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California ZEV Investment Plan: Cycle 2

Public Version – October 3, 2018

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List of Acronyms

Please note – further definition of select terms found in the Glossary in Appendix 3.

BEV	Battery Electric Vehicle
CBO	Community-based Organization
CCS	Combined Charging System
CRM	Customer Relations Management
DAC/LIC	Disadvantaged Communities/Low-income Communities
DCFC	Direct Current Fast Charge
DVMT	Daily Vehicle Miles Traveled
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FCEV	Fuel Cell Electric Vehicle
ICE	Internal Combustion Engine
kWh	Kilowatt-hour
L2	Level 2 Charging Station
MSA	Metropolitan Statistical Area
MUD	Multiunit Dwelling
MWh	Megawatt-hour
OCPI	Open Charge Point Interface
OCPP	Open Charge Point Protocol
OEM	Original Equipment Manufacturer
OOH	Out of Home
PEV	Plug-in Electric Vehicle (BEV or PHEV)
PHEV	Plug-in Hybrid Electric Vehicle
RFI	Request for Information
RFP	Request for Proposal
TNC	Transportation Networking Company
VMT	Vehicle Miles Traveled
ZEV	Zero Emission Vehicle

Executive Summary

Electrify America is pleased to present this California Zero Emission Vehicle (ZEV) Investment Plan for its second cycle of ZEV infrastructure, education and awareness, and access investments in the State of California. As required by Appendix C to the 2.0-Liter Partial Consent Decree entered by the U.S. District Court for the Northern District of California on October 25, 2016, Volkswagen Group of America is investing $800 million over 10 years to support the increased adoption of ZEV technology in California. This investment represents the largest commitment of its kind to date. Following many months of collaboration with the California Air Resources Board (CARB), this plan defines the investments to be made or targeted in Cycle 2, from July 2019 through December 2021.

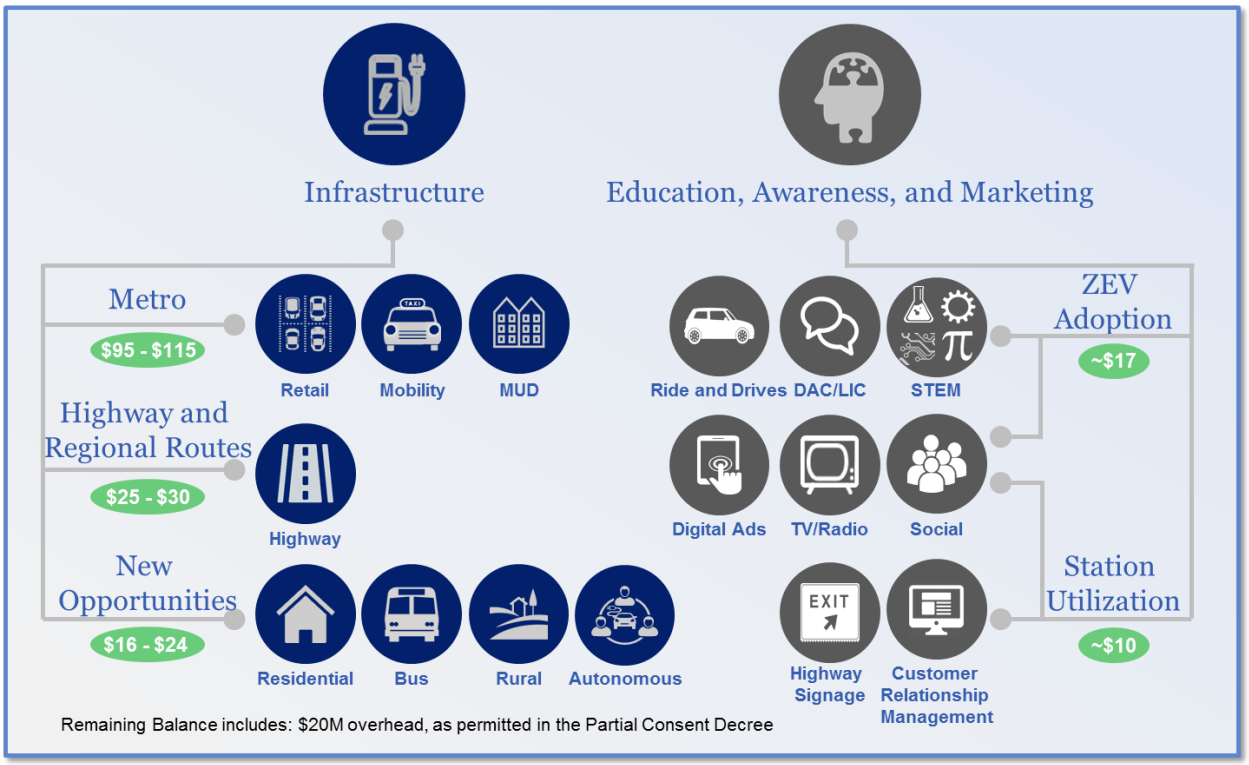
This ZEV Investment Plan is the culmination of nearly a year's worth of research, analysis, and outreach efforts led by a new dedicated infrastructure planning team. Electrify America has extensively sought to engage stakeholders throughout the ZEV community in defining this plan, through in-person meetings, hundreds of phone calls, community conversations, webinars, and a web-based comment/submission forum. Each touchpoint yielded new ideas and recommendations for the investment, many of which complemented our own internal thinking. Electrify America has thoroughly analyzed each opportunity for its impact on ZEV adoption, and its value as an investment to help Electrify America build toward a sustainable business. The response to our outreach has been inspiring. It demonstrates the real commitment the ZEV community has to our shared mission and this transformational opportunity to drive long-term ZEV adoption. We are deeply grateful to all those who have been a part of this effort.

Electrify America's Cycle 2 investments center on two core areas: ZEV Fueling Infrastructure and ZEV Education, Awareness, and Marketing. In addition, Electrify America will continue Access efforts in Sacramento under the Green City Initiative.

Consistent with the guidance of CARB, Electrify America will strive to ensure that 35% of Cycle 2 investments are in low-income and disadvantaged communities.[1]

[1] Electrify America uses definitions for low-income and disadvantaged communities established by the State of California, which are published and mapped by CARB on its "Disadvantaged and Low-income Communities Investments" webpage: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/communityinvestments.htm.

Figure 1: Overview of Cycle 2 Investments



Fueling Infrastructure (~$153 million)

In Cycle 2, Electrify America will invest approximately $153 million in fueling infrastructure for EVs across a broad set of use cases already established in Cycle 1 or newly developed for Cycle 2. Infrastructure cost ranges are Electrify America's best estimates of projected costs, given uncertainties related to hardware, construction, and operations costs.

- **Metro Community Charging ($95 - $115 million):** The major focus of infrastructure investment in Cycle 2 is charging within metro areas, where research show that EV drivers charge most often. Electrify America will invest in metro-based direct current fast charging (DCFC) stations in nine California metro areas. These metro areas are expected to account for 89% of expected battery electric vehicles (BEVs) in operation in California through 2022 (Navigant, 2017). Metro DCFC stations will be placed in retail locations throughout a metro region and are intended to serve EV drivers' daily fueling needs. Select DCFC stations will also be targeted at customers living in multiunit dwellings (MUDs), expanding access to drivers who reside in such communities. Finally, Electrify America will invest in DCFC stations specifically designed to serve shared mobility drivers (car share, taxis, and transportation networking company (TNC) drivers) to ensure that these high mileage drivers and passengers are able to enjoy the benefits of ZEV adoption conveniently and cost effectively. Creditable operating expenses associated with metro charging are forecasted to be approximately $24 million of the total spend in this category.

- **Highways and Regional Routes ($25 – $30 million)**: Cycle 2 investments will build upon Cycle 1 efforts to develop a highway network of ultra-fast DCFC stations. This will include building new sites connecting regional destinations and filling in existing routes as station utilization of the highway network increases. Creditable operating expenses associated with highway charging are forecasted to be approximately $11 million of the total spend in this category.

- **Residential ($8 - $12 million):** The primary, most convenient, and cost efficient fueling option for many drivers is residential charging. The Office of Energy Efficiency & Renewable Energy (EERE) at the Department of Energy (2018) reports that EV drivers conduct "more than 80% of their charging at home." However, the cost and complexity of installing home charging can be a barrier to adoption for some buyers, especially low-income and disadvantaged drivers. To address this need, Electrify America will develop a number of residential solutions. First, Electrify America will develop an online tool that promotes and connects EV buyers with the wide range of residential charging incentives and rebates already available in California, and consolidates the process of applying for these programs. Electrify America plans to integrate its tool with the 'One-Stop-Shop' tool for low-income car buyers that will soon be built as a result of funds provided by Volkswagen to address barriers to ZEV adoption in low-income communities. Together these offerings will provide customers support throughout the entire purchase process. In addition, Electrify America will offer 'no-money-down' residential chargers and installation, enabling buyers who cannot or choose not to pay for the Level 2 (L2) charger up front to repay the cost over time. Finally, Electrify America will develop a demand response platform to allow drivers with a home charger to earn financial rewards for plugging in and supporting grid stability. Together, Electrify America believes these programs will help reduce both the costs and the complexity of home charging and further catalyze EV adoption.

- **Bus and Shuttle Charging ($4 - $6 million):** Electrification of buses and shuttles presents an opportunity to dramatically reduce greenhouse gas emissions. According to the National Academy of Sciences, Engineering, and Medicine (2018), "life cycle global warming emissions [of battery electric buses] are almost 75% less than CNG and diesel buses." To help spur adoption in this sector, Electrify America plans to install dedicated infrastructure at depots, layover points, and on key routes for these vehicles in collaboration with transit providers. Of note, this approach offers another means of serving disadvantaged and low-income populations who cannot afford to buy or lease new or used EVs.

- **Rural Community Charging (~$2 million):** Several California National Outreach submissions noted the importance of including a rural strategy in our Cycle 2 plan. For example, the Fresno County Rural Transit Agency stated: "Electrify America should acknowledge and prioritize rural communities that have great potential for community charging investment." Comments like these complement those heard during in-person meetings with community-based and other rural organizations, which expressed specific needs for support. While Electrify America's highway and regional route investments will provide connectivity and support to rural communities, Electrify America plans to further support the adoption of ZEVs in these communities by deploying L2 chargers in rural areas, with a potential focus on healthcare facilities and educational institutions. This will be an initial investment that explores the

commercial viability of rural-based L2 charging. Should the results prove beneficial to drivers and present a positive, longer-term business case, Electrify America may undertake further rural L2 investments in future cycles.

- **Autonomous Vehicle Charging ($2 - $4 million):** Innovative and disruptive mobility alternatives, specifically driverless/autonomous vehicles, have the potential to bring many benefits to society including significant reductions in traffic congestion and vehicle emissions (Fagnant & Kockelman, 2015; Anderson et al., 2016). However, autonomous zero-emission vehicles require unique fueling solutions. To meet the emerging need presented by autonomous ZEVs, Electrify America plans to build two commercial autonomous electric vehicle fueling stations.

- **Renewable Generation:** To provide clean and financially sustainable power to stations in Cycle 2, Electrify America will explore installing renewable generation where cost effective. These costs are related to station infrastructure and as such are included in the aforementioned cost estimates. In aggregate, investments in renewable generation are not expected to exceed $5 million.

Electrify America notes that the estimated budgets represent a good faith estimate of Cycle 2 costs. Given uncertainties regarding both capital and operating costs, it is possible that total costs may exceed or fall below targeted levels. In the event that costs fall below targets, Electrify America will deploy additional investments in approved use cases to meet The Appendix C ZEV Investment Commitment. If costs exceed budget forecasts, the number of infrastructure investments will be reduced by a commensurate amount. In addition, given the early stage of partner discussions, availability of site locations, and/or the technology itself (e.g. autonomous), each new use case involves a level of uncertainty in both cost and operational feasibility. Should investment targets in any new use case be unachievable due to practical considerations, the allocated funds will be redeployed into one or more of the other approved use cases to ensure the total investment fulfills Appendix C requirements.

Table 1: Infrastructure Investment Overview

Use Case	Projected Technology	Estimated Spend ($M)[1]
Metro Community Charging	150 kW DCFC	$95 - $115
Highways and Regional Routes	150 kW / 350 kW DCFC	$25 - $30
Residential	L2	$8 - $12
Buses	50 kW / 150 kW DCFC	$4 - $6
Rural	L2	~$2
Autonomous	TBD	$2 - $4
TOTAL		**~$153**

[1] Costs include creditable operating expenses and on site storage where appropriate.

Electrify America believes the investments described in Table 1 address the use cases and locations where ZEV drivers need infrastructure most, while also contributing to a sustainable long-term business for Electrify America and further improvement to California air quality. The investments are projected to roll out along the following timeline in Table 2.

Table 2: Cycle 2 California Preliminary Infrastructure Deployment Schedule – All Sites

Cycle 2 Infrastructure Investments[1]			
Quarter	Pre-site selection	In development	Operational
Q4 2019	1,910 – 2,585	675 - 840	5 - 10
Q2 2020	1,295 – 1,720	665 - 840	630 - 875
Q4 2020	620 - 885	665 - 840	1,305 – 1,710
Q2 2021	0 - 0	665 - 840	1,925 – 2,595
Q4 2021	0 - 0	0 - 0	2,610 – 3,460

[1] Excludes Bus and Shuttle Chargers, see section 3.8 Infrastructure Investment Timeline and Milestones for detail.

Public Education, Awareness and Marketing Activities

Electrify America will engage in two distinctive and differentiated campaigns, targeting two distinct goals: (1) a brand-neutral campaign to drive ZEV adoption; and (2) a branded media campaign intended to drive station utilization.

Boosting ZEV Adoption through Education and Awareness (~$17 million)

Electrify America will invest approximately $17 million in brand-neutral education, awareness, and outreach activities to boost adoption of plug-in electric and fuel cell electric vehicles from across the marketplace.

Recent academic research shows that mass-market ZEV adoption has been significantly limited by low awareness. For example, Strategic Vision's 2016 New Vehicle Experience Study found that just 48% of new car buyers in California and 41% of national buyers have ever heard of a ZEV. A UC Davis GreenLight blogpost by Ken Kurani and Scott Hardman entitled, "Automakers and Policymakers May Be on a Path to Electric Vehicles; Consumers Aren't," echoes this finding, showing that consideration of plug-in electric vehicles changed little from 2014 to 2017. During the initial phases of Cycle 2, efforts will primarily focus on increasing awareness and consideration of ZEVs by informing the public of ZEV benefits. This will likely take the form of traditional media advertising, similar to Electrify America's Cycle 1 Jetstones TV/radio campaign, but it will also include other proven awareness building activities, such as partnerships and digital activations. After ZEV awareness has been boosted by Electrify America's campaign, awareness initiatives from Veloz and others, and the introduction of new ZEV models, Electrify America will shift focus to encouraging customers to research ZEVs and test drive the vehicles. Accordingly, our marketing and media tactics will shift to more targeted digital media interactions such as paid search and web banners as these tactics traditionally perform well given minimum levels of consumer awareness.

Given the still prevailing lack of ZEV awareness in California, the largest portion of the Cycle 2 budget will go toward traditional media, with TV, radio and Out of Home (i.e., billboards) accounting for

approximately $6 million of spending. Digital advertising will account for another approximately $5 million of the budget. To complement these efforts, Electrify America is also planning to spend approximately $3 to $4 million on a range of alternative tactics to provide audiences additional touch points with ZEVs. These tactics may include collaborating with key social media influencers such as bloggers to promote positive aspects of ZEVs; supporting ZEV experience centers with educational materials; and offering STEM educational programs about ZEVs and charging infrastructure for K-12, vocational schools, professional development, and community colleges. Electrify America will sponsor 'Discover and Drive' events to give consumers an opportunity to experience the thrill of driving a ZEV. And Electrify America will continue to collaborate with organizations that are consumer-oriented and create content/events/test drives to promote ZEV adoption.

To build awareness in low-income and disadvantaged communities, Electrify America will dedicate $2 to $3 million in Cycle 2 to support programs to build awareness of ZEVs offered by organizations with a track record of particular credibility and effectiveness in low-income and disadvantaged communities. In addition, as in Cycle 1, Electrify America will strive to ensure that 35% of education and awareness media investments target low-income and disadvantaged communities. Finally, Electrify America may choose to divert a portion of the Cycle 2 35% media allocation to increase funding of programs run by local entities depending on the results of these types of investments in Cycle 1.

Boosting Station Utilization through Marketing (~$10 million)

Electrify America will also invest in driving utilization of its charging network through branded events, promotions, and marketing. As outlined in Appendix C of the Partial Consent Decree, Electrify America must target utilization to demonstrate its investments are "addressing an existing need or supporting a reasonably anticipated need." National Renewable Energy Laboratory's 2017 'Consumer Views on Plug-in Electric Vehicles – National Benchmark Report' highlights the challenge, finding that a large majority (~80%) of survey respondents were not aware of any charging stations, including at places they passed regularly, worked at, or frequented. To meet this utilization goal, Electrify America plans to spend approximately $10 million to generate awareness of its ZEV charging infrastructure footprint and drive station utilization. These activities will use Electrify America branding as necessary, but will not feature or favor Volkswagen Group of America vehicles.

Electrify America's marketing efforts will highlight four primary benefits for EV drivers:

- Locations: Convenient charging locations in major metropolitan areas and on national and regional highways;
- Speed: High-powered charging speeds, offering consumers a convenient charging experience (up to 350kW, providing 200 miles of range in as little as 10 minutes);
- Affordability: Fairly priced and competitive fueling across the network, including subscription plans and charging bundles provided by automotive manufacturers; and
- Customer-centricity: Infrastructure designed considering the consumer experience first, including locations near retail and amenities and credit card access at all DCFC stations.

The largest portion (approximately $5 million) of this branded campaign budget will be dedicated to digital advertising. These efforts will be targeted toward those specific groups most likely to be able to utilize the Electrify America charging network, including new and used EV buyers, EV customers graduating out of automotive manufacturer provided charging bundles, EV driver club members, and prospective EV buyers/researchers. Electrify America will use digital tools to reach these prospects and deliver the right message (e.g., promotion of closest EV charging location) at the right time (e.g., when someone is searching for an EV charger).

The remaining ~$5 million will be used for complementary messaging tactics. These investments may include working with established media outlets to sponsor editorial content about DCFC charging infrastructure; leveraging customer relations management tools to keep our customers and prospects informed of new charger installations; funding memberships or sponsorships; supporting key industry events; and supporting signage along roadways to identify Electrify America charging sites.

Green City

Leveraging the $44 million investment from Cycle 1, Electrify America will continue to provide operational support and strategic guidance for the Green City Initiative in Sacramento, and the services created as a result of Electrify America's Cycle 1 investment will be operated by vendors during the full length of Cycle 2. This initiative, which includes two ZEV car-share programs, two BEV bus/shuttle services, and substantial investments in associated charging infrastructure, will showcase emerging uses of ZEV technology and promote increased ZEV usage (i.e. "access") across many channels. In particular, these efforts will help to serve low-income or disadvantaged communities. More than 70% of the service territory for the GIG Car Share service (a wholly owned subsidiary of AAA) is in low-income or disadvantaged communities, and 75% of the communities served by the Envoy car-share program will be low-income or disadvantaged. Similarly, the Sacramento Regional Transit EV micro-shuttle service will operate in territories that are 90% low-income or disadvantaged. While these programs are funded in Cycle 1, the services -- and benefits -- of this $44 million investment will launch and become fully operational during Cycle 2. Electrify America will provide strategic guidance and operational support for these services over the course of Cycle 2.

In addition to serving the community of Sacramento, the Green City Initiative provides a significant learning opportunity for Electrify America and the entire ZEV community. The two car-sharing services will provide insights on how best to operate an electric car-sharing service, including how to provide education for drivers who may never have driven or charged an EV. The two services are also sufficiently distinct to allow Electrify America to compare and contrast different service models for electric car-sharing. The bus and shuttle services offer similar insights, including how to manage fueling for an EV bus fleet and help ensure maximum uptime of buses while managing fueling costs. Collectively, these insights and learnings will be instrumental in designing Electrify America's next Green City investment in Cycle 3 or 4.

Conclusion

Electrify America's Cycle 2 planned investments are summarized below (see Table 3). The Cycle 2 budget focuses even more investment on DC fast charging in metro areas, where data demonstrates

that the need for investment is extraordinary. The budget also continues to grow the network of highway stations started in Cycle 1. Finally, it is noteworthy given the effort to cultivate new use cases with promising current or future potential for ZEV adoption.

