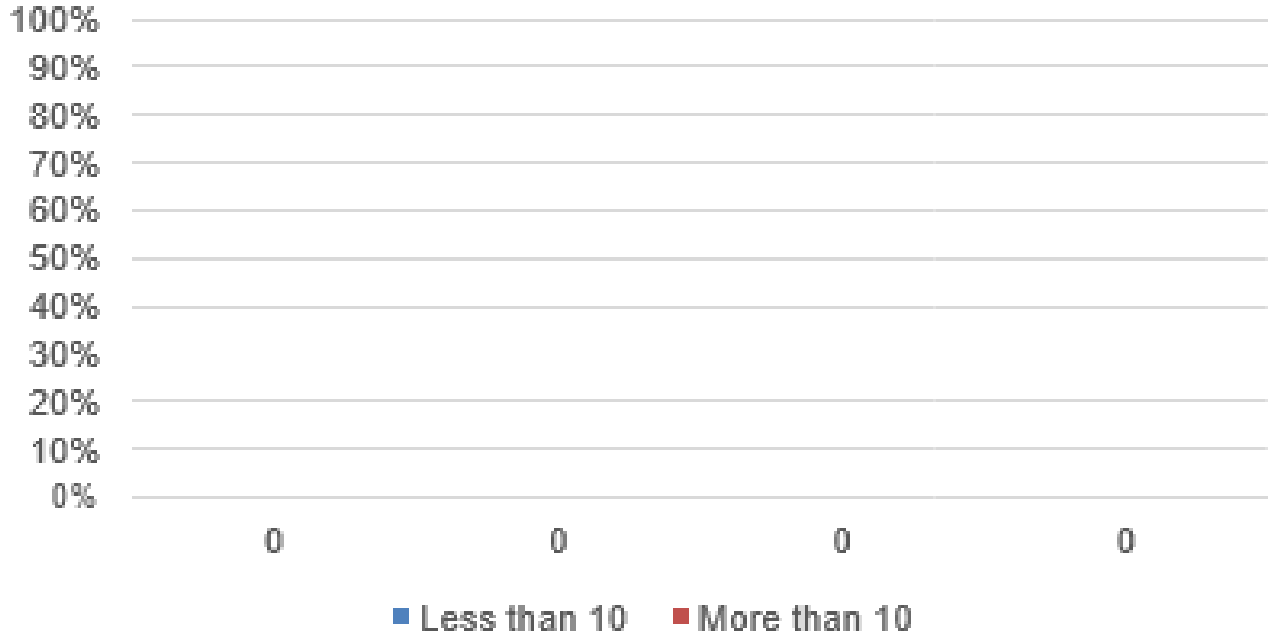
Source: ICF

Charging Infrastructure Needs

The results of the Vehicle Ownership Survey indicate that there needs to be more public and workplace charging infrastructure in the region to support growth in PEV adoption. For instance, more than half of the survey respondents who commute into the Tahoe- Truckee Region typically drive more than 40 miles per day, presumably making it difficult to consider buying a PEV given current range limitations. Also, if a commuter has a PHEV, then the number of miles traveled that can be electrified is limited without additional workplace charging.

Residents often take long trips over half of the respondents reported taking more than 10 trips per year that were at least 100 miles one-way. As expected, the rate is even higher for seasonal residents over 80 percent (as shown in Figure 33).