Table 3 Cycle 2 Budget Breakdown

Category	Estimated Budget ($M)[1]
Infrastructure	**~$153**
Metro Community Charging	**$95 - $115**
Highways and Regional Routes	**$25 - $30**
Residential	**$8 - $12**
Bus and Shuttle Charging	**$4 - $6**
Rural Level 2	**~$2**
Autonomous Vehicle Charging	**$2 - $4**
Brand-Neutral Efforts to Boost ZEV Adoption	**~$17**
Electrify America Efforts to Drive Station Utilization	**~$10**
Electrify America Business Operation & Organization[2]	**$20**
TOTAL	**$200**

[1] Costs include creditable operating expenses and on site storage where appropriate.
[2] According section 5.1 of Appendix C-1 of the Partial Consent Decree, Electrify America is permitted to spend 10% of the total budget on these costs.

At the end of Cycle 2, Electrify America will have invested its first $400 million in infrastructure, education, awareness, and access initiatives across California – achieving a key 'half way point' milestone in its 10 year commitment to accelerate ZEV adoption for all drivers. We hope that our investments, as well as outreach and collaboration, serve as a 'rising tide that lifts all boats' for ZEV stakeholders in the public and private sectors, creating benefits for drivers, car companies, utilities, charging infrastructure suppliers, and the construction trades.

We take our planning, development and deployment work seriously and recognize that the greater supplies and types of zero emission vehicles coming to market from a variety of car companies (established over 100 years ago or new to market) can only be fully leveraged with commensurate infrastructure and initiatives related to awareness, education, and access. The entire staff at Electrify America understands that we have an important, unique, and transformational opportunity to bring the United States into the age of electric cars.

The future can be brighter for drivers, air quality, fossil fuel independence, and reduced congestion thanks to zero emission transportation. Electrify America is honored to be a part of this important mission, and we are committed to restoring public trust.

1. Introduction

1.1. Background

As agreed to in Appendix C to the 2.0-Liter Partial Consent Decree entered by the U.S. District Court for the Northern District of California on October 25, 2016, Volkswagen Group of America is investing $2 billion over 10 years in zero emission vehicle infrastructure, education and awareness, and access efforts to support the increased adoption of ZEV technology in the United States.

Volkswagen Group of America created Electrify America LLC, a wholly-owned subsidiary headquartered in Reston, Virginia, to fulfill the ZEV Investment Commitment in Appendix C. The company has grown to more than 65 full-time employees with a diversity of backgrounds in automotive, utilities, EV infrastructure, technology, construction, and state and federal government and has recently opened its second office in California. All employees share a passion for helping transform and electrify the transportation sector through investments to grow the market for all zero emission drivers and stakeholders.

Of the overall $2 billion commitment, $800 million will be spent in California in $200 million increments over four 30-month cycles. This report describes the $200 million of investment that will be made in the second 30-month cycle in California. The Cycle 2 period is from Q3 2019 through Q4 2021 (see Table 4).

Table 4: Investment Cycles

	Cycle 1 (Q1 2017 – Q2 2019)	Cycle 2 (Q3 2019 – Q4 2021)	Cycle 3 (Q1 2022 – Q2 2024)	Cycle 4 (Q3 2024 – Q4 2026)	Full 10 years
California Plan	$200M	$200M	$200M	$200M	**$800M**

The Partial Consent Decree defines those investments that qualify toward Electrify America's commitment. Infrastructure investments "should support and advance the use of ZEVs in the United States by addressing an existing need or supporting a reasonably anticipated need." Brand-neutral education investment "builds or increases public awareness of ZEVs." And access investments "increase public exposure and/or access to ZEVs without requiring the consumer to purchase or lease a ZEV at full market value." Infrastructure investments outlined in this plan must meet Appendix C's threshold for qualification, including expectations that infrastructure address an existing or reasonably anticipated need.

This document, which is certified by Electrify America leadership consistent with Partial Consent Decree requirements in Appendix 1, outlines Electrify America's plan for the second cycle of investment. Electrify America's mission continues to be:

- Making it easier for millions of drivers to fuel their ZEVs through economically sustainable investments, and
- Promoting sustained ZEV adoption and station utilization through education, awareness, outreach, and access programs

1.2. Investment Plan Overview

This Cycle 2 California ZEV Investment Plan is a comprehensive presentation of Electrify America's Cycle 2 investments, along with supporting documentation as to why each investment meets the Partial Consent Decree's requirements for investment. Chapter 1 contains background information, Electrify America's approach to its Cycle 2 California ZEV Investment Plan, and its commitments to low-income and disadvantaged communities of California. Chapter 2 details Electrify America's outreach efforts to stakeholders throughout the ZEV industry, including specific efforts through the National Outreach website. It also includes the key learnings Electrify America has taken from these efforts that shaped the Cycle 2 plan for California. Chapter 3 lays out Electrify America's infrastructure investment plan, including the use cases selected, investment methodology, and use case specific details. Chapter 4 addresses investments in education, awareness, and marketing efforts to increase ZEV adoption and boost station utilization. Chapter 5 discusses Electrify America's ongoing commitment to the Green City Initiative and access investments in Sacramento. Finally, Chapter 6 highlights Electrify America's impact on our local communities.

Electrify America's Cycle 2 investment represents a continuation of the largest single investment in non-proprietary ZEV fueling and education in U.S. history. The second cycle will dramatically expand ZEV fueling options across the country and support education, awareness, and ultimately, adoption by millions of drivers for years to come. The investment will also enable electrification of carbon intensive sectors of transportation, including shared mobility and transit buses. Overall, it presents a substantial step toward transportation electrification, and the associated benefits of clean air and fossil fuel independence.

1.3. Cycle 2 Approach

Electrify America believes each new investment cycle offers the opportunity to evaluate new information, revisit past assumptions, and consider new ideas and feedback in the planning process. As such, three core principles guided the approach to Cycle 2 planning: (1) Start from the fundamentals; (2) Engage external stakeholders; and (3) Emphasize real world inputs.

Figure 2: Cycle 2 Approach

1. ***Start from the fundamentals***
   - *Analyze both business fundamentals of existing investments (e.g., highway and metro) and new business opportunities*
2. ***Engage external stakeholders***
   - *Collaborate with stakeholders throughout planning process to strengthen thinking*
3. ***Emphasize real world inputs***
   - *Leverage operational data and customer-backed research to make data-driven decisions*

Electrify America began its Cycle 2 planning efforts over a year ago by initiating a re-examination of the fundamentals of ZEV adoption and the ZEV fueling business. This analysis included updated vehicle sales forecasts for battery electric vehicles (BEVs), plug-in hybrid vehicles (PHEVs), and fuel cell electric vehicles (FCEVs), and reviewing the fueling characteristics of ZEVs scheduled for release up through 2022. This involved an analysis of automotive original equipment manufacturer (OEM) public announcements regarding vehicle types and range, charging connectors, and charging speeds (DC power levels). In addition, Electrify America examined fueling patterns of today's ZEV fleet, with close consideration for the subset of vehicles that more closely reflect the next generation of vehicles coming to market, which are expected to have larger batteries, longer ranges, and faster charging speeds. In conducting this analysis, Electrify America frequently conferred with academic experts at our nation's national laboratories, universities, and research institutions.

In parallel, Electrify America actively engaged with public and private sector stakeholders throughout the ZEV ecosystem to understand how ZEV investments can have the highest impact on adoption and maximize infrastructure utilization. These hundreds of inputs included conversations with car manufacturers on the technical features of the next generation of vehicles, collaborations with academics on infrastructure siting best practices and recent trends in ZEV awareness, and discussions with advocacy groups and non-profits on how to drive ZEV adoption in local communities. In addition, Electrify America solicited input and feedback from federal agencies; state, local, and tribal governments; and across the industry through its National Outreach website. The guidance from over 700 inputs submitted online, along with subsequent follow-up conversations by Electrify America staff with submitters, has meaningfully informed and confirmed Electrify America's investment plan and specific strategies for Cycle 2.

As a data driven company, Electrify America has focused on leveraging real-world data and evidence to inform decision-making and improve investment targeting. Data on utilization of existing fueling stations, vehicle sales, local travel patterns, demographics of EV purchasers, and utility rates and programs all guided the selection of Cycle 2 investments. For infrastructure investments, particular emphasis was placed on building a data-backed business case to ensure that all investments are sustainable beyond the end of the Partial Consent Decree. For marketing, education and awareness, and access investments, the focus was on identifying and prioritizing investments with the largest impact on ZEV awareness and adoption.

Additional details on the insights and findings pertinent to these three investments can be found in Chapter 2: Outreach Efforts and Key Learnings.

1.4. Low-Income and Disadvantaged Communities

Electrify America intends to make investments that benefit all Californians. The ZEV Investment Commitment requirements in Appendix C of the 2.0 Liter Partial Consent Decree do not include a goal of benefiting any specific community, but Electrify America has received input from CARB and advocacy groups urging investment in California's low-income, disadvantaged, and underserved communities. A letter from 12 groups representing environmental, environmental justice, equity, and Central Valley air quality interests reiterated their request that Electrify America continue to strive to ensure investment in disadvantaged or low-income communities during Cycle 2. Electrify America is committed to making business-driven investments that help the state of California meet environmental goals and other priorities.

Within infrastructure, Electrify America will strive to ensure 35% of investments in California are in low-income or disadvantaged communities. Specific efforts toward this goal include:

- Making low-income and disadvantaged communities one of the criteria for site selection for all charging stations;
- Selecting three metro areas with high concentrations of low-income and disadvantaged areas - Fresno (69%), Riverside-San Bernardino (52%), Santa Cruz (54%) – in which to concentrate community-based investments;
- Within these selected communities, Electrify America will build stations to meet the needs of residents of multiunit dwellings (MUD), and will invest to meet the fueling needs and lower fuel costs for shared mobility (Taxi, TNC) drivers, a disproportionately low-income population;
- Electrify America will also invest in EV charging stations in specific rural areas of the Central, Imperial, and Coachella Valleys which have higher proportions of low-income and disadvantaged communities; and
- Electrify America will reduce the cost of ZEV ownership for low-income and disadvantaged drivers by offering no-money down home charging equipment and developing a tool to connect these drivers with the many existing forms of financial support (e.g., utility rebates, AQMD funding) to "go electric."

Electrify America will also strive to ensure that 35% of brand-neutral education, awareness, and outreach investments in California are in or target low-income and disadvantaged communities. The majority of spend in these categories is dedicated to mass media programming, and Electrify America will target these campaigns (e.g., TV, radio, billboards, digital ads) toward low-income or disadvantaged census tracts or ZIP codes. Electrify America has also dedicated approximately $2 to $3 million of Cycle 2 funds to supporting the programs of local entities with particular credibility and success in low-income or disadvantaged communities. Together with these entities, Electrify America will develop information and campaign tools highlighting the incentives available for low-income and disadvantaged community residents. Similar to Cycle 1, Electrify America will conduct 'Discover and Drive' events in low-income and disadvantaged communities to boost awareness and enable residents to feel the thrill of driving a ZEV.

Electrify America continues to work as a good corporate citizen with these communities. Electrify America's California Cycle 2 efforts are expected to support up to 1,500 jobs, many of which are

blue-collar jobs (Department of Transportation, Council of Economic Advisors).[2] Electrify America is an active member of the Clean Energy Access Working Group, launched by Southern California Edison and The Greenlining Institute, to develop community-centric solutions for healthy air and environment, to identify barriers to ZEV adoption in low-income and disadvantaged communities, and to explore viable solutions to these barriers. The Working Group harnesses environmental, faith-based, and community groups to inform members of the public vulnerable to the adverse effects of pollution, which include disadvantaged and low-income communities. The organization highlights the benefits of adopting clean technologies, such as electric vehicles, as pathways to improve the air quality in and around their communities. Electrify America is also a board member of Veloz, a California-based non-profit dedicated to reducing barriers to electric vehicle adoption for all Californians. Finally, as part of its normal course of business, Electrify America actively engages stakeholders in low-income and disadvantaged communities through in-person meetings and listening sessions.

Finally, as we build a new company, Electrify America's leadership is committed to establishing a diverse, open, and engaging workplace and to attracting a vendor pool that is both exceptionally skilled and highly diverse. Electrify America will take a number of concrete efforts to demonstrate that commitment in Cycle 2, and will continue to engage vendors on this effort and report results.

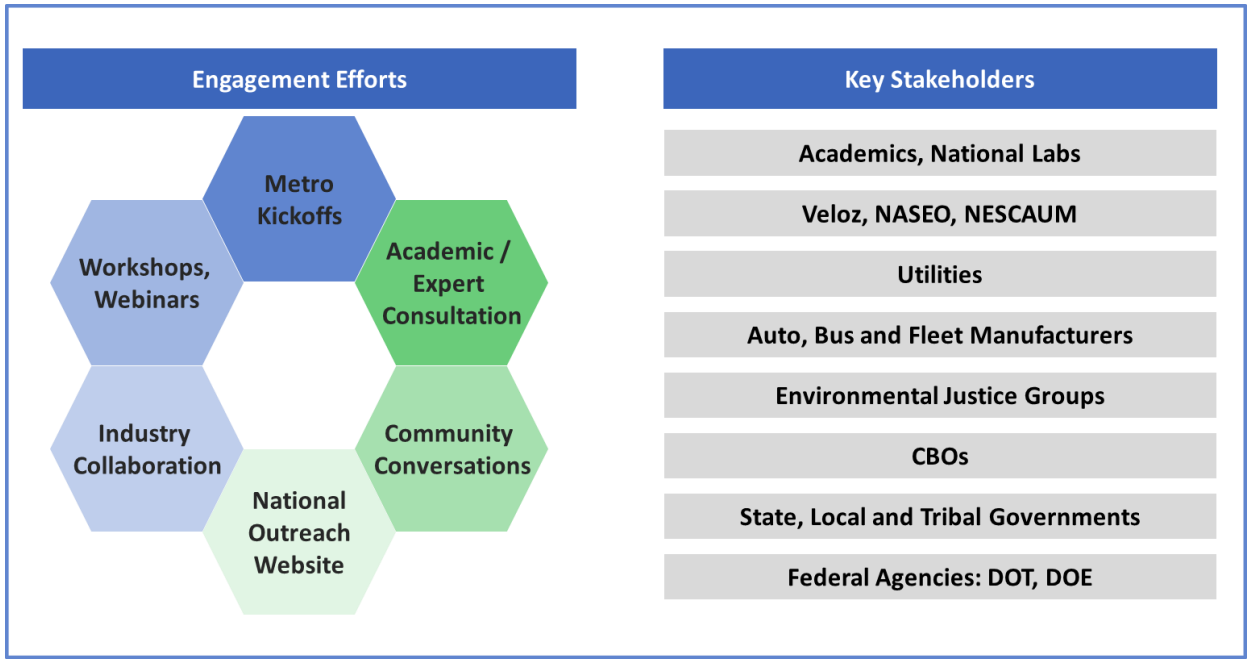
Electrify America believes these investments, alongside the efforts of dozens of state and local ZEV stakeholders, will help educate residents of low-income and disadvantaged communities on ZEVs and encourage ZEV adoption. Additional details on each aspect of this low-income and disadvantaged community engagement strategy can be found in the respective chapters of this ZEV Investment Plan.

[2] The Council of Economic Advisors estimates that every $1 billion in federal highway and transit investment would support 13,000 jobs. This total count includes direct, indirect, and induced jobs. The estimate here is for the number of jobs created by infrastructure investments, and it does not include jobs created through education, awareness, and outreach or Electrify America overhead. The estimate assumes that ZEV investments create a similar number of job-hours per dollar spent as highway and transit investments.

2. Outreach Efforts and Key Learnings

Electrify America strongly believes that success in driving ZEV adoption will come from collaboration with the entire landscape of ZEV stakeholders including automotive companies, infrastructure suppliers, utilities, state and local governments, academics, interest groups, and beyond. As such, over the last 12 months our team has spent hundreds of hours and traveled extensively to engage stakeholders in the ZEV community to seek insights on industry trends and customer behaviors, ideas for new business concepts, to understand evolving policies and utility programs, and to collaborate with others on investment opportunities as part of a comprehensive approach laid out in our National Outreach Process. These engagements have taken many forms, including briefings with leaders in our Cycle 1 metropolitan areas, community conversations with local constituencies, workshops, webinars, and consultations with academic experts. Electrify America is grateful to all those who have taken the time to engage with the company in this process.

Figure 3: Stakeholder Engagement Efforts



In addition to the aforementioned efforts, and consistent with Electrify America's commitment to engage in outreach as part of its investment planning process, Electrify America issued a second call for comments, data, and recommendations to inform decisions regarding Cycle 2 investments in ZEV infrastructure, education and awareness, and access programs. The request for input through the National Outreach website launched in January 2018 provided an opportunity for governments, organizations, and others to provide input for Electrify America to update analytical models, evaluate new technology and public policy developments, track evolving consumer expectations, and explore the value of new allowable ZEV Investments. To aid in drafting the Cycle 2 ZEV Investment Plans, Electrify America specifically sought the following types of input:

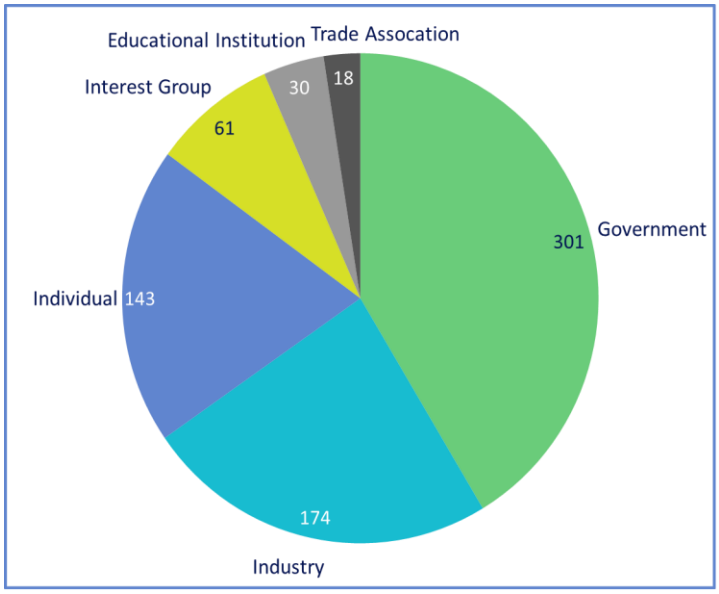
- Suggestions and Data Relevant to Cycle 2 Investments – Inputs from governments or organizations that are helpful to the decision-making process, including data to help locate charging stations, ZEV infrastructure plans for individual communities, and information regarding state and local policies designed to increase ZEV adoption;
- Education and Access Suggestions – Suggestions on Electrify America's approach to brand-neutral education and access or specific events the company should consider for participation;
- Specific Charging Site Locations – Site locations nominated for consideration in Cycle 2 infrastructure investments;
- Cycle 1 Comments and Feedback – Feedback on the Cycle 1 National and California ZEV Investment Plans, including approaches to metro selection, highways included, evaluation of use cases, and integration of new technology; and
- Other – All other comments or submissions that relate directly to Electrify America's ZEV Investment Commitment.

As a part of this process, Electrify America received over 700 submissions, including 174 from California, each of which has been carefully reviewed and considered in developing our Cycle 2 plan. The following pages detail our outreach efforts and key learnings and insights from this process.

2.1. Summary of National Outreach Effort

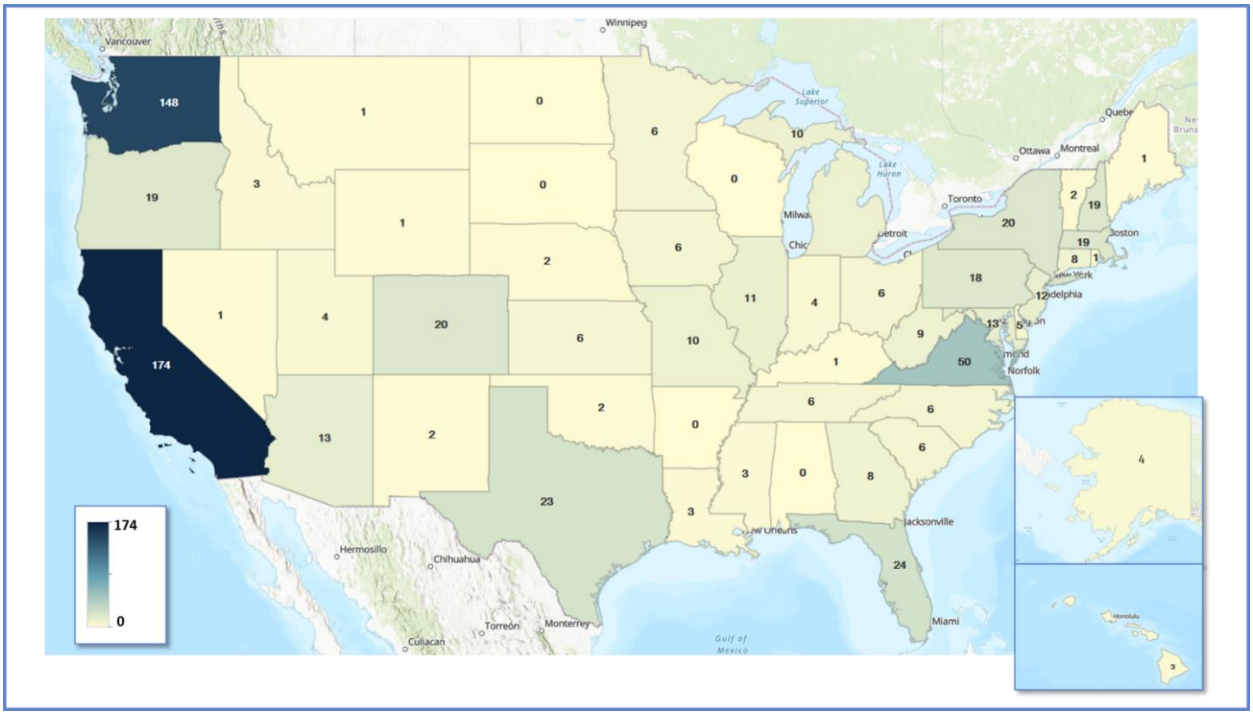
In January 2018, Electrify America launched a page on its website for comments, proposals, data, and recommendations to help define Cycle 2 investments. As of September 6, 2018, 727 submissions were received through the online portal.[3] Government entities made up 41% of submissions (Figure 4). Submissions came in from 45 states and the District of Columbia (see Figure 5), with the largest number of submissions from the states of California (174 submissions) and Washington (148 submissions and over 970 site suggestions).

Figure 4: Overall Submissions by Institution Category



Electrify America's team reviewed and summarized every submission and assigned to internal working teams for a secondary review and follow-up by email or phone call. Electrify America spoke individually with more than 100 submitters, and every submitter was invited to a series of webinars during which findings and lessons learned were shared.

Figure 5: Submissions by State



[3] The official period for submitting formal comments and suggestions regarding Electrify America's Cycle 2 ZEV Investment Plans was originally open from January 15 to March 1, 2018. However, Electrify America has kept the submissions page open and continued to review the submissions up to the week before this Plan was published.

Electrify America received submissions from a variety of stakeholders, including state, county, and local governments, private companies (including electric utilities and charging providers), and individuals. (See Figure 6).

In California, a total of 308 sites were suggested through 48 unique submissions (see Figure 7).

Looking across the broad range of submissions, a few major trends were clear (see Figure 8). First, submitters cited a need for more DCFC stations, both in metro areas and on highways. Within metros, they noted a need for strategically placed DCFC infrastructure that can serve multiple use cases, including commuters and people without home charging options. A major American automaker suggested specifically focusing on the needs of DCFC for urban core customers such as taxi/TNC services which require charging near hotels, airports, and convention centers. Submitters commented that highway stations are also essential, suggesting that a highway network will help reduce or eliminate range anxiety. For example, the City of San Jose shared that range anxiety and insufficient public charging infrastructure are key barriers to achieving the City's ZEV goals.

Figure 6: Submissions by Stakeholder Category (California)

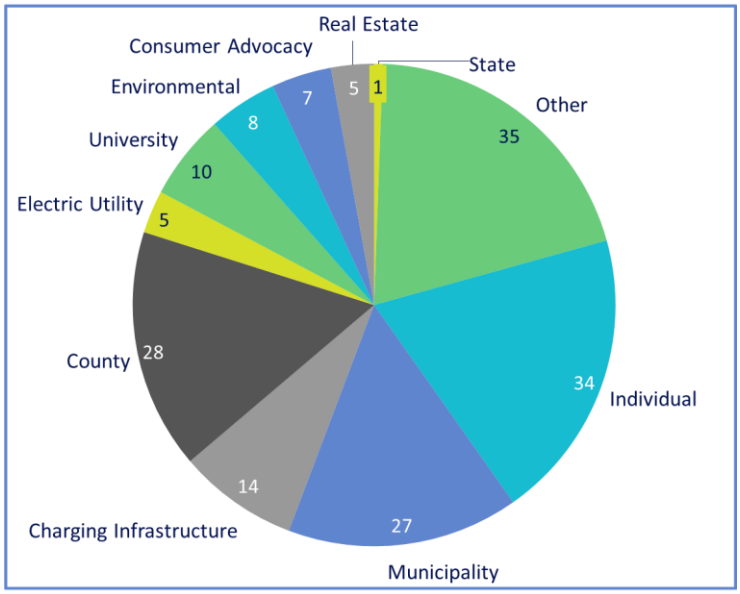
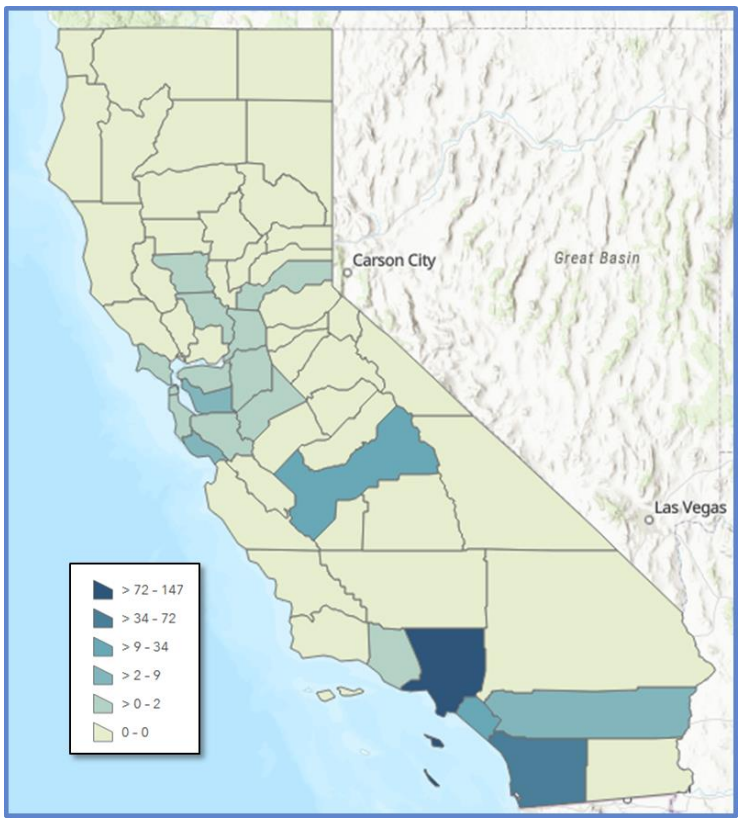


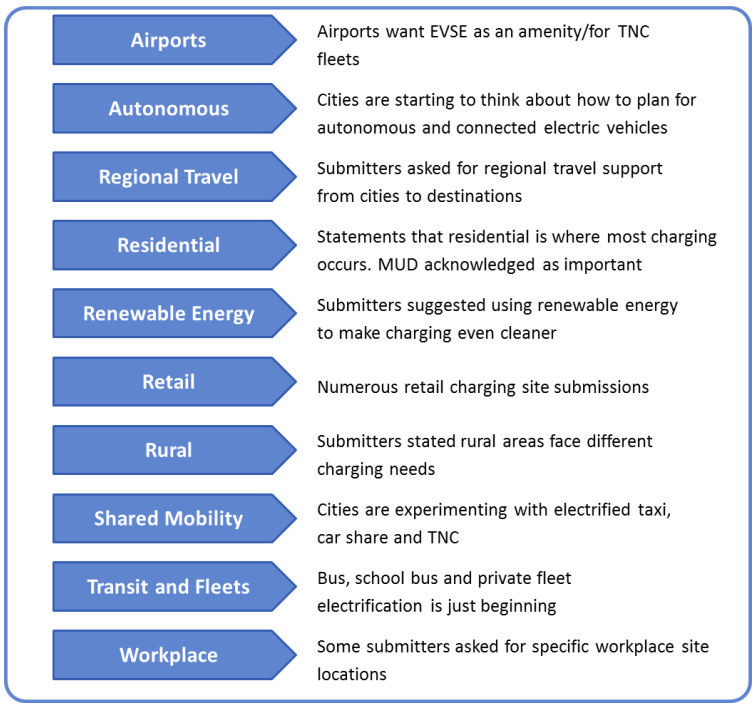
Figure 7: Site Suggestions by County



Nearly 50 submissions noted charging in multiunit dwellings (MUDs) as a priority focus, including 10 in California. However, commenters cited divergent strategies to address the MUD market, which suggests there is no single best solution for this use case. Some submissions recommended strategies for L2 installations in MUDs, including focusing on larger MUDs or new buildings to manage costs. New York City, on the other hand, suggested "[f]ast charge hubs overcome the barrier posed by lacking home charging access by establishing highly visible and centralized access points across the city where electric drivers can top up quickly and conveniently…." A similar

recommendation was put forward by UCLA's Luskin Center in a recent paper on the barriers to EV charging in MUDs (Luskin, 2016).

Figure 8: Themes from National Outreach Responses



While the vast majority of submissions were focused on EV infrastructure, three percent of submissions (17 total) mentioned hydrogen fueling infrastructure. Eight of these came from hydrogen advocacy organizations or companies in the hydrogen and/or fuel cell business. Five were from government agencies recommending deployment of hydrogen fueling infrastructure, and three were from government agencies supporting medium- and heavy-duty applications, including at their ports. One transit agency, San Diego Metro Transit System, noted interest in ZEV technology, to include either battery electric or hydrogen buses.

Finally, nearly 90 submissions discussed ZEV education, awareness, and access initiatives, including 50 from California. Many mentioned brand-neutral vehicle showcases and test drives (commonly known as 'Discover and Drives') as a way to help potential ZEV customers learn about the performance and environmental benefits of ZEVs. Some submissions mentioned using digital media/social media to spur ZEV adoption. For example, ZappyRide offered to collaborate with Electrify America to develop a web platform for prospective EV purchasers aimed at removing the most common obstacles to ZEV adoption. Nearly two dozen submissions mentioned job training or EV curriculum development for both ZEVs and ZEV infrastructure in the form of internships, job training, and career opportunities, particularly for youth. For example, Drive Electric Washington suggested Electrify America "support efforts to design curriculum to serve as a primer about electric cars for secondary students." Similarly, the Mississippi State University Center for Advanced Vehicles Systems suggested educating a broad spectrum of individuals regarding ZEVs "which would include the American public along with specialized education programs developed for secondary, post-secondary, and engineering students."

Overall, Electrify America's National Outreach Effort was even more successful than our Cycle 1 experience. It provided a deeper understanding of the infrastructure, education, and access priorities from state and local stakeholders, which have been incorporated alongside other insights captured below to shape the direction and tactics for this Cycle 2 California ZEV Investment Plan.

2.2. Infrastructure Learnings and Insights

Through the outreach process, Electrify America sought to understand four core questions related to ZEV infrastructure:

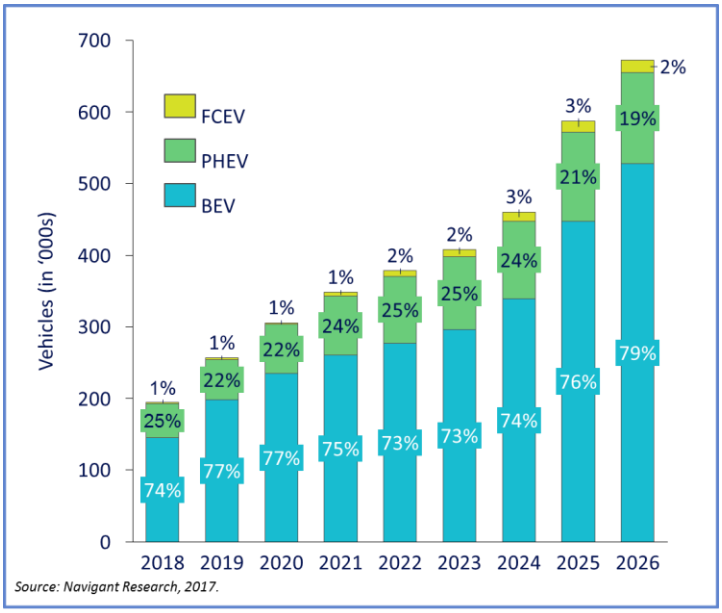
- What types of ZEVs will dominate the future?
- How will these ZEVs be used?
- How will the ZEVs be fueled?
- What infrastructure investments will have the greatest impact on low-income and disadvantaged communities?

The answer to each of these questions has a major impact on the type and locations of infrastructure required and therefore has been used to guide Electrify America's thinking on its Cycle 2 investments.

What types of ZEVs will dominate the future?

Based on all feedback received and analysis completed through planning Cycle 2, Electrify America believes long-range BEVs will dominate the future both in California and nationally. As detailed in Figure 9, Navigant Research's 2017 forecast[4] shows the coming decade of ZEV sales in California to be increasingly represented by BEVs as falling battery prices strengthen the economic advantage of BEVs over their PHEV and ICE counterparts. Complementing this analysis, Bloomberg New Energy Finance (O'Donovan, 2018) forecasts electric car battery prices will fall 54% by 2025 based on technology improvements and scaling associating with increased demand. In contrast to BEVs, Navigant Research forecasts hydrogen fuel cell EVs (FCEVs) will continue to be less than 3% of ZEV sales through 2026, and less than 1% of total vehicle sales in California (Navigant, 2017).[5]

Figure 9: Navigant California ZEV Sales Forecast ('000 vehicles)



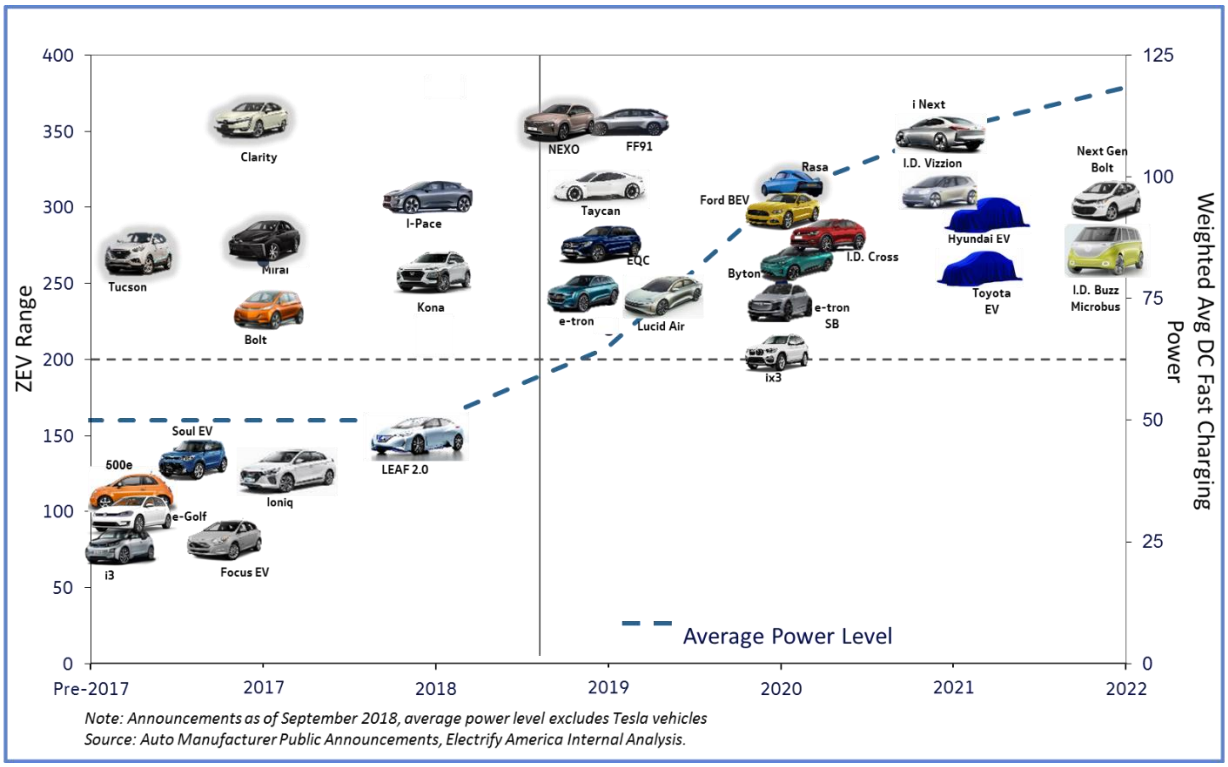
Electrify America's analysis of automotive manufacturer announcements for vehicles slated for release throughout the next five years indicates the clear trend of larger battery, longer range BEVs, with nearly all models planned for over 200 miles of range and some even surpassing 300 miles. These vehicles will also feature higher charging speeds, with most models projected to accept charging speeds

[4] Based on Navigant's 2017 Base Case scenario.

[5] Navigant does not break out FCEV sales into state/metro areas. Based on discussions with Navigant and automotive OEMs, Electrify America assumes the majority of FCEVs forecasted by Navigant will be sold in California.

of 100 kW and above (see Figure 10). According to Strategic Vision research, "recharging time" is one of the top five reasons for BEV avoidance, and thus increasing power levels and charge speed are very important to ZEV adoption. Finally, a greater diversity of body styles and price points provide more consumer choice, and several new car companies[6] have announced plans to bring all new designs, technologies, and customer experiences to market.

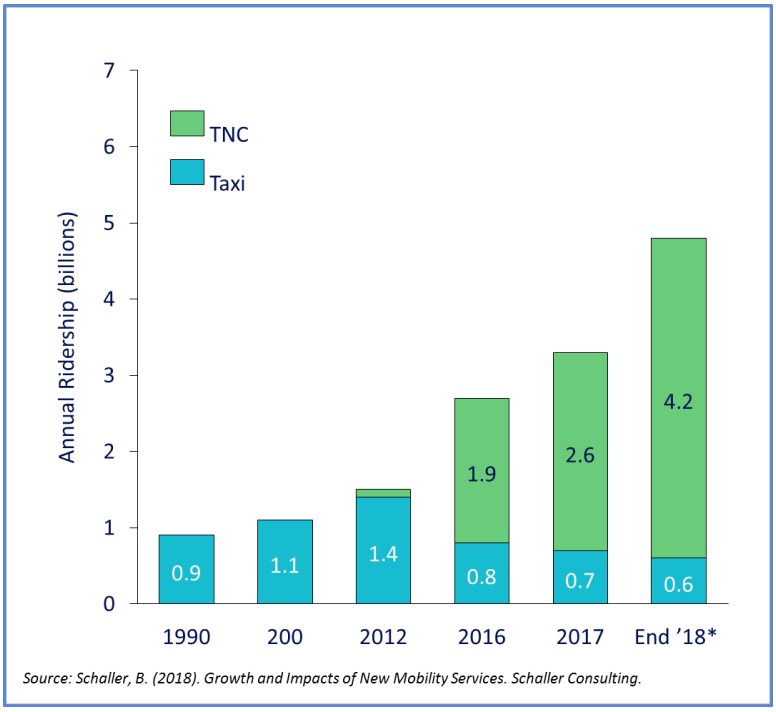
Figure 10: Vehicle Launch Date vs Range and Fast Charge Power (Announcements as of Sept 2018)



[6] Including Faraday Future, Lucid, Byton, SF Motors, and Nio.

In addition to BEV growth in the private use vehicle market, efforts by municipalities, taxi authorities, TNCs, and utilities indicate increased use of ZEVs in shared mobility in the near future. According to Schaller Consulting (Schaller, 2018), annual ridership for ride hail grew ~37% from 2016 to 2017, and is projected to grow ~62% from 2017 to 2018 (see Figure 11). Despite a shrinking portion of ridership for taxis, these combined use cases are seeing dramatic growth and thus the high annual mileage of these vehicles presents a prime opportunity for electrification.

Figure 11: Annual Ridership



Source: Schaller, B. (2018). Growth and Impacts of New Mobility Services. Schaller Consulting.