Figure 33: Number of trips made per year that are over 100 miles one-way



Source: ICF

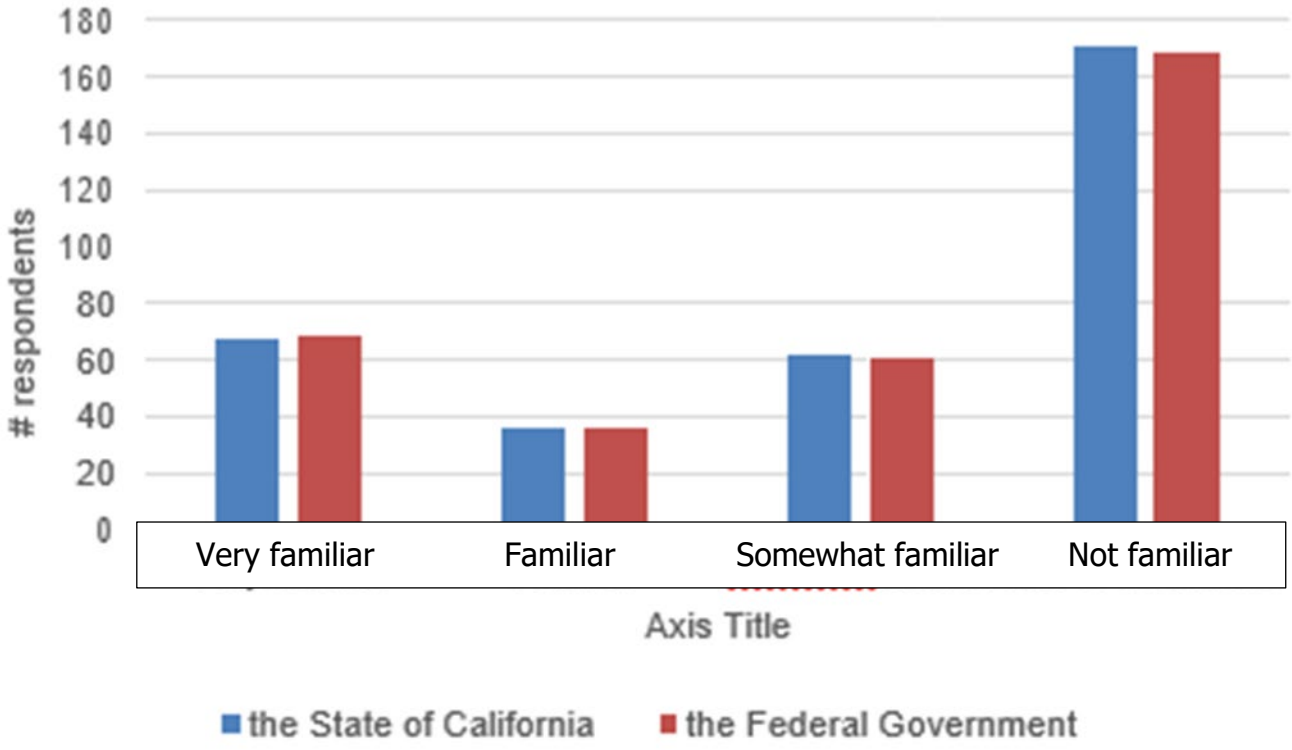
These travel patterns emphasize the limitations that residents and visitors may face when considering the purchase of a battery electric vehicle with a range of approximately 80 to 100 miles. Even longer-range BEVs will likely require the deployment of corridor charging to ensure that sufficient charging infrastructure is in place to enable these longer trips taken by residents and visitors.

Outreach and Education Needs

Survey respondents are generally familiar with EV, but almost 70 percent reported that they have never driven one. Figure 34 presents respondents' familiarity with financial incentives to purchase or lease a PEV. Over 50 percent are not at all familiar with financial incentives offered by either the California State or federal government.

There is an opportunity here for increasing education and awareness around the availability of these substantial tax credits and rebates.

Figure 34: Familiarity with Financial Incentives to Buy or Lease an Electric Vehicle



Source: ICF

APPENDIX D:
Plug-in Electric Vehicle Toolkits

As part of the planning process, resources were developed for key sectors that play a role in PEV readiness in the Tahoe-Truckee Region, including residents and visitors to the region, local governments, fleet owners and operators, and utilities. Weblinks to the toolkits are provided below.

Tahoe-Truckee PEV Toolkits for:

- Residents and Visitors http://tahoealternativefuels.com/wp-content/uploads/2017/06/Utilities-PEV-Toolkit_Final_6-13-17.pdf
- Charging Destinations http://tahoealternativefuels.com/wp-content/uploads/2017/06/Utilities-PEV-Toolkit_Final_6-13-17.pdf
- Local Government http://tahoealternativefuels.com/wp-content/uploads/2017/06/Utilities-PEV-Toolkit_Final_6-13-17.pdf
- Fleet Managers http://tahoealternativefuels.com/wp-content/uploads/2017/06/Utilities-PEV-Toolkit_Final_6-13-17.pdf
- Utilities http://tahoealternativefuels.com/wp-content/uploads/2017/06/Utilities-PEV-Toolkit_Final_6-13-17.pdf