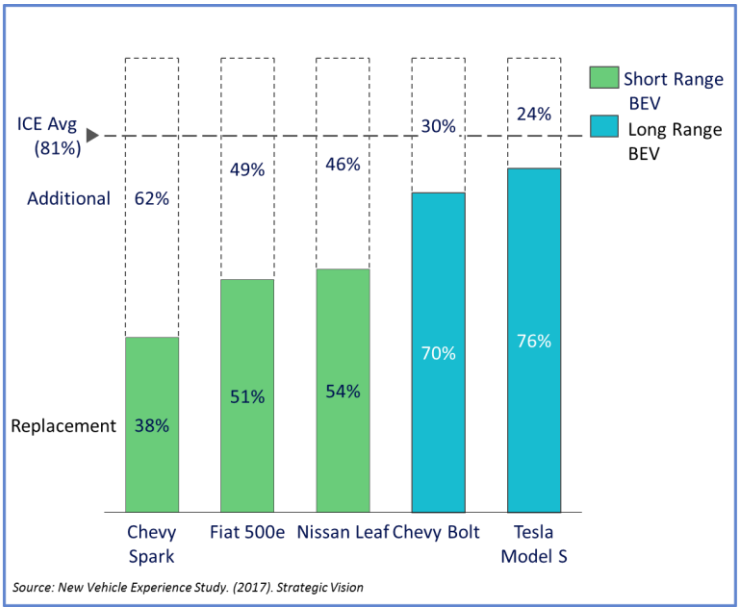
National Outreach submissions also demonstrated an interest in shared mobility concepts such as ride hailing, ride sharing, and car sharing in more than 30 submissions, including more than 10 in California. Many cities and urban areas, including Los Angeles, Sacramento, San Jose, Washington D.C., Denver, the Twin Cities, Atlanta, King County (WA), Nashville, and Chattanooga noted that they are considering or actively pursuing EV car-sharing fleets. The City of Santa Monica shared its 2017 Electric Vehicle Action Plan which highlights EV car share and ride share as a way to "reduce carbon emissions and increase demand for charging…." The plan goes on to detail recent case studies from WaiveCar, ReachNow, Bollore Group, and ZipCar that already serve this space.

Municipal buses also present a notable growth area for electrification, as many transit agencies and cities have either recently decided to adopt, or are considering transitioning to, electric buses. More than 35 submissions to Electrify America's National Outreach website mentioned electric buses, including about a dozen from California. For example, the Metropolitan Transportation Commission and the Bay Area Air Quality Management District, in a joint submission, stated "we also reiterate our initial comments regarding the need to prioritize investments in medium-and heavy-duty zero emission vehicles – for both freight delivery and public transit vehicles." For buses, the agencies cited the pollution reduction benefits and lower operating and maintenance costs as key reasons for the change, and municipalities cited Federal Transit Administration, CARB, and Volkswagen's NOx Mitigation Trust Funds as the primary sources for their investments.

How will these ZEVs be used?

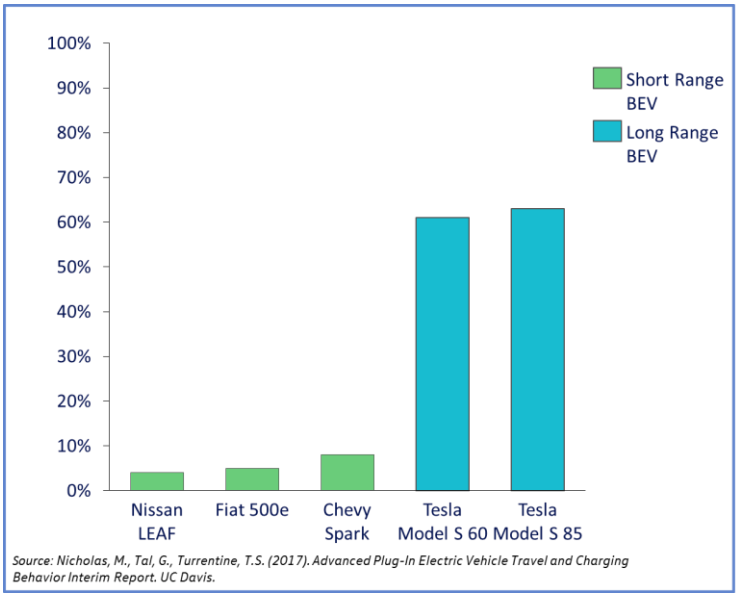
Early data on 200+ mile, long-range BEVs indicates that these vehicles are used by households quite differently than their shorter-range equivalents. First, buyers indicate long-range BEVs are frequently purchased as a replacement vehicle to an existing car in a household fleet (see Figure 12). Whereas short-range BEVs are often additive to a household's fleet and seen solely as a commuter car, the coming 200+ mile BEVs are expected to replace existing household vehicles and perform similar roles as an internal combustion engine (ICE) vehicle does today (New Vehicle Experience Study, 2017).

Figure 12: ZEV Purchase Reasons for Household Fleet



Similarly, long-range BEVs are used on more 200+ mile trips than their short-range equivalents. Tesla Model S and X vehicles are used for over 60% of household trips that are over 200 miles compared to Nissan Leafs, which are used on fewer than 5% of long trips (see Figure 13) (Nicholas et al., 2017), although new longer range Leaf vehicles will likely reverse this trend. Electrify America expects the "EVs as primary use vehicles" trend to continue as more long-range BEVs become available and as the growing networks of fast charging stations enable this shift.

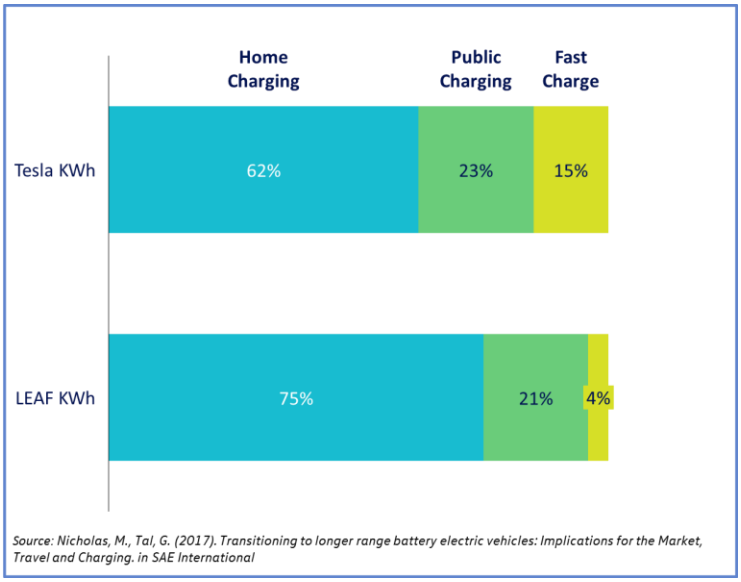
Figure 13: Percentage of Household's 200 Mile Trips Driven in PEV vs. ICE



Beyond EV growth in the private use and shared mobility segments, innovations like autonomous vehicles are expected to shift how future electric vehicles will be used. KMPG's Autonomous Vehicles Readiness Index reports autonomous technology will "transform our lives, because it will mean for the first time in history, mobility freedom will be available for everyone, everywhere" (Threlfall et al, 2018). Numerous pilot deployments of autonomous vehicles are already taking place throughout California by a variety of technology and automotive companies. In fact, in May of 2018 the California Public Utilities Commission authorized transportation companies to begin piloting passenger service using autonomous vehicles (CPUC, 2018).

How will ZEVs be fueled?

Figure 14: Charging Location Mix



Source: Nicholas, M., Tal, G. (2017). Transitioning to longer range battery electric vehicles: Implications for the Market, Travel and Charging. in SAE International

According to "Three Revolutions" by Daniel Sperling (2018), "most EV owners depend on overnight charging at home and only secondarily on public and worksite charging." In fact, the U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy reports that EV drivers conduct "more than 80% of their charging at home." The next largest segment of charging takes place at workplaces and at public L2s, and then – finally – at public DCFC stations (see Figure 14) (Nicholas & Tal, 2017).

Home charging will support most individuals in single family homes, but multiunit dwellings (MUDs) have traditionally been difficult to outfit with charging infrastructure. According to DeShazo (2017), "MUD residents face a number of obstacles to installing electric vehicle service equipment (EVSE). Foremost is the variable and often high cost of EVSE installation at a MUD site. Additionally, the renter or owner exhibits a low to nonexistent investment motivation." Electrify America anticipates that as EVs gain market share and penetrate larger portions of the overall population, public DCFC will become increasingly important for serving those MUD dwellers.

Electrify America thoroughly investigated how hydrogen fuel cell vehicles are expected to be refueled in Cycle 2, as it explored investment opportunities in this space. Based on stakeholder and expert feedback, Electrify America anticipates that these vehicles will continue to be refueled at public stations, not in home, for the foreseeable future. The Department of Energy continues to support research and development of in-home hydrogen production and refueling. The Department recently awarded a $1 million prize to SimpleFuel for design of what may someday be a new garage appliance (Voelcker, 2017), although current estimates put the price of an in-home station as high as $250,000 for what would be considered a pre-commercial deployment (Blanco, 2017). In California, public hydrogen stations are being built rapidly as a result of AB 8, which requires the California Energy Commission to spend $20 million annually to fund public hydrogen station construction until certain deployment requirements are met,[7] and Governor Brown's January 2018 Executive Order which called for California to support construction of 200 stations. The California Energy Commission and CARB recently found in their joint "2018 Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development" that this additional support would be sufficient to meet the needs of hydrogen fuel cell vehicle drivers, writing: "due to the anticipated acceleration in hydrogen fueling network growth, sufficient fueling capacity and coverage should be available by 2025 to enable FCEV

[7] AB 8 requires funding be provided until the 100th station opens or until "the commission determines, in consultation with the state board (CARB), that the private sector is establishing publicly available hydrogen-fueling stations without the need for government support."

deployments at a rate two to three times greater than currently-reported plans." (California Air Resources Board, 2018).

What infrastructure investments will have the greatest impact on low-income and disadvantaged communities?

In its recent report on the barriers to ZEV adoption in low-income and disadvantaged communities, CARB concluded that a lack of charging infrastructure represented a significant barrier to EV adoption (CARB, 2018b). Through its National Outreach Effort, Electrify America received nearly 40 submissions from California stakeholders regarding low-income and disadvantaged communities. A wide variety of approaches were suggested for low-income and disadvantaged community engagement. These included EV charging stations in the communities, targeted marketing, facilitating used EV purchasing, supporting EV car-sharing pilots and electric bike programs, targeted workplace charging, establishing an advocacy office/ZEV learning center, and providing or leveraging EV and EVSE rebates and financing solutions.

In particular, several California entities made specific suggestions to Electrify America regarding ways that Cycle 2 investments could be made in low-income and disadvantaged communities. Los Angeles County called on Electrify America to more thoroughly integrate community-based organizations into the Cycle 2 planning process and offered to host a stakeholder meeting, which was held in July 2018. Los Angeles County also suggested locations to install charging stations in these communities. Ventura County noted that specific communities, which are subject to more toxic and particulate matter air pollution, could benefit greatly from the adoption of EVs. The LA Economic Development Corporation suggested that Electrify America complement the State of California's EV 'make-ready' requirements for MUDs by installing chargers at affordable housing sites in LA County which will be "EV Ready." Electrify America considered this valuable input in developing this Cycle 2 California ZEV Investment Plan and will address disadvantaged and low-income communities through a variety of channels in its Cycle 2 efforts.

2.3. Education and Awareness Learnings and Insights

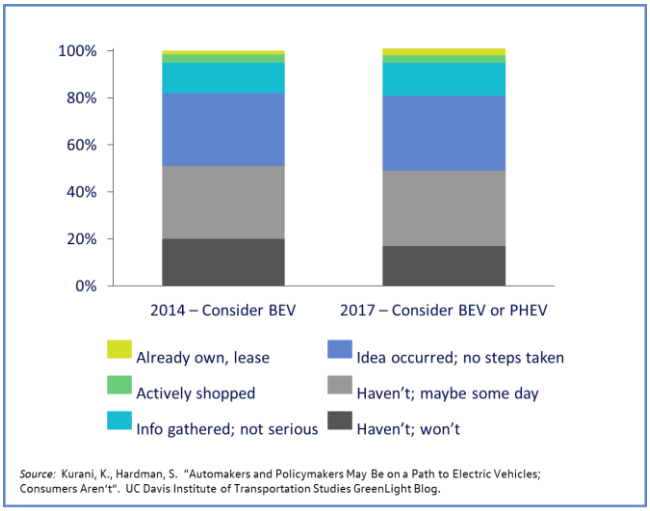
Electrify America also sought to better understand consumer perspectives and behavior to target the Cycle 2 education, awareness, outreach, and marketing efforts. The three primary strategic questions were:

- How are ZEVs perceived today?
- What are the key barriers to EV adoption?
- What education and awareness investments will have the greatest impact on low-income and disadvantaged communities?

How are ZEVs perceived today?

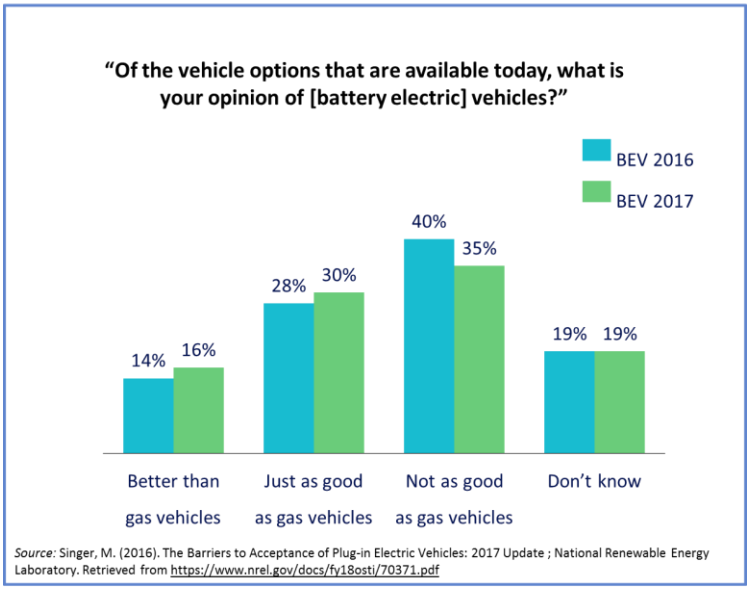
Overall awareness and consideration of electric vehicles today remains low, both in California and nationally. According to 2017 research by Ken Kurani and Scott Hardman of UC Davis, consideration of plug-in electric vehicles has changed little from 2014 to 2017 (see Figure 15). This report, and similar data from Strategic Vision (shared in the Education, Awareness, and Marketing section) are sobering reminders of the limited consideration of ZEVs today and clearly suggest the need for more effective awareness building strategies and solutions.

Figure 15: BEV Awareness 2014 vs 2017



Source: Kurani, K., Hardman, S. "Automakers and Policymakers May Be on a Path to Electric Vehicles; Consumers Aren't". UC Davis Institute of Transportation Studies GreenLight Blog.

Figure 16: Opinions of BEVs vs Gas Vehicles

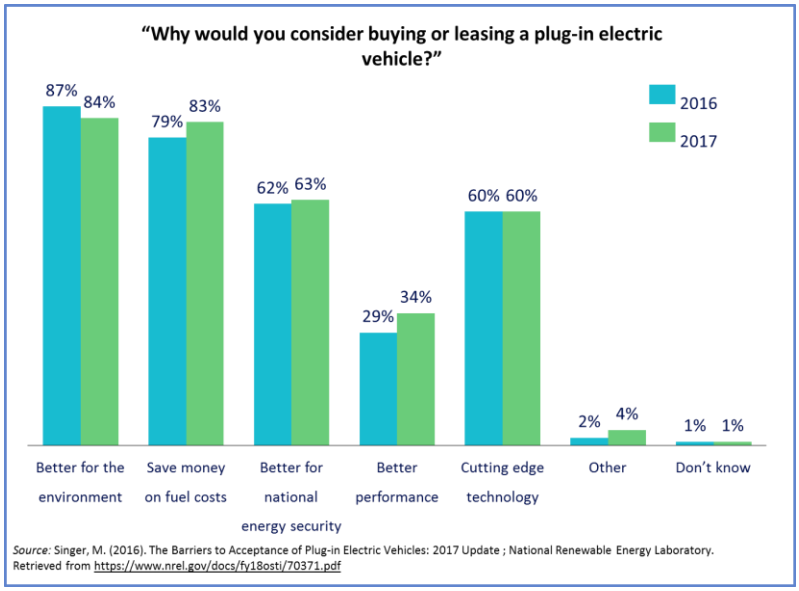


Source: Singer, M. (2016). The Barriers to Acceptance of Plug-in Electric Vehicles: 2017 Update ; National Renewable Energy Laboratory. Retrieved from https://www.nrel.gov/docs/fy18osti/70371.pdf

However, the 2017 NREL study entitled "The Barriers to Acceptance of Plug-in Electric Vehicles: 2017 Update" provides a more positive outlook on the market. Over half of consumers view battery electric vehicles as either better than, or just as good as, gas vehicles available today, and this number grew year over year compared to 2016 (see Figure 16). A large portion of the population – nearly 20% – answered "don't know" which indicates that even more could be persuaded if they were educated about the advantages of ZEVs.

The NREL study also reports that consumers continue to view the primary benefits of electric vehicles as being better for the environment and offering savings on fuel costs (Figure 17). These electric vehicle opinions are correct, of course, but recent studies show that other factors – such as vehicle performance – are more important drivers of purchasing behavior.

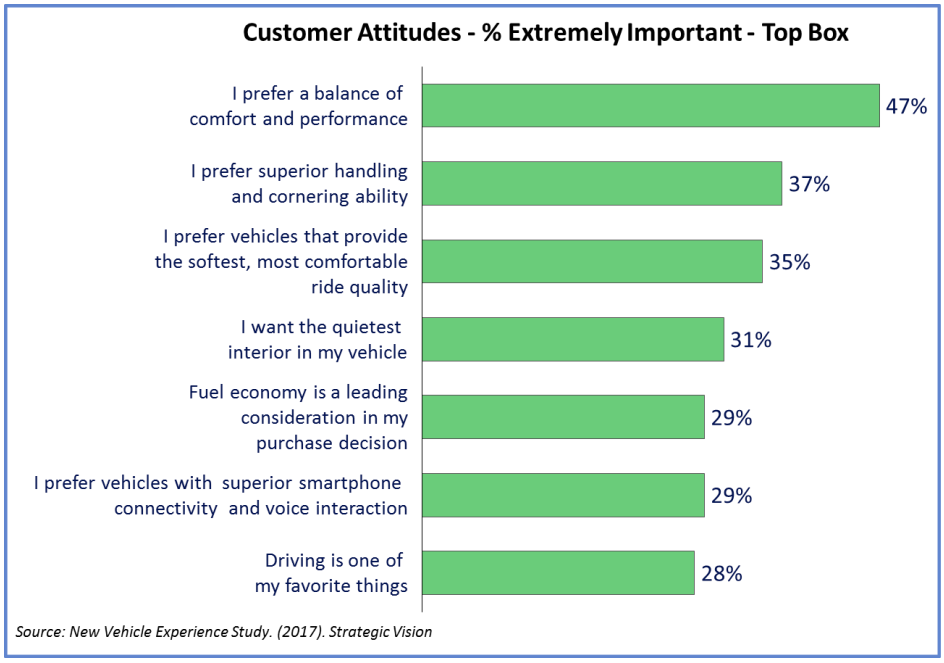
Figure 17: Consumer Views on PEVs



Source: Singer, M. (2016). The Barriers to Acceptance of Plug-in Electric Vehicles: 2017 Update ; National Renewable Energy Laboratory. Retrieved from https://www.nrel.gov/docs/fy18osti/70371.pdf

As evidence, recent research from Strategic Vision's New Vehicle Experience Study shows that mainstream car buyers rate comfort and performance as "Extremely Important" (see Figure 18). Fuel economy is also mentioned by respondents, but it ranks 5th, behind handling and cornering, soft comfortable ride, and quiet interior. Thus, the primary messaging in promoting the benefits of ZEVs to buyers should focus on performance and handling. Since EVs already possess performance advantages, such as quick acceleration offered by their powerful motors and improved handling thanks to their low center of gravity, this communications approach will be authentic.

Figure 18: Consumer Attitudes When Shopping for a Vehicle



Source: New Vehicle Experience Study. (2017). Strategic Vision

What are the key barriers to EV adoption?

Numerous studies including NREL's 2017 "Barriers to Acceptance…,' Strategic Vision's 2017 New Vehicle Experience Study, McKinsey & Company's 2017 "Electrifying Insights…," and UBS Evidence Lab's 2016 "What Consumers Think About Electric Cars," highlight a range of barriers to ZEV adoption. While the importance of each barrier varies depending on when and how the study was conducted, five categories typically emerge (ranking is dependent on when and how the studies were conducted):

1) **Range**: Most consumers are not aware that even entry level EVs have a range of 80+ miles per charge, well within most daily commutes. Education is required to show that other models offer up to 300+ miles of range.

2) **Charging Station Availability**: Another barrier is the perception of the lack of charging infrastructure currently available. While ICE drivers can go on long trips secure in the knowledge that they will be able to refuel quickly en route, it is more complex for EV drivers; this same trip requires researching the location of charging stations along the way and setting aside time to charge up.

3) **Cost**: The purchase price of EVs is a deterrent to some buyers. Although EVs are increasingly available at lower price points, they generally remain more expensive than equivalent gasoline vehicles. This financial barrier is overcome in part by federal and state purchase incentives, which can reduce the upfront cost of the vehicle, as well as reduced operating costs (fuel, maintenance), which accumulate over the life of the vehicle. Despite these benefits, further education is necessary to establish awareness regarding these economic advantages. For example, according to NREL's 2017 study "Barriers to Acceptance…," fewer than a quarter of respondents (23%) had heard of PEV tax incentives. Furthermore, EVs typically cost less to operate than gasoline vehicles, including fuel, maintenance, and repairs, and these advantages can become education points as well.

4) **Performance**: Most people have never ridden in or driven an electric car, so the performance compared to non-EVs is one that requires education and experience.

5) **EV Model Selection**: While nearly all vehicle manufacturers already have or are developing electric vehicle models, consumers note the lack of variety in the number of vehicle models available. Currently, most electric cars are small, midsize, or compact, so consumers wanting pickup trucks or SUVs feel they do not have options. Also, many are only available in California and the other states that have adopted the Zero Emission Vehicle Mandate.

Electrify America also believes that one additional barrier to adoption, not often noted, is that the majority of people don't think about electric vehicles when they are buying a new car. For the most part, over the last 100 years, vehicles have been purchased and driven in the same way largely because the current driving culture, refueling network, and larger eco-system supporting modern transportation has been developed and well established around fossil fuels and personal use vehicle travel. Consumers typically don't enjoy changing from well-established norms unless there are clear and known advantages to the replacement approach. Fortunately, electric vehicles represent compelling reasons for change for drivers, society at large, air quality, and climate change.

What education and awareness investments will have the greatest impact on low-income and disadvantaged communities?

The California Air Resources Board's 2018 paper entitled "Low-Income Barriers Study, Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents" addresses many of the ways to better serve low-income and disadvantaged communities. The priority recommendations address a broad set of opportunities, including building additional public charging infrastructure installations. Specifically related to education and awareness, recommendations include:

- Create outreach and education materials specific to community needs and relevant, accessible, practical and available in the spoken languages of those communities;
- Provide targeted outreach and technical assistance for low-income residents. Expand coordinated community-based outreach efforts utilizing local resources to increase program participation;
- Expand access to vocational training, pre-apprenticeship, and apprenticeship programs to support clean transportation jobs and workforce development in low-income and disadvantaged communities, especially for youth.

Electrify America's National Outreach website and dozens of conversations with community-based organizations and other stakeholders in low-income and disadvantaged communities also identified a number of ways to increase ZEV adoption in low-income and disadvantaged communities. First, stakeholders identified overall education and outreach efforts as a primary tool for driving adoption. Traditional media campaigns, in multiple languages and across multiple media channels, will help to spread the word in communities where ZEV awareness is generally low today.

Second, Electrify America heard from stakeholders in Fresno and Bakersfield and from more than 10 environmental and environmental justice organizations that working with local organizations that are trusted in the community is critical to communicating the economic appeal of adopting ZEV technology. These can be community-based organizations, elected officials, faith-based organizations, or non-profits – the most important aspect is that these entities have strong ties with the local community and an ability to communicate and demystify California's complex ZEV incentive regimes.

Finally, creative approaches can be leveraged to target typically hard-to-reach communities. Proposals suggested advertising on ethnic radio stations and other means of trustworthy communication to minority groups. The City of Los Angeles suggested supporting ride-share programs in disadvantaged communities to give individuals who might not otherwise be able to afford an electric vehicle an opportunity to experience the thrill of an EV. A letter from 12 groups representing environmental, environmental justice, equity, and Central Valley air quality interests suggested Electrify America "continue to complement California EV equity programs and continue to improve access to used EVs."

2.4. Outreach Efforts and Key Learnings Summary

All of the stakeholder engagement efforts detailed above, from the National Outreach website to the hundreds of stakeholder conversations and dozens of academic research papers carefully read, have been instrumental in shaping our understanding of the ZEV marketplace as well as what is most important to driving ZEV adoption. During Cycle 2, Electrify America plans to conduct a similar process of outreach in order to draft our Cycle 3 ZEV Investment Plans.

3. Infrastructure Investments (~$153 million)

Electrify America's infrastructure mission is to drive ZEV adoption by reducing range anxiety and increasing charging convenience. To meet this goal, Electrify America is establishing a premier ZEV charging network that is comprehensive, technologically-advanced, and customer-centric with the intent of showing ZEV drivers in California that ZEVs can be used as a primary vehicle. To this end, Electrify America will invest approximately $153 million in Cycle 2 across a broad set of infrastructure use cases including metropolitan areas, highways and regional routes, residences, buses, rural and autonomous charging. Estimated budgets for each investment are shown in Table 5 and detailed in the following sections.

Table 5: Estimated Infrastructure Investment Budgets

Category	Estimated Budget ($M)[1]
Infrastructure	**~$153**
Metro Community Charging	**$95 - $115**
Highways and Regional Routes	**$25 - $30**
Residential	**$8 - $12**
Bus and Shuttle Charging	**$4 - $6**
Rural Charging	**~$2**
Autonomous Vehicle Charging	**$2 - $4**

[1] Costs include creditable operating expenses and on-site storage where appropriate.

These investments were selected from a much larger set of use cases that were studied including on-street charging, hotels, transit hubs such as park and rides, and hydrogen fueling stations. While each of these use cases show merit, Electrify America was not able to establish a satisfactory business case that would justify investment during Cycle 2. Electrify America will continue to examine facts and new information, however, and will potentially shift resources to these use cases during Cycle 2 if new information or opportunities demonstrate these to be wise financial investments for the long-term and substantially impactful on ZEV adoption during Cycle 2.

Several key guiding principles underlined our selection of infrastructure investments for Cycle 2. These principles capture the short and long-term goals and vision of our organization and ensure that each infrastructure investment works towards those goals and vision. The key guiding principles for selecting Cycle 2 investments included:

- **Focus on locations where access and utilization is projected to be highest**: Investments target highways and metropolitan areas with high current and projected concentrations of ZEV drivers. This will maximize potential network utilization, the clearly established goal of and success metric

for the ZEV infrastructure investments established in Appendix C of the Partial Consent Decree. This will also improve both ZEV driver convenience and infrastructure investment economics.

- **Strive to expand ZEV adoption, and meet the needs of drivers in regions:** Investing in adjacent metropolitan areas produces a network effect, where investments to support travel and tourism between cities also supports the spread of ZEV adoption geographically across a region.

- **Focus on a variety of use cases based on anticipated charging behaviors of ZEV drivers**: Electrify America will build chargers to serve current and emerging driver needs – including charging at home, serving transit buses, as well as supporting mobility services, corridor travel, and charging in public areas (commercial/retail locations, parking garages) within a metro.

- **Incorporate anticipated changes in the ZEV industry by 'future-proofing' stations to maximize their usefulness in the medium-to-long-term**: Investments will include the latest technology (from L2s up to 350 kW DCFC) and operate across different charging standards (CCS and CHAdeMO) to maximize access and help ensure future compatibility in a rapidly evolving industry. Electrify America will also continually look toward new technologies, including ways to meet the needs of emerging autonomous vehicles, and work to ensure investments are optimized to incorporate these technologies in future investment cycles.

- **Focus on a sustainable business model**: Electrify America is implementing a set of ZEV infrastructure investments designed to be economically sustainable for the long-term.

- **Strive to ensure 35% of investments are in disadvantaged and low-income (DAC/LIC) communities:** In addition to focusing on a sustainable business model, Electrify America will strive to ensure that 35% of its economically sustainable infrastructure investments in California are in disadvantaged and low-income communities.

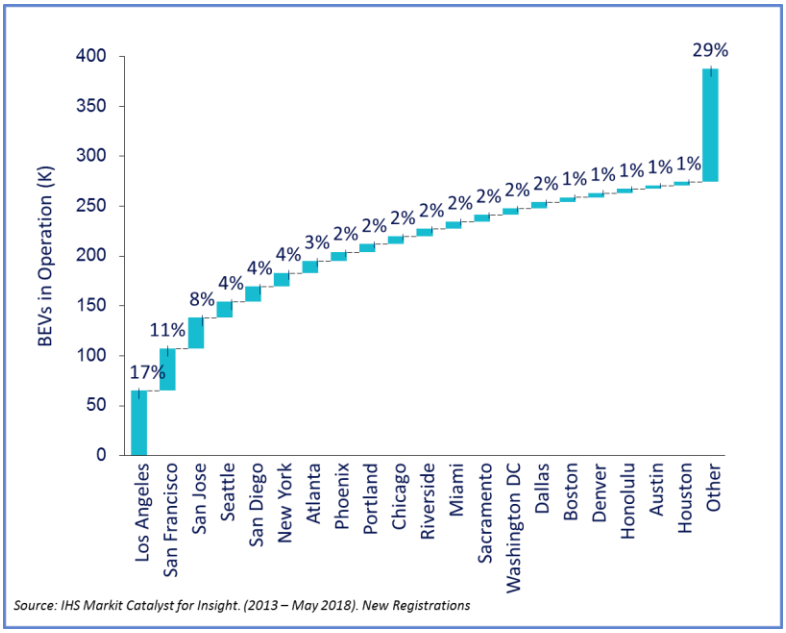
3.1. Metro Community Charging ($95 - $115 million)

3.1.1. Investment Overview

The largest portion of Electrify America's Cycle 2 investment is dedicated to community charging within metropolitan areas. Electrify America has identified metro charging as the primary use case based on four key market factors:

1. The vast majority of BEVs are projected to be sold in top metro markets;
2. Most miles driven in these BEVs are anticipated to be driven in and around metro areas;
3. Recent research shows that the majority of public charging happens relatively close to home, and;
4. New technology is shifting more vehicle miles traveled toward shared mobility options, which will require increasing charging support in and around metros.

Figure 19: BEVs Sold in Top 20 MSAs



Early adoption of BEVs in the U.S. has been concentrated principally within major metro areas, and this trend is projected to continue at least through 2022. Today, 71% of the nearly 400,000 BEVs in operation are concentrated in 20 metropolitan areas, and 57% are concentrated within the top 10 metros (IHS Markit Catalyst, 2018). Navigant Research (2017) forecasts this trend will continue through 2022 with over 70% of the projected two million BEVs in operation concentrated in just 20 metro areas. In addition to these forecast findings, Electrify America also considered that the majority of the US population today lives in cities. According to the U.S. Census Bureau (2015), cities are home to 62.7% of the U.S. population. In a 2016 press release discussing the U.S. Census Bureau's American Community Survey, Census Bureau Director John H. Thompson wrote that, "rural areas cover 97 percent of the nation's land area but contain 19.3 percent of the population (about 60 million people)."

Electrify America expects that most BEVs, similar to their ICE counterparts, will be driven in and around their metros. According to the Federal Highway Administration's 2017 National Household Travel Survey, 95% of vehicle trips were less than 30 miles from their origin. With most trips occurring close to home, it is not surprising that most DCFC charging sessions also occur close to home. In their 2017 study "Survey and Consumer Motivations to DC Fast Charge," Michael Nicholas and Gil Tal from University of California Davis showed that a majority of DCFC events for Chevy Bolt drivers were recorded within 8 miles of home. Nicholas and Tal's study "Transitioning to Longer Range Battery Electric Vehicles" (2017) shows Tesla drivers have similar charging behavior, albeit with a wider driving radius, averaging 29 miles from home for most charging sessions.

Electrify America expects metro charging to become even more important as BEV buyer demographics evolve and a significant number of MUD dwellers and renters purchase BEVs. In today's market, few owners of MUD buildings are willing to install chargers (Sperling, 2018). As The Northeast States for Coordinated Air Use Management (NESCAUM) described in their submission, "to increase access to EVs for residents of multiunit dwellings (MUDs), Electrify America should pilot innovative solutions for MUDs." Placing DCFCs in sections of metro areas with high MUD density, which has been recommended by UCLA researchers, is an innovative solution to addressing the need of future BEV drivers that live in MUDs.

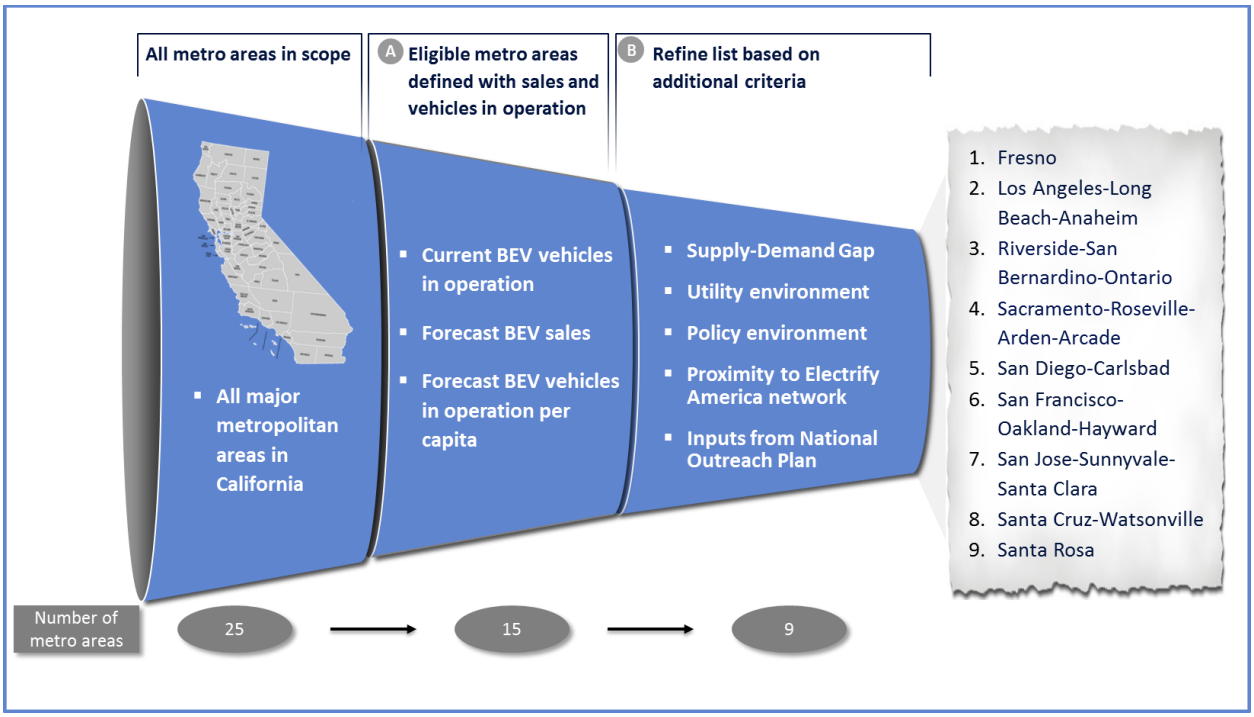
The shared vehicle economy also represents an increasingly important travel component within cities and is an attractive opportunity for early EV adoption by both drivers and passengers. The emergence of ride-sharing companies like Uber and Lyft in New York City, increased the vehicle miles traveled (VMT) from shared vehicles, including taxis and black cars, by 25% between 2013 and 2016 (Schaller, 2017). According to the San Francisco County Transportation Authority (2017), in San Francisco, one of the most mature ride-sharing markets in the U.S., 15% of all weekend vehicle trips were completed through transportation networking companies in 2016. This growing shared vehicle trend is expected to continue, with the Boston Consulting Group (2017) forecasting that by 2030, 25% of miles driven in the US could be in shared self-driving EVs. These shared vehicles are particularly well suited for electrification, with high annual mileage, such vehicles enable drivers to realize fuel and maintenance savings even faster than a typical ICE vehicle driver and increase their net income. Electric shared mobility vehicles displace fossil fuel vehicles, reduce household fleet vehicle needs and traffic congestion, and reduce greenhouse gas emissions. However, drivers and communities can only realize these benefits if there is sufficient public charging in the right locations to meet drivers' charging needs.

Considering all of these factors, Electrify America will prioritize metro-based charging investments in Cycle 2. To meet the needs of these drivers, Electrify America will invest in DCFC for three primary use cases within metro areas: retail/community, MUDs, and mobility services. Retail/community stations will target the needs of EV owners as they drive around town on their daily commutes, run errands, or visit friends and relatives. MUD stations will specifically target communities with a density of MUD dwellers, and will serve as an alternative for those who lack reliable overnight charging at their residence or workplace. Finally, shared mobility stations target the needs of taxi, TNC and car-share drivers in their daily travel around a metropolitan area. Electrify America believes that – collectively – these use cases will address the most critical DCFC needs of drivers within selected metropolitan areas.

3.1.2. Investment Selection Methodology

In Cycle 1, Electrify America selected metropolitan areas for investment through a two-step process that featured both quantitative and qualitative filters. Electrify America built upon this two-step approach in Cycle 2, upgrading key metrics to refine the analysis (see Figure 20).

Figure 20: Cycle 2 Metro Selection Process



The two-step process for selecting metro areas in Cycle 2 has been improved and is described below:

1. Starting with the most populous 25 metro markets in the California, representing over 95% of the California population (ESRI, 2016), Electrify America assessed each market on their BEV sales today and forecasted for 2022. Sales were analyzed on both a gross and a BEV per capita perspective to not only identify large markets of potential, but to give opportunity to smaller, higher growth potential markets.

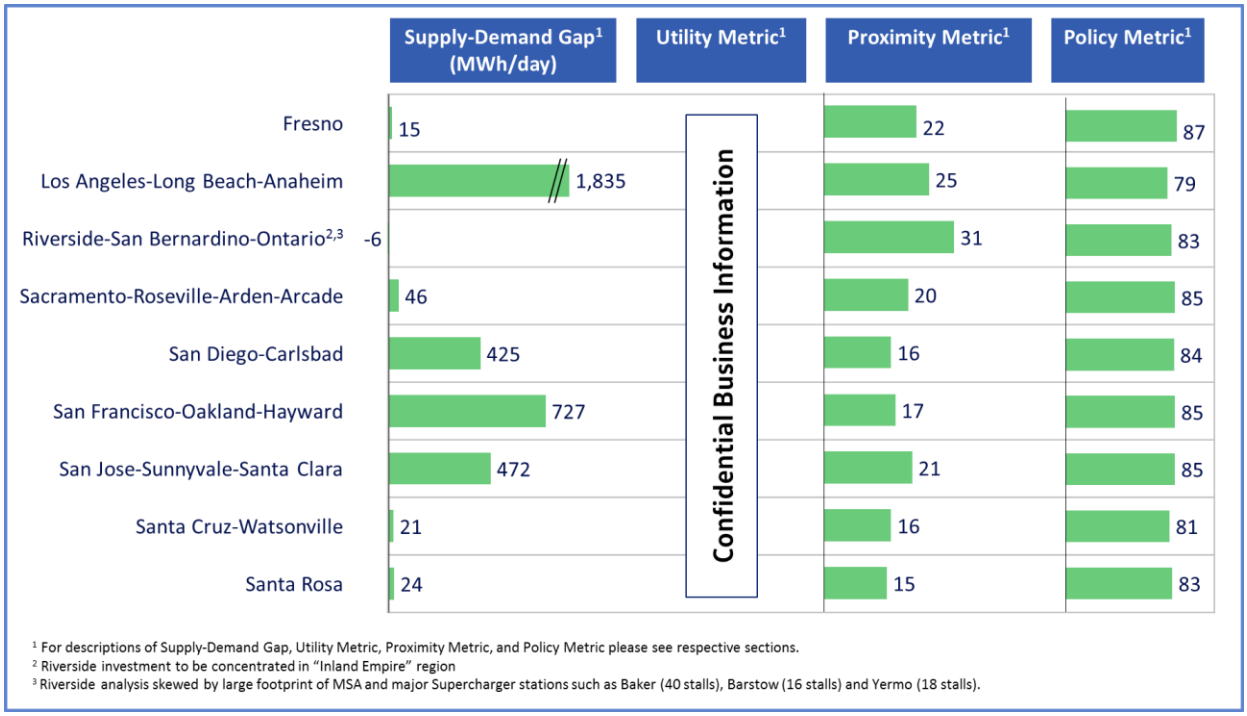
   Top scoring metros on the sales metrics were passed on to the second stage of analysis. This yielded 15 metropolitan areas for further evaluation.

2. The 15 metropolitan areas were then evaluated on their expected needs for charging infrastructure (supply-demand gap, a cornerstone Electrify America methodology established for Cycle 1), the local electric utility costs and collaboration opportunities (utility environment), state and local policies impacting EV adoption (policy environment), and the fit of the metro with Electrify America's broader network (proximity to EA network). For details, see Figure 22 and detailed descriptions of each criteria used below. Electrify America looked qualitatively across each of the four metrics to determine which metropolitan areas showed the greatest potential for investment in Cycle 2.

Through this process, nine metropolitan areas within California were selected for metro community charging investments in Cycle 2. These nine metropolitan areas currently host approximately 80% of the total population of California (ESRI, 2016; U.S. Department of Commerce - Bureau of the Census, 2017), and they are projected to account for 89% of the BEVs in 2022 in California (Navigant, 2017).

Figure 21: Cycle 2 California Metro Map

Figure 22: Cycle 2 California Metros Selected



Supply-Demand Gap[8]

To ensure investments address a reasonably anticipated need and have a high likelihood of utilization, Electrify America used a supply-demand gap in the metro selection process. The projected gap in supply and demand for BEV charging was determined by (1) calculating the projected charging power demand (in MWh/day) for public charging in 2022 outside the home and (2) subtracting the current supply of power delivered by public charging for each metropolitan area. Demand for public charging in a metropolitan area was calculated using the projected number of BEVs in operation by 2022, the average daily vehicle miles traveled as collected by the Federal Highway Administration, the mix of single-family and multiunit homes from the U.S. Census Bureau, and assumptions for vehicle efficiency and the portion of charging occurring at homes. Supply of charging power was estimated using existing charging infrastructure in Recargo's PlugShare database with assumptions made regarding the power level and utilization at each station. Electrify America stations under development as a part of Cycle 1 were added to the charging supply calculations in each metro to provide a more complete

[8] In Cycle 1, Electrify America developed a megawatt-hour supply-demand gap analysis methodology to assess the infrastructure needs for any given geographic area. Through the Cycle 2 planning process, Electrify America shared this methodology with academics and researchers across the ZEV space, including teams from UC Davis, UCLA, NREL, Argonne National Laboratory, Idaho National Laboratory, and more. The methodology largely stood up to academic questioning, and thus Electrify America has elected to use this approach again for Cycle 2. However, specific assumptions and data sets have been adjusted based on stakeholder feedback. For example, during a review in October 2017, the UC Davis team noted that our Cycle 1 methodology used commuting data (travel to and from work) to gauge vehicle miles traveled within a city, but that commuting miles represent just a fraction of total miles. As a result, Electrify America has selected a new dataset that provides a more comprehensive set of miles traveled within a metro area.

picture of future supply.[9] The resulting Supply-Demand Gap is expressed in MWh/day as the projected unmet energy demand, per day, in each metro area.

Utility Environment

The local utility (or utilities) for each Electrify America metropolitan area plays a major role in the stations' long-term success. To date, California utilities have been crucial partners in deploying their infrastructure to bring Electrify America's charging network to drivers across the state. To further optimize Electrify America's infrastructure investments in Cycle 2, this metric identifies the most EV-focused utility environments. An EV-focused utility environment, with utility infrastructure support (such as make-readies), DCFC-specific energy rates, and lower or non-existent demand charges, can have a significant impact on the economics of the station. In addition, streamlined utility processes can accelerate site construction and dramatically lower both capital and operating costs. Markets where these same conditions are not as positive, especially those with high demand peak charges, can make the economics of owning and operating DCFC stations over the long-term particularly challenging. This metric evaluates both the utility costs to operate DCFC stations within a utility territory, as well as the collaboration potential of the local utility. [10]

Policy Environment

State and local policies can have a major impact on ZEV adoption, especially as vehicle technologies mature. In Cycle 1, Electrify America captured the impact of such policies on ZEV adoption within a given metropolitan area by counting the number of policies enacted in each metro. However, policies can have varying impact. For example, purchase incentives and vehicle mandates can have a much larger impact than non-binding sales 'targets.' To better address these nuances, Electrify America collaborated with the National Association of State Energy Officials (NASEO) and Cadmus Group to develop an updated policy metric. NASEO and Cadmus used existing analysis and the input of a panel of ZEV policy experts and practitioners to create a policy tool that ranks and weighs each policy's effectiveness. Policies for each metropolitan area were then aggregated, producing a score which reflects the policy environment in each metro area, and its relative impact on ZEV adoption. For more information on the policy metric, see inset.

Proximity Metric

When considering the purchase of a new vehicle, many buyers look not only at the fueling options within their own metro area, but also on key routes to nearby regional destinations. Over 70% of Tesla drivers cite the existence of the Tesla Supercharger Network as a 'very important' factor in their decision to purchase (Recargo, 2015). Therefore, it is important that Electrify America support not only the local charging needs, but also charging within a reasonable driving radius from home. This metric reflects how many Electrify America highway stations are located within a 120 mile radius of the metropolitan area's borders.

[9] Proposed/planned stations from other EVSE providers were not included due to the uncertainty of location, quantity, and timing of these stations.

[10] For metro areas with more than one primary utility, Electrify America uses a blend of the two utility scores (e.g., Los Angeles MSA has multiple electric utilities, and is largely based on scores from Southern California Edison and Los Angeles Department of Water and Power).

Policy Metric

Electrify America commissioned the National Association of State Energy Officials (NASEO), in partnership with Cadmus Group, to develop the Plug-In Electric Vehicle Policy Tool to evaluate the impact of state and local policies on plug-in electric vehicle (PEV) adoption in states and cities across the United States. The Tool was designed for Electrify America to use when considering potential metro areas for Cycle 2 investment, and allows the user to evaluate the combined strengths and weaknesses of all PEV-related policies in a given metro area on a scale of 1-100 and compare the result with other metro areas.

The Tool provides a unique, evidence-based method to evaluate the ZEV investment climate of a metro area. The Tool's main feature – the Policy Evaluation Rubric – categorizes all PEV policies into six policy categories and 14 policy subcategories. Each policy subcategory is assigned a weight, based on its strength to spur PEV adoption relative to other policies. These weightings were assigned after an exhaustive review of peer-reviewed journal articles, publications from government, non-governmental organizations (NGOs), and the National Academies of Sciences, as well as rounds of expert input from an external Technical Advisory Committee (TAC). Members of the TAC provided input on the project's Policy Tool Methodology and Policy Evaluation Rubric; however the TAC was not shown the proposed Cycle 1 and Cycle 2 investment jurisdictions, and did not partake in reviewing the draft rankings of candidate jurisdictions. TAC members included:

- Jeff Allen, Forth
- Samantha Bingham, Chicago Department of Transportation
- Austin Brown, University of California-Davis
- Tonia Buell, Washington State Department of Transportation
- Stephen Capanna, U.S. Department of Energy
- Gregory Dotson, University of Oregon School of Law
- Robert Jackson, Michigan Energy Office
- Dave Reichmuth, Union of Concerned Scientists
- Michael Samulon, City of Los Angeles
- Christian Williss, Colorado Energy Office

The NASEO team assigned the highest weight to vehicle purchase incentives, followed by PEV deployment targets (including the ZEV mandate) and policies that incentivize EVSE installation and reduce EVSE operational costs. While there is some debate in the literature around the relative effectiveness of these policies, it is the project team's conclusion that these four types of policies represent the most effective policies at advancing PEV adoption.

This Tool was designed for Electrify America in its Cycle 2 investment planning, but may also be used by policymakers at the state and local level to evaluate their jurisdiction's current PEV policy environment. The Tool, as well as a detailed report on the methodology behind it, are available online here: ***https://naseo.org/news-article?NewsID=3321***

3.1.3. Investment Details

Electrify America's metro investments are forecasted to account for $95 - $115 million of the infrastructure investment budget.

Metro Allocations

To split metro funds between the selected Cycle 2 metros, Electrify America considered a combination of factors to appropriately meet the charging needs of communities and ensure the economic viability of the stations. These factors included the supply-demand gap, policy and utility environment, and the overall connectivity of the metro with other significant BEV markets. Electrify America also weighed operational constraints and challenges including real estate availability in areas where they could be identified. Finally, while the size of the supply-demand gap in the largest metro is more than 100 times the size of the gap in the smaller metro areas selected for investment, Electrify America rebalanced its investment to the smaller, emerging EV markets where necessary to provide sufficient charging services in these markets and to support ZEV growth.

Table 6: Cycle 2 California Metros

Metro	Estimated New Station Count[1]
Fresno	1 - 3
Los Angeles-Long Beach-Anaheim	14 - 18
Riverside-San Bernardino-Ontario[2]	2 – 3
Sacramento-Roseville-Arden-Arcade[3]	1 – 3
San Diego-Carlsbad[4]	7 - 10
San Francisco-Oakland-Hayward	8 - 12
San Jose-Sunnyvale-Santa Clara	7 - 10
Santa Cruz	1 - 3
Santa Rosa	2 - 4

[1] Electrify America defines a "metro area" as a Metropolitan Statistical Area, except in a limited set of circumstances where Electrify America determines that the MSA arbitrarily excludes a community that is part of the metro area or includes extremely rural areas within its border. In such cases, Electrify America exerted discretion on metro area boundaries.
[2] Riverside investment to be concentrated in "Inland Empire" region.
[3] Electrify America's Green City investment will install approximately eight stations and 35 DCFC dispensers within the City of Sacramento in Cycle 1. Given the high concentration of this investment within the city, Cycle 2 investments will be targeted at areas outside the city that support the needs of Sacramento drivers.
[4] Electrify America is aware that San Diego Gas and Electric is considering the creation of new rates for EV stations, though none have been proposed to the CPUC. If rates are not revised, business imperatives may lead Electrify America to reallocate stations out of San Diego metro to other California metros during Cycle 2.

Cycle 2 Use Cases:

Retail/Community

The primary use case for metro community charging in Cycle 2 will be retail/community stations. These stations will be sited to primarily serve drivers around town. Within each metro area, specific site selection and station characteristics require integration of multiple inputs. First, Electrify America uses a proprietary geospatial model for identifying "target zones" that

require DCFC infrastructure. While the specific geospatial and demographic criteria used are confidential, Electrify America's framework is generally consistent with those factors identified by Fitzgerald and Nelder in Rocky Mountain Institute's 'From Gas to Grid' (2017) and includes high-traffic retail areas in locations with strong ZEV adoption potential. In addition, Electrify America takes into consideration the distance between existing Electrify America charging stations to ensure its network meets the needs of ZEV drivers throughout a metro region.

Once a target zone or zones have been identified, Electrify America will use a combination of desktop research and on-the-ground resources to identify and screen specific locations within each target zone as leads. Electrify America, like other industry players deploying charging infrastructure, will use site location criteria to optimize charging locations where they are most likely to be highly utilized. While Electrify America's Cycle 2 site location criteria are proprietary and are still being revised, Electrify America anticipates using criteria similar to those used by Pacific Gas and Electric in their "2016 Electric Program Investment Charge" effort, which include:

- Minimum siting conditions (e.g., ADA compliance, paved and level, safe and visible);
- Siting to increase EV adoption (e.g., food for purchase, premium spaces, future capacity);
- Siting to minimize cost (e.g., transformer capacity, distance from transformer, surface materials); and
- Siting for disadvantaged communities (e.g., CalEnviroScreen top PG&E quartile).

Multiunit Dwelling

As discussed in Section 2.2 Infrastructure Learnings, MUDs present numerous challenges to charging electric vehicles. Electrify America will support drivers living in MUDs in Cycle 2 through placement of DCFC sites within close proximity of groups of MUDs. Many of the same criteria from the retail/community use case will be used to site these stations, however, in addition to these data points, Electrify America will analyze MUD proximity and density to target stations at convenient locations to meet the needs of drivers living in MUDs.

Shared Mobility

As discussed in Section 2.2. Infrastructure Learnings, in some metro areas of the U.S. there is an emerging need for charging of electrified shared mobility vehicles. Approximately 30 submissions received through the National Outreach website discussed the topic. For example, the City of New York, stated, "a rapid expansion of public charging infrastructure can enable an increase in the share of ZEVs in the high-mileage taxi and [for-hire vehicle] fleet." The transition of shared mobility to electric is not only driven by stakeholder support and potential emissions reductions, but also by the potential cost savings realized by drivers and passengers – where an EV deployed for shared mobility can provide a lower total cost of ownership than a comparable ICE vehicle today (Fitzgerald & Nelder, 2017). The benefits of these lower-cost and emission free vehicles are poised to most directly benefit disadvantage drivers and passengers, who may not have easy access to cars (Sperling, 2018). While the transition of these vehicles to electric presents numerous benefits, one of the key issues identified when interviewing electric shared mobility drivers is the availability and accessibility of DCFC (House & Fitzgerald, 2018).

Electrify America believes it is crucial that the transition to electric shared mobility comes without compromise to cost or convenience for the driver. To better understand how to conveniently (and economically) serve the needs of these drivers, Electrify America conducted numerous interviews with drivers, discussed challenges and approaches with shared mobility companies and taxi cab commissions, and collaborated on focus groups of current and potential electric shared mobility drivers. This collaboration, outreach, and research revealed that these vehicles often require chargers in specific areas of a city not necessarily aligned with considerations for light duty private use EVs, and thus need separate site location considerations.

To site stations to support these drivers, Electrify America will continue to collaborate with the shared mobility industry, including drivers, taxi companies, airport authorities, city governments, regulatory bodies and digital platform providers such as Lyft and Uber, to select two to three metros from our Cycle 2 metros for investment in shared mobility targeted infrastructure. Metros will be selected based on a combination of factors designed to identify where the need for these investments is emerging, including local regulations, incentives, and support for electrification of shared mobility vehicles. Electrify America has found that many drivers and cities are interested in having their shared mobility vehicles convert to electric, and the State of California has recently enacted legislation (Senate Bill 1014, by Sen. Nancy Skinner) authorizing the Public Utilities Commission to require electrification of some mobility services. However, the most attractive metros for investment are those where policies or partnerships actually assist, accelerate, or require the conversion of the shared mobility fleet.

Shared mobility vehicle charging stations will be sited using a geospatial model that considers some of the same key factors as retail/community stations, including frequently traveled routes and 24/7 access. However, shared mobility vehicles require locations specifically targeted to their unique routes, including stations near transportation hubs and high traffic areas. As a result, Electrify America will work with shared mobility vehicle entities (e.g., drivers, taxis, TNCs) to optimize charging locations for these drivers. At this time, Electrify America plans to dedicate these sites to shared mobility drivers. Electrify America will aim to maximize ZEV adoption for all and will monitor usage to determine whether to allow for partial or complete public access while maintaining an optimal charging experience for all drivers.

Station Design Details

Stations in metro/community charging use cases will typically employ five ultra-fast EV charging dispensers. In areas with particularly high traffic and willing site hosts, stations may have up to 10 dispensers; in areas with real estate constraints, sites may be limited to three dispensers. The typical power level of each station will be 150 kW, but DCFC levels will range between 50 kW and 350 kW depending on site constraints (e.g., utility interconnection limitations, available real estate) and expected usage. All public facing fast charging locations will support both CCS and CHAdeMO connectors. Some Electrify America metro stations may include L2 charging where the site host prefers, and where the business case can be justified. The decision to include L2 charging will be made on a case-by-case and site-specific basis.

Table 7 identifies the expected number of stations by use case.

Table 7: Cycle 2 Metro Investments by Use Case

Metro Use Case	Average Ultra-Fast DCFC Charger Count Per Station	Estimated Number of California Stations
Retail/Community	5	41 - 49
MUD	5	8 – 12
Shared Mobility[1]	5	6 – 10
Upgrades to Support Highly Used Locations[2]	5	10 - 14
Total New Stations		**65 – 85**

[1] If Electrify America is unable to identify a sufficient number of metro areas for the total expected shared mobility charging investments, funds will be invested in other metro charging use cases in Cycle 2 metros.
[2] Electrify America will continually monitor the utilization of the existing metro stations and invest a portion of the metro budget towards either adding additional capacity (including additional chargers and/or energy storage) at an existing metro station or adding an additional site nearby to support BEV drivers' needs in Cycle 2. These site decisions will be made based on utilization data from Cycle 1 through the early phase of Cycle 2.

Select Electrify America sites will also include investments in renewable generation[11] (e.g. solar, wind, hydrogen fuel cell) and storage consistent with CARB's February 2017 guidance document to Electrify America.

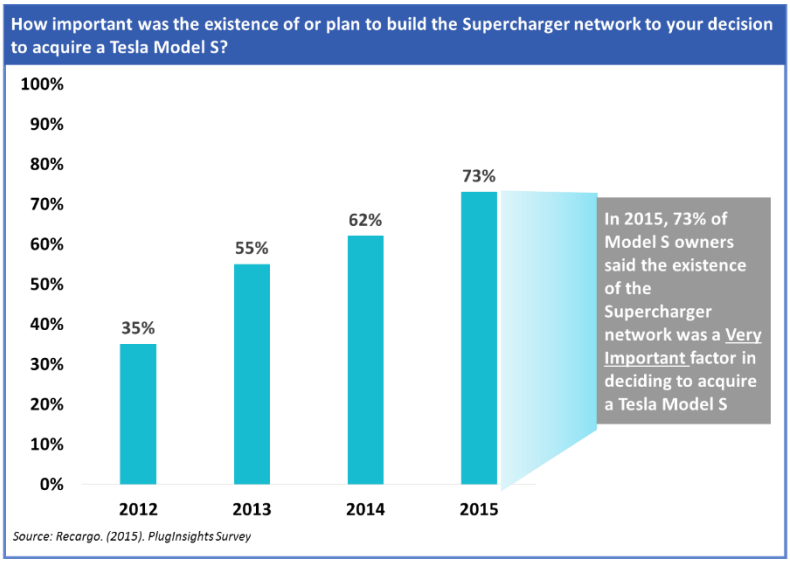
[11] The primary goal of Electrify America's ZEV investments is to support increased adoption of ZEVs in the United States. Fueling BEVs with electricity from renewable sources represents the next step toward zero emissions, and furthers California's emissions reduction goals established in AB 32. In addition to providing cleaner fuel, renewables can improve the customer experience (i.e., they can shade customers from the elements) and support the long-term economic sustainability of a charging site. Electricity costs can account for over 40% of DCFC operating costs. Ensuring public DCFC is affordable for all consumers is a key to attracting potential buyers and ultimately driving mass adoption. Electrify America plans to invest up to $5 million in renewable generation to power its DCFC stations. Electrify America expects that approximately 1-2 MW of renewable generation will be installed, resulting in approximately 1,600-3,800 GWh of electricity produced annually.

3.2. Regional Routes and Highway Investments ($25 - $30 million)

3.2.1. Investment Overview

The second largest category of infrastructure investments in Cycle 2 will be on regional routes and highway corridors. In Cycle 1, Electrify America prioritized the build out of a cross-country network of charging infrastructure focused on highly traveled corridors between major metropolitan areas. In Cycle 2, Electrify America will further enhance the highway corridors outlined in the Cycle 1 California ZEV Investment Plan, while also developing new corridors to support the regional travel needs of drivers in top BEV markets.

Figure 23: Importance of Supercharger Network to Tesla Drivers



A key consideration when purchasing a primary household vehicle is whether it will meet the consumer's long-distance travel needs. When surveyed, over 70% of Tesla drivers cited the existence of the Tesla Supercharger Network as a 'very important' factor in their decision to purchase the vehicle (see Figure 23) (Recargo, 2015). Empirical data also shows that vehicle range and supporting infrastructure have an effect on how a vehicle is used – the Tesla Model S is utilized for 63% of household trips over 200 miles, compared to much lower rates for other smaller battery EVs currently available (Advanced Plug-In Electric Vehicle Travel and Charging Behavior Interim Report, 2017). Considering automotive manufacturers' announcements indicate that the majority of future BEVs will have ranges greater than 200 miles (according to Electrify America analysis), a suitable long distance network is needed to support adoption.

While a nationwide long distance fueling network is critical for supporting ZEV adoption, regional routes address the more realistic driving habits of most drivers. Federal travel data suggests that over 50% of long distance trips (trips greater than 100 miles) are completed within a 200 mile radius of home, and that nearly 80% of all long distance trips are within 300 miles of home (U.S. Department of Transportation, 2016). Several National Outreach Process submissions also mentioned the importance of placing DCFC stations along regional routes. In Cycle 2, Electrify America will focus on building out new regional routes to support the travel needs of drivers in selected metro areas on more localized corridors.

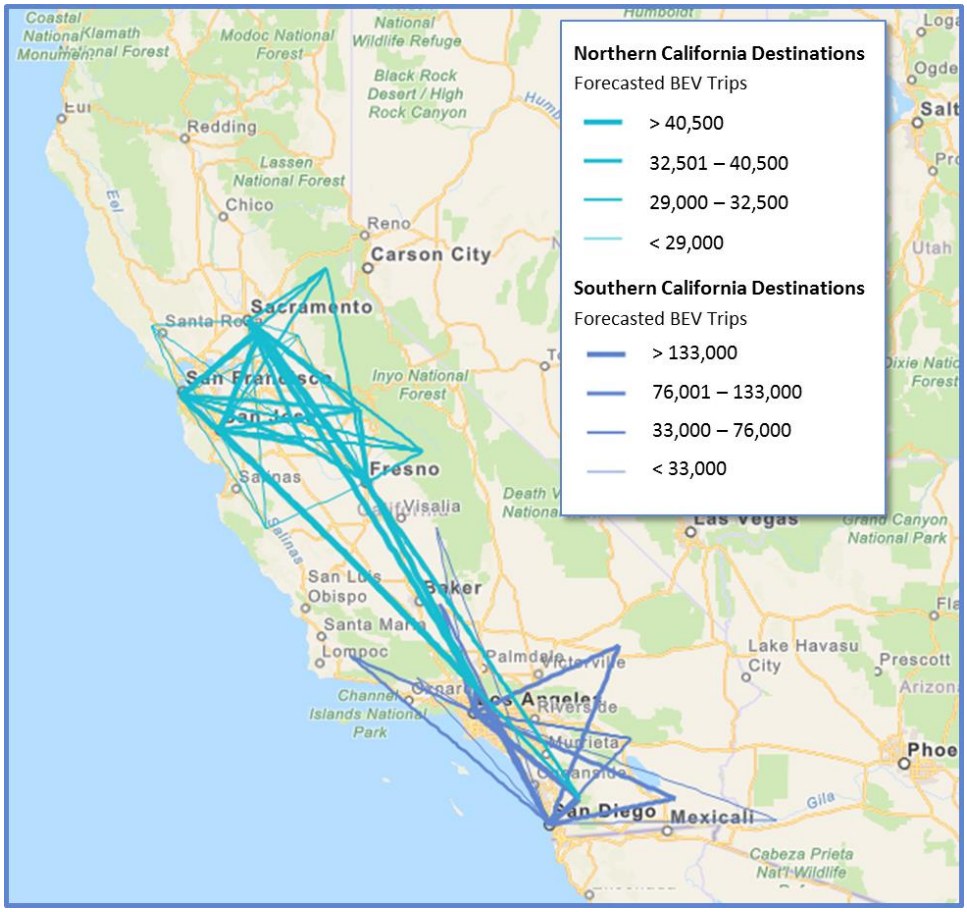
Finally, Electrify America's Cycle 1 investments were intended to meet ZEV driver needs out into the future. However, in the case that existing stations show higher utilization than originally expected and queuing during Cycle 2, Electrify America will add capacity to existing highway routes to ensure sufficient capacity for the growing set of BEV drivers.

3.2.2. Investment Selection Methodology

To ensure our Cycle 2 stations serve the anticipated needs of BEV drivers, Electrify America leveraged a data driven approach to select regional routes for new stations.

Electrify America started by identifying the top BEV markets in California based on Navigant's BEV forecast. These top markets were prioritized to ensure that investments support the needs of the highest number of existing and future EV drivers possible. Electrify America then used federal and state/local travel data (where available from our National Outreach Process) to analyze the long distance travel patterns of drivers from these metros and to identify the most popular travel destinations.[12] The number of vehicles traveling to each destination was then converted to a forecast of BEV travel using Navigant's forecasted BEV penetration at the origin point (see Figure 24). Finally, forecasted BEV travel to common destinations from MSAs within a single region (e.g., Southern vs Northern California) were aggregated to identify the most important routes for EV charging. To finalize the regional routes selected for investment in Cycle 2, destinations were compared to those submitted by the state and municipalities in the National Outreach Process to ensure the geospatial analysis matched local needs.

Figure 24: Top California Long Distance Destination Counties



[12] Travel data allowed visualization of trips from county to county. Specific destinations within each county were identified using National Outreach Process submissions and discussions with local experts.

Figure 25: California Cycle 2 Regional Routes

The regional routes for investment in California are spread throughout the state (see Figure 25). In Northern California, routes were prioritized to support access to Salinas and Santa Cruz, as well as highways north of Oakland through Vallejo. In Central California, Electrify America will support travel to the Sierra Mountain communities and destinations, along with additional travel between communities along Highway 99. Finally, in Southern California Electrify America will add DCFC on CA 101 between Santa Barbara and Santa Maria, will connect Riverside and San Bernardino with the San Diego metro via I-215 and I-15, and will also support travel to Lake Havasu along I-40. In order to ensure that these investments have the greatest impact on ZEV adoption, Electrify America will continue to analyze long-

distance travel data during Cycle 2 and may expand or modify the list of prioritized regional routes to address emerging needs.

In addition to the regional routes being built in Cycle 2, Electrify America will continually monitor the utilization of the existing highway stations and invest a portion of the highway budget towards expanding, or adding, station infrastructure and/or storage where high utilization is evident.

3.2.3. Investment Details

Electrify America's highway investments, including any generation and storage assets, are projected to account for approximately $25 - $30 million of the infrastructure investment budget. Most sites will target light duty vehicles. However, some highway stations may be designed to serve medium- and heavy-duty vehicles where the business case can be justified.

Regional Route Allocations

Funding allocations toward each regional route are based on the number of sites needed to provide travel from Cycle 2 metros to identified destinations. Most sites serving regional routes in Cycle 2 will consist of four chargers (or dispensers), two 150 kW and two 350 kW.[13] The number of sites is determined based on the length of the route, location of existing Electrify America stations, the likely origin of BEVs traveling on the routes, and maintaining a distance of less than 120 miles between stations with consideration for significant changes in elevation.[14] Specific regional routes are identified in Table 8. The total budget for these sites is approximately $8 - $10 million.

Table 8: Cycle 2 Regional Route and Corridor Investments

Regional Route Highway	Estimated Station Count
CA-29 North of Oakland through Vallejo	2
CA-120 / CA-41 to Sierra Mountains	2
CA-1 / CA-101 Salinas to Santa Cruz	1
CA- 99 Fresno to Modesto	1
CA-101 Santa Barbara to Santa Maria	1
I-40 Barstow to Needles	1
I-215 / I-15 Riverside to San Diego	1
New stations and/or upgrades to Existing Routes Demonstrating High Utilization	6 – 10
Total	**15 – 19**

Select Electrify America sites will also include investments in renewable generation[15] (e.g. solar, wind, hydrogen fuel cell) and storage consistent with CARB's February 2017 guidance document to Electrify America.

[13] The high powered chargers Electrify America is currently deploying are a mix of 350kW and 320kW, but Electrify America anticipates being able to increase power levels through upgrades over time. Maximum charging power levels are limited by vehicle capabilities, safety protections, and the charging protocols' technical specifications.
[14] On rare occasion, Electrify America must extend the distance slightly beyond 120 miles to account for significant siting constraints including available real estate, utility connections, etc.
[15] See footnote 11.

Supporting the Highway Network with continued investments

To support the highway investments made in Cycle 1, Electrify America anticipates some routes in its highway network will demonstrate utilization which requires additional investment to meet driver needs and avoid crowding or queuing. Approximately $6 - $10 million will be dedicated to supporting the existing highway network by either adding additional capacity (including additional chargers and/or energy storage) at an existing highway station or adding an additional site along a highway route to support BEV drivers' needs in Cycle 2. These site decisions will be made based on utilization data from Cycle 1 through the early phase of Cycle 2.[16]

[16] If utilization at stations on Cycle 1 and Cycle 2 routes does not demonstrate sufficient utilization to warrant additional investment, this budget will be reallocated to other approved Cycle 2 use cases.

3.3. Residential ($8 - $12 million)

3.3.1. Investment Overview

Residential or "home" charging is a critical element of the EV ecosystem. According to the Department of Energy's Office of Energy Efficiency & Renewable Energy (EERE), over 80% of charging happens at home. EV drivers also rave about the convenience of home charging – Clean Technica's 2015 study entitled "Electric Cars: What Early Adopters and First Followers Want," found convenience of home charging is one of EV drivers' top 5 favorite things about their electric vehicle. NREL's "The Barriers to Acceptance of Plug-in Electric Vehicles: 2017 Update" echoes this sentiment, noting that EV drivers that do have the ability to charge at home are more likely to report positive sentiments about PHEVs and EVs.

However, the costs of residential charging can increase the up-front cost of purchasing an EV, and therefore can be a deterrent to EV adoption. According to EERE, L2 residential installations can range from $500 to $2,000, depending on the equipment installed and the existing electrical infrastructure. Many utilities within California offer credits to offset a portion of this cost (typically up to $500), but the remaining amount, plus the complexity of identifying and applying for these offers, can present a barrier to EV adoption.

Electrify America plans to address these barriers through an integrated set of programs. First, Electrify America will build a user friendly web tool that promotes L2 residential charging and helps EV drivers take advantage of existing offers which reduce the cost of home charging. Electrify America envisions this as a user friendly online tool that provides a simple and intuitive way to identify and apply for the many existing residential EV charging incentives for Californians. Second, Electrify America will offer customers a no-money-down L2 charger and installation.[17] This will allow EV drivers who are unable or who are reluctant to cover the up-front costs of home charging to adopt EVs and pay for the charger over time. Finally, consistent with CARB guidance that Electrify America prioritize investments that serve as an asset to the power grid (Corey, 2017), Electrify America is developing a 'demand response' platform for drivers on the Electrify America network to realize even greater fuel savings. Participating drivers will receive rewards for plugging in at home and allowing Electrify America to manage their daily charging needs.

Through the combination of these three offers, Electrify America expects to reduce a significant barrier to EV adoption for the next generation of drivers and to enable more users to experience the convenience and economic benefits of home charging.

3.3.2. Investment Details

Electrify America's residential investments are projected to account for $8 to $12 million of the infrastructure investment budget. Please Note: if for any reason Electrify America is unable to identify sufficient investments to meet the $8 to $12 million budget by June 2020, any remaining funds will be redistributed to other approved use cases in order to ensure Electrify America meets the spending requirements of the Partial Consent Decree.

[17] Offer may be subject to specific cost thresholds.

Charger Incentive Simplification Tool (~$1 to $2 million)

Electrify America's charger incentive simplification tool will be designed to dramatically simplify the process of identifying and applying for existing home charging programs. This tool will integrate the wide variety of home charger incentives within California, including those from utilities and air quality management districts. Electrify America plans to integrate its tool with the 'One-Stop-Shop' tool for low-income car buyers that will soon be built as a result of funds provided by Volkswagen to address barriers to ZEV adoption in low-income communities. While Electrify America's tool will be designed to help low-income buyers as well, the tool will be available for use by all buyers throughout the California market.

No-Money-Down Residential L2 (~$6 to $8 million)

The no-money-down residential L2 offer will help EV drivers obtain and install a L2 charger in their homes at no upfront cost. To take advantage of this offer, drivers will navigate to Electrify America's website and will be able to sign up for the program. Electrify America will then schedule a qualified installer to come install a charger at the driver's home.[18] Once the charger is installed, Electrify America currently anticipates that it will own, operate, and maintain the charger.[19] The customer will pay a moderate fee for use of the equipment, as Electrify America customers pay for public charger access. However, after a period of time to be established by contract terms, the charger will become the customer's asset. For those participants that qualify for financial incentives from utilities or other programs, these incentives may be used toward reducing the size or duration of monthly payments.

Based on current estimates, Electrify America expects to fund between 2,500 to 3,300 L2 home chargers.[20] Program funding will support the L2 hardware, in-home installation, retail "web shop" for selling the product, software, and customer support necessary to deliver a complete product. Please note that while this offer will be targeted at the residential marketplace, Electrify America may expand to offer the same or similar L2 charging in workplaces during Cycle 2.

Demand Response (~$0.5 to $2 million)

Electrify America seeks to reduce the costs of EV charging and provide positive benefits to the electrical grid by developing a demand response program for its L2 residential customers. With customer consent, Electrify America will modulate charging timing and power level to best synchronize its customers' charging needs with the needs of the grid using a Wi-Fi-connected charger. In turn, Electrify America will aggregate the load of all its customers within a given region and sell the electric utility capacity to 'shed' or reduce this load when demand on the grid is highest. This 'demand response' mechanism benefits all Californians by reducing the cost of electricity across the grid, and by

[18] Offer is limited to EV drivers with a circuit panel and associated electric meter dedicated to their residence (not shared), as well as a dedicated parking spot. Renters will qualify for the program, but will be required to secure permission from the property owner to install a home charger on the property.

[19] The technical specifications of this L2 charger will be finalized after the completion of a competitive RFP by Electrify America.

[20] Today, most L2 residential offers require the customer to purchase the charger up front. As a result, this product is relatively unique and forecasts of customer uptake are uncertain. Actual units delivered may deviate substantially from estimates based on demand from drivers.

reducing the need to build or operate peaking generation facilities. The utility also pays compensation for this 'demand response' capacity, and these savings will be shared with participating drivers.

To ensure drivers maintain sufficient battery state of charge and are able to charge at critical times (e.g., the day before a big trip), Electrify America will allow drivers to input preferences and opt in/out for specific times. However, the more participants that opt in, the more the capacity is worth to electric grid operators and the more savings participants can earn. This program has no limit to the number of potential participants – in fact, the more participants in the program, the bigger the savings and the impact.

3.4. Bus and Shuttle Charging ($4 - $6 million)

3.4.1. Investment Overview

Zero emission buses, and in particular battery electric buses, are a rapidly growing piece of the U.S. and global transit fleet. By 2030, Bloomberg New Energy Finance (O'Donovan, 2018) projects 84% of all municipal bus sales globally will be electric. In California, many local transit authorities already have zero emission goals, including commitments by Los Angeles Metro, the Los Angeles Department of Transportation, and Foothill Transit to convert 100% of their fleets (approximately 3,200 buses) to electric by 2030 (Californians for Zero Emission Vehicles). Submissions to Electrify America's National Outreach website also reflected a strong desire to adopt ZEV buses, with more than 10 submissions describing existing or new initiatives. As just one example, The University of California Transportation Working Group expressed interest in converting campus transit fleets to EVs. Electrify America anticipates that the pace of ZEV transit bus deployment in California will increase if CARB finalizes its proposed Innovative Clean Transit regulation.

Zero emission buses also can make a significant impact in greenhouse gas reductions. In his book, "Three Revolutions" (2018), Daniel Sperling writes, "buses in the United States on average have higher greenhouse gas emissions than cars per passenger mile." However, battery electric buses have much lower life cycle emissions than their fossil fuel counterparts. According to the 2018 National Academy of Sciences paper "Battery Electric Buses State of the Practice," "life cycle global warming emissions [of battery electric buses] are almost 75% less than CNG and diesel buses. Further, [battery electric buses] produce significantly lower NO_x emissions than diesel and CNG buses and lower life cycle particulate matter emissions than diesel…." Electrification of these buses will primarily benefit priority and sensitive populations who more heavily rely on this form of transportation, including children and those without access to a personal vehicle. To address these zero-emission needs and support the broader goals of the ZEV Investment Commitment and CARB, Electrify America plans to invest $4 to $6 million in electric vehicle charging infrastructure for transit buses in California.

3.4.2. Investment Selection Methodology

Specific investments within the electric bus fueling infrastructure space are highly dependent on the needs and timing of local transit agencies. It is nearly impossible to pinpoint specific locations or investments far in advance of committing funding for these projects. Therefore, to fulfil this investment commitment, Electrify America plans to work with transit agencies and bus fleet operators over the course of Cycle 2 to identify upcoming purchases of electric buses and any associated charging needs.

Electrify America will then collaborate with the relevant transit agency to develop a business model that meets all parties' needs. Electrify America's dual goals are to promote ZEV adoption and to develop a long-term sustainable business. A pure 'grant' style of funding support would fulfil the first goal, but would not represent a business investment sustainable for the long-term. To ensure both goals are addressed, Electrify America will work with our transit partners to develop an investment structure, revenue model, and station ownership structure that meets the transit agencies' needs and also and achieves Electrify America's goals, consistent with the requirements of the ZEV Investment Commitment and the Creditable Cost Guidance. In those areas where funding for electrical infrastructure and make readies is available from the local utility, Electrify America will also collaborate with the utility to maximize overall investment impact.

3.4.3. Investment Details

Electrify America's Bus and Shuttle Charging infrastructure investment will be heavily shaped by the specific needs of each transit authority. Therefore, bus and shuttle charging investments are projected to account for approximately $4 to $6 million of the infrastructure investment budget. Electrify America understands that to date, most transit authorities require one DCFC per electric bus in the depot, and that charging power requirements for those buses can range from 50 – 150 kW depending on the dwell time of the bus. Electrify America has also heard from transit agencies that energy management is a critical element for electric bus adoption. Selecting from a range of electric rates, managing demand charges and time of use pricing, and balancing load across a fleet of buses all have a significant impact on the fuel cost and ultimately on the total cost of ownership of the buses. If required, Electrify America may also invest in energy management solutions to meet the needs of transit authorities and ensure they can smoothly and successfully convert their fleets.

Given the project-based nature of this investment, costs and charger counts are difficult to estimate. However, based on information to date, a $4 - $6 million investment could look like the following in Table 9:

Table 9: Cycle 2 Bus and Shuttle Charging Investment

Charger Power Level	Estimated Charger[1] Count
50 kW	50
150 kW	15
Total	**65**

[1]Given the project-based nature of this investment, the estimated number of stations is highly uncertain. To provide transparency, Electrify America has opted to present an estimated number of chargers for this use case rather than an estimated station count.

Please Note: if for any reason Electrify America is unable to identify sufficient investments to meet the $4 - $6 million budget by June 2020, any remaining funds will be redistributed to other approved use cases in order to ensure Electrify America meets the investment requirements of the ZEV Investment Commitment in the Partial Consent Decree.

3.5. Rural Community Charging (~$2 million)

3.5.1. Investment Overview

A frequent request from California stakeholders during Electrify America's outreach efforts was to support ZEV adoption in rural communities. Stakeholder meetings in Fresno and Bakersfield uncovered a need for more charging stations to support local transportation. This request was reiterated by The Greenlining Institute, Communities for a Better Environment, Central California Asthma Collaborative, Coalition for Clean Air, The Center for Energy Efficiency and Renewable Technologies, Union of Concerned Scientists, Valley Latino Environmental Advancement Project (LEAP), Valley Clean Air Now (CAN), Natural Resources Defense Council, Sierra Club California, Leadership Counsel for Justice and Accountability, and the Liberty Hill Foundation in an April 2018 letter. In particular, L2s were identified as a preferred mode of charging because they are typically lower cost and would offer a more acceptable price point for local communities. These groups prioritized health centers and educational institutions, as these sites are frequently visited and also offer extended hours of access.

Electrify America also received guidance on rural charging through its National Outreach Process. The Northwest California ZEV Readiness coalition encouraged investment in California's rural regions, writing in their submission that this funding "provides economic activity for many communities that are underserved in public and private investment in ZEV technology. Funds for rural infrastructure facilitates inter-regional travel and drives adoption of ZEVs in historically disadvantaged communities." EV Advocates of Ventura County echoed the need for rural charging, though they recommended trying new business models including developing full-service fueling stations (with bistro, valet service, ride hailing, etc.) to improve overall site economics.

While Electrify America's regional route and highway investments will provide connectivity and support to these historically underserved communities, in Cycle 2, Electrify America will implement a pilot program to invest in L2 charging sites in California's rural areas, including, but not limited to, the Central, Imperial, and Coachella Valleys. The ongoing financial return on investment of this program is uncertain, but this pilot program will provide Electrify America with an opportunity to identify a sustainable long-term business model to deploy L2 charging in rural and underserved communities. Stations will be targeted at educational and health care institutions, which the Department of Energy has found to be frequently associated with early adopter populations (Ryder and Lommele, 2016) (Giles, et. al., 2016), with site host permission. The chargers will be maintained by Electrify America for the duration of the Partial Consent Decree.

3.5.2. Investment Selection Methodology

Rural infrastructure investments will be targeted toward communities in California's rural areas including, but not limited to, the Central, Imperial, and Coachella Valleys. To select specific locations for rural Cycle 2 investments, Electrify America will analyze the following factors:

1. Communities and locations with the greatest need for charging
2. Existing charging options from both public and private charging networks
3. Local commuting and travel patterns
4. Real estate availability and cost
5. Existing site infrastructure

6. Installation costs
7. Parking durations (facility dwell times)
8. Parking lot/facility utilization, especially during nonstandard business hours (24/7)

Electrify America will size the stations at each location based on anticipated local demand and site-specific considerations.

3.5.3. Investment Details

Electrify America will deploy L2 stations in rural communities. The total budget for this pilot program will be approximately $2 million (see Table 10). Typical stations will have 5 dispensers with power levels between 6-10 kW which is expected to support approximately 175 – 225 L2 stations across more than approximately 35 sites.[21] Consistent with Electrify America's guiding principle to focus on a sustainable business model, this pilot program will allow Electrify America to gain insights that may be leveraged to sustainably deploy additional L2 charging in rural communities across future cycles of investment.

Table 10: Cycle 2 Residential Investment

Investment	Estimated Number of Stations
Rural L2 Stations	35 - 50
Total	**35 – 50**

[21] Actual station site and power level will be dictated by site-specific real estate availability and available power.

3.6. Autonomous Vehicle Charging ($2 - $4 million)

3.6.1. Investment Overview

The automotive industry is in transition as vehicle ownership models are being challenged by disruptive mobility alternatives. The next generation of potential automotive buyers are taking advantage of new mobility services (ride hail, car share, public transit), and the industry is becoming focused on the potential of new mobility choices. These trends can be summarized as Autonomous, Connected, Electrified, Shared (ACES) (INRIX, 2018), or as vehicle electrification, vehicle automation and pooling, and sharing (Sperling, 2018). In addition, recent announcements regarding autonomous vehicle deployments in Long Beach, San Francisco, and Sacramento are examples of how quickly charging for autonomous vehicles could emerge as a new infrastructure need (Rodd, 2018; Knight Foundation, 2018).

While Electrify America is generating learnings in shared mobility programs through investments in the Green City Initiative in Sacramento, there are further learning opportunities associated with supporting autonomous service providers using electrified fleets. Accordingly, in Cycle 2, Electrify America is looking to partner with autonomous vehicle service providers to support their programs with autonomous charging solutions.

3.6.2. Investment Selection Methodology

Electrify America plans to partner with an existing autonomous vehicle company or companies to build an autonomous vehicle charging station(s) in a market where such a station(s) is necessary to serve emerging needs. As the autonomous fleet providers are subject to California legal limitations as to where they are able to operate their programs, Electrify America investment in this area will be subject to such location-based limitations.

3.6.3. Investment Details

Electrify America anticipates that two separate stations can be supported by this $2 to $4 million infrastructure investment. Hardware deployed at the station (e.g., robotic arm) will depend on the available charging technology as well as the OEM vehicle capabilities in the market during Cycle 2.

Please note: if for any reason Electrify America is unable to identify sufficient investments to meet the $2 to $4 million budget by June 2020, any remaining funds will be redistributed to other approved use cases in order to ensure Electrify America meets the spending requirements of the Partial Consent Decree.

3.7. Hydrogen and Other Unanticipated Investments

The National Outreach website received over 700 submissions, 17 of which discussed hydrogen solutions for investment in Cycle 2. Eight submissions came from hydrogen advocacy organizations or companies in the hydrogen and/or fuel cell business. Of the nine remaining submissions, five were from government agencies, which recommended deploying hydrogen fueling infrastructure. For example, Plug-in Central Coast recommended Cycle 2 funding for a hydrogen fueling station to fill a gap in the current station network. In addition, three government agencies recommended a focus on medium- and heavy-duty hydrogen applications, including at ports. One transit agency (San Diego Metro Transit System) noted interest in ZEV technology, to include either battery electric or hydrogen buses.

Electrify America examined Cycle 2 investment opportunities in both hydrogen production and retailing, for light- and heavy-duty usage, and to date, has not identified concrete investment opportunities that can be made during the Cycle 2 investment window, which lead to a sustainable business model. In the submission request process, Electrify America emphasized that it was seeking investment ideas and opportunities during Cycle 2, and communicated that grant requests are not considered investments. Electrify America followed up with each submitter to discuss their suggestions, and in each case Electrify America reiterated its request for a specific investment opportunity to evaluate in either hydrogen production or hydrogen fueling stations. Electrify America had extremely informative and productive conversations with each submitter, and Electrify America also followed up with leads suggested by submitters, major automakers, major station investors, and industry experts at the Department of Energy. Unfortunately, despite this outreach and follow up, Electrify America did not receive specific investment proposals to consider.

Electrify America also conducted its own in-depth study of the hydrogen fuel production and delivery value chain, in order to determine whether an investment could be justified economically during Cycle 2.

Electrify America will continue to accept and evaluate investment (not grant) opportunities in hydrogen fueling throughout Cycle 2. Should any party present to Electrify America a specific, creditable, and sustainable investment in hydrogen fueling or any other eligible ZEV infrastructure as defined by Appendix C of the Partial Consent Decree, Electrify America will investigate the opportunity and consider it for investment in Cycle 2. Any new investment would reduce the budget dedicated to the above described infrastructure use cases in favor of the new effort. Electrify America would inform CARB staff of any reallocation of Cycle 2 funding to new ZEV infrastructure use cases not included in the Cycle 2 California ZEV Investment Plan.

3.8. Infrastructure Investment Timeline and Milestones

Through implementing the Cycle 1 ZEV Investment Plans, Electrify America has acquired extensive experience deploying DCFC and L2 stations across the country. In Cycle 2, Electrify America will leverage this experience to ensure an efficient and effective roll-out of the infrastructure investments outlined in this plan. Developing any charging site, and especially a high-powered DCFC site with several chargers, is an extensive and time intensive process involving multiple steps and the coordination of numerous parties including real estate owners, hardware vendors, construction contractors, utilities, and permitting agencies. The key steps necessary to develop each DCFC charging location, once a site has been secured, are outlined below:

- Ordering equipment
- Development of new property leads
- Validating the suitability of multiple property leads per site
- Negotiation and signing of lease or license agreements (or, where appropriate, purchasing property)
- Development of permitting/pre-construction packages
- Filing permits
- Warehousing equipment and quality assurance/quality control
- Permit approval
- Site preparation
- Equipment delivery to site
- Completion of site construction
- Landscaping
- Utility connection to the grid/inspection and any additional utility preparation including new transformers or upgraded substations
- Commissioning

The length of time needed to develop a charging location can vary significantly based on available real-estate, site characteristics, utility capacity, local permitting agencies, easements, and other geographic and business factors. Electrify America has already established an extensive list of major real-estate partners, which will aid in reducing the overall time necessary to identify charging sites in Cycle 2. In addition, Electrify America has established relationships with many local utilities and permitting agencies, allowing both parties to become more familiar with Electrify America's infrastructure approach, while also improving Electrify America's understanding of local processes. These relationships and learnings can make station development more predictable and streamlined over time.

Continuing a practice already begun in Cycle 1, Electrify America will work closely with California state agencies, including the Governor's Office of Business and Economic Development, the California Department of Transportation, the California Energy Commission, and the California Public Utilities Commission, to improve charging infrastructure planning and deployment, to identify station site leads, and to improve processes such as permitting, easements, and other factors that slow down charging infrastructure installations. State agencies will play a critical role in enforcing AB 1236, which requires all local jurisdictions to establish expedited permitting for EV charging stations. These conversations also help identify other charging infrastructure programs or private/public funding opportunities that could be leveraged with Electrify America's investments to further increase the net funding in infrastructure.

Considering learnings from Cycle 1, Electrify America plans to begin development of the first Cycle 2 stations as soon as the Cycle 2 California ZEV Investment Plan is found to be consistent with the Partial Consent Decree by CARB. If this determination is made prior to the start of Cycle 2, Electrify America will be able to conduct new RFPs, negotiate contracts, place orders for equipment, secure sites, and begin other key development activities in advance of the beginning of Cycle 2. Based on this schedule, by the end of 2019 the first Cycle 2 sites are expected to be online, with many additional Cycle 2 sites well on their way through the development stage. Tables 11 through 15 illustrate the anticipated preliminary roll-out schedule for infrastructure sites across the different infrastructure use cases in Cycle 2.

Deployment of the rural, residential, and bus infrastructure will take place throughout Cycle 2. Upon plan approval, RFPs will be issued to select key vendors to support the execution of these investments, including hardware acquisition, software development, and installation partners. Electrify America will make every effort to execute these use cases in an accelerated manner in Cycle 2, while paying close attention to maintaining high quality and adhering to Electrify America's guiding principles.

The deployment schedule of the rural community charging investments, similar to other charging station deployments, is primarily contingent upon site acquisition. Once a site is acquired, the next largest variable is whether or not there is enough utility capacity at the site to support the additional load added by the charging stations. A site with enough existing utility transformer capacity to support the added load) can take between one and two weeks to construct (depending on the amount of trenching required). If utility transformer upgrades are required, a site can take upwards of one month to construct after site acquisition.

The residential investment schedule will be primarily driven by customer uptake once the necessary website portals and software have been developed. Electrify America currently anticipates being able to initiate the residential offering to customers beginning in early 2020, but will accelerate this timing as much as feasible as software development timelines are further clarified.

Bus and shuttle charging investments will similarly be driven by customer uptake. This investment will entail participation in transit procurement processes and the timing associated with bidding into those processes. Upon plan approval, Electrify America will rapidly begin identifying and participating in electric bus and shuttle procurement processes.

Table 11: Cycle 2 California Preliminary Infrastructure Deployment Schedule – All Sites

Cycle 2 Infrastructure Investments[1]			
Quarter	**Pre-site selection**	**In development**	**Operational**
Q4 2019	1,920 – 2,600	680 - 850	5 - 10
Q2 2020	1,300 – 1,730	670 - 850	635 - 880
Q4 2020	620 - 890	670 - 850	1,315 – 1,720
Q2 2021	0 - 0	670 - 850	1,935 – 2,610
Q4 2021	0 - 0	0 - 0	2,630 – 3,460

[1]Excludes Bus and Shuttle Charging schedule, see table below

Table 12: Cycle 2 California Preliminary Infrastructure Deployment Schedule - Metro Community Charging and Regional Route and Highway Sites

Cycle 2 Metro Community Charging and Regional Route and Highway Investments			
Quarter	Pre-site selection	In development	Operational
Q4 2019	40 - 50	10 - 20	5 - 10
Q2 2020	30 - 40	10 - 20	10 - 20
Q4 2020	10 - 20	10 - 20	30 - 40
Q2 2021	0 - 0	10 - 20	45 - 60
Q4 2021	0 - 0	0 - 0	~80

Table 13: Cycle 2 California Preliminary Infrastructure Deployment Schedule - Residential Sites

Cycle 2 Residential Sites			
Quarter	Pre-site selection	In development	Operational
Q4 2019	1,850 – 2,500	650 - 800	-
Q2 2020	1,250 – 1,650	650 - 800	600 - 850
Q4 2020	600 - 850	650 - 800	1,250 – 1,650
Q2 2021	-	650 - 800	1,850 – 2,500
Q4 2021	-	-	2,500 – 3,300

Table 14: Cycle 2 California Preliminary Infrastructure Deployment Schedule - Bus and Shuttle Chargers

Cycle 2 Bus and Shuttle Chargers			
Quarter	Pre-site selection	In development	Operational
Q4 2019	10 - 15	5 - 10	0 – 0
Q2 2020	5 - 10	5 - 10	5 – 5
Q4 2020	0 - 5	5 - 10	10 - 10
Q2 2021	0 - 0	5 - 10	10 - 15
Q4 2021	-	-	15 - 25

Table 15: Cycle 2 California Preliminary Infrastructure Deployment Schedule - Rural Community Charging Sites

Cycle 2 Rural Community Charging Sites			
Quarter	Pre-site selection	In development	Operational
Q4 2019	26 - 38	9 - 12	0 - 0
Q2 2020	17 - 26	9 - 12	9 - 12
Q4 2020	8 - 14	8 - 12	18 - 24
Q2 2021	0 - 0	8 - 14	26 - 36
Q4 2021	0 - 0	0 - 0	35 - 50

Electrify America's Cycle 2 DCFC roll-out strategy includes two major phases. In Cycle 1, Electrify America deployed the first UL Certified 150 kW and 350 kW DCFC stations in the United States. These first-of-their-kind stations provide drivers the capability to refuel up to 20 miles of range for every minute charging,[22] along with universal driver access through credit/debit card readers and a simplified and intuitive charging experience presented by a 15-inch touch screen display. In Phase 1 of the Cycle 2 roll-out, Electrify America will leverage this existing station design to increase the coverage of the Electrify America network. In Phase 2, Electrify America will monitor emerging technology developments and will consider adjusting hardware design and strategy, taking into account lessons learned and customer feedback regarding the original design. This two-phase approach will allow Electrify America to rapidly increase the convenience of charging BEVs, while also allowing for longer-lead times necessary to modify station designs and acquire sites in more challenging areas.

In Cycle 2, Electrify America will continue to rely upon the capabilities and innovations of an extensive group of experienced suppliers to support the deployment of charging infrastructure. Electrify America will engage in a competitive procurement process to select vendors as necessary to meet the build-out schedules for Phase 1 and Phase 2 of the Cycle 2 schedule. This process will consist of issuing inclusive Requests for Information (RFI) and Requests for Proposals (RFPs) to support activities such as site identification, site development, and procurement of both current and newly designed charging equipment. This procurement process is expected to begin by Q1 2019 and run through Cycle 2.

[22] Assumes 3.5 miles per kWh.

3.9. Maintenance Plan for Infrastructure

Electrify America's mission to build a comprehensive, technologically-advanced and customer-centric charging network requires that equipment be maintained to industry-leading standards, customer support is available when needed, and stations are repaired in a timely manner when issues occur. Regardless of whether maintenance is performed in house or by a contractor, Electrify America has ensured contractual requirements to reasonably resolve issues with all stations within a maximum of 72 hours.

To meet these expectations, Electrify America conducted a competitive bid process and selected a vendor to provide maintenance for all Electrify America DCFC stations nationwide. This agreement includes routine preventative, campaign, and emergency maintenance for all stations through the contract period. Prior to the conclusion of the contract, or as necessary, Electrify America will solicit competitive bids to ensure no lapses in maintenance coverage for 10 years from the Partial Consent Decree effective date. In addition, all Cycle 2 stations will be marked with a toll-free customer service hotline. Should a customer encounter any issues fueling at an Electrify America station, the 24/7 Customer Contact Center will be available to provide support. Agents and operators have access to real-time station status information and can perform tasks such as reviewing unit performance history, initiating a charge, resetting a charger, or other issue resolution tasks.

Customer experience will be the top priority as Electrify America launches new L2 initiatives in Cycle 2. To support charger availability and customer satisfaction at Electrify America's L2 charging investments, Electrify America will ensure that each Cycle 2 funded station is marked with a toll-free customer service phone number answered by a live operator and that service, maintenance, and repair are provided in a timely manner.

3.10. Pricing, Interoperability, and Open Access

Broadly speaking, Electrify America intends to own and operate most of its ZEV infrastructure investments, though some investments may be handled under different ownership/operating structures as required for specific locations and use case needs. At those stations for which Electrify America operates the infrastructure, pricing will be a function of inputs including utility costs, station capital and operating costs, competitor pricing for subscription and rack rate products, and gasoline equivalent prices. Electrify America will set and adjust prices as required to reflect these inputs and drive toward a sustainable business model that always offers fair and reasonable value given our optimal charger utilization targets.

To maximize public access to its network of charging stations, Electrify America stations will continue to have the ability to charge plug-in EVs using a mix of non-proprietary connectors used by multiple automakers. Specifically, public facing DCFC stations will utilize CCS and CHAdeMO non-proprietary charging standards, while L2 stations will utilize the universally accepted J1772 connector. Throughout Cycle 2, Electrify America will continue to monitor the developing market of non-proprietary connectors to determine which types of connectors and mix should be deployed as technology and sales evolve.

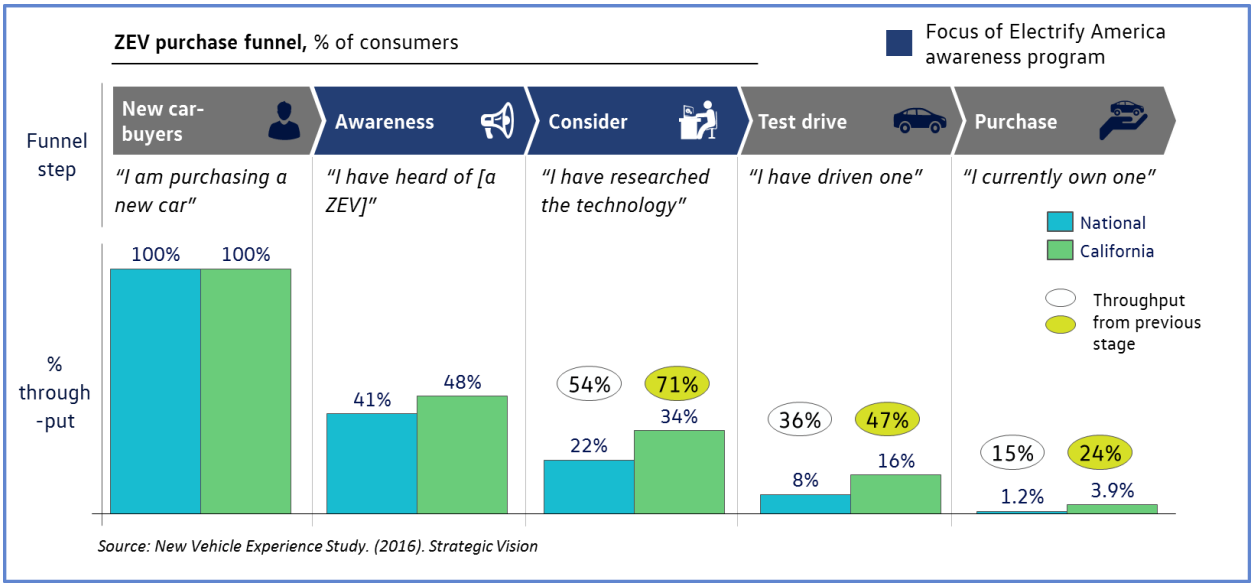
Electrify America will also support open protocols including Open Charge Point Protocol (OCPP) that allow more standardized communication between different chargers and networks. Electrify America will also work to maintain OCPP compliance and other measures to help maximize interoperability, a term that describes the ease of communication between the charger and the network it is on. Electrify America's public DCFC stations are all equipped with credit/debit card readers, and Electrify America believes that true access to charging stations is best guaranteed through credit card readers. In addition, Electrify America's public stations will be equipped with back end systems that can use Open Charge Point Interface (OCPI) 2.1 to communicate with other networks, when a business agreement is secured. Electrify America continues to pursue agreements with other network providers, and supports CARB's regulations focusing on a common, non-proprietary communication interface that does not require use of any particular firm's intellectual property or mandate contractual terms among private sector actors. Electrify America's network of ultra-fast chargers will also have the ability to accept multiple payment methods (e.g., subscriptions, mobile pay, RFID, credit cards, and "Plug-and-Charge" standardized in IEC/ISO 15118) to simplify usage as much as possible across a range of buyers. Through the support of multiple charging standards, the ability to accept multiple payment methods, and a strong focus on publicly-accessible infrastructure, Electrify America will be building a highly interoperable network that provides access to as many consumers as possible.

4. Public Education, Awareness, and Marketing Activities

To complement the infrastructure portion of its ZEV investments, Electrify America will also roll out a broad set of education, awareness, and marketing programs in Cycle 2. The effort consists of media and tools from across the marketing spectrum including traditional media (e.g., TV, radio, billboards, etc.) as well as more targeted efforts including 'Discover and Drive' events and 'new media,' such as social media messaging and paid search. This effort will include distinct campaigns intended to support two distinct themes of Appendix C of the Partial Consent Decree: increasing the use of zero emission vehicle technology and driving utilization of Electrify America's zero emission infrastructure.

Stakeholders and academic scholars repeatedly cite education and awareness as a critical input for ZEV adoption. Electrify America's National Outreach website received over 25 submissions from California stakeholders highlighting the importance of these efforts, including many invitations to participate in specific events or programs. The City of Santa Cruz suggested Electrify America "partner with the city, non-profit partners and advocacy groups, and UCSC to expand awareness and knowledge of EVs…." Similarly, the Leadership Counsel for Justice and Accountability strongly supports Electrify America developing "meaningful education and outreach programs in California." Stakeholders at in-person meetings in Fresno and Bakersfield also stressed the importance of combining education and awareness efforts with infrastructure installations and focused on the importance of partnering with local community organizations to maximize the impact of these activities.

Figure 26: Electrify America Cycle 1 Education and Awareness Overview



Recent academic research also shows that mass-market ZEV adoption has been significantly limited by low awareness. Strategic Vision's 2016 New Vehicle Experience Study found that just 48% of new car buyers in California and 41% of national buyers have ever heard of a ZEV (see Figure 26). Similarly, a 2017 Cox Automotive EV consumer study showed that the first electric vehicle that comes to mind for consumers is not actually a battery electric vehicle – it is a Toyota Prius, a hybrid. With such low awareness as a starting point, it is no surprise that an even smaller number of buyers actually take an EV for a test drive and ultimately purchase or lease one.

Electrify America also recognizes the importance of driving utilization across its network of stations. Station utilization is a key metric by which our infrastructure investments are judged, and thus a component of Electrify America's outreach funding will be dedicated to building awareness of Electrify America's network and helping drivers find our stations.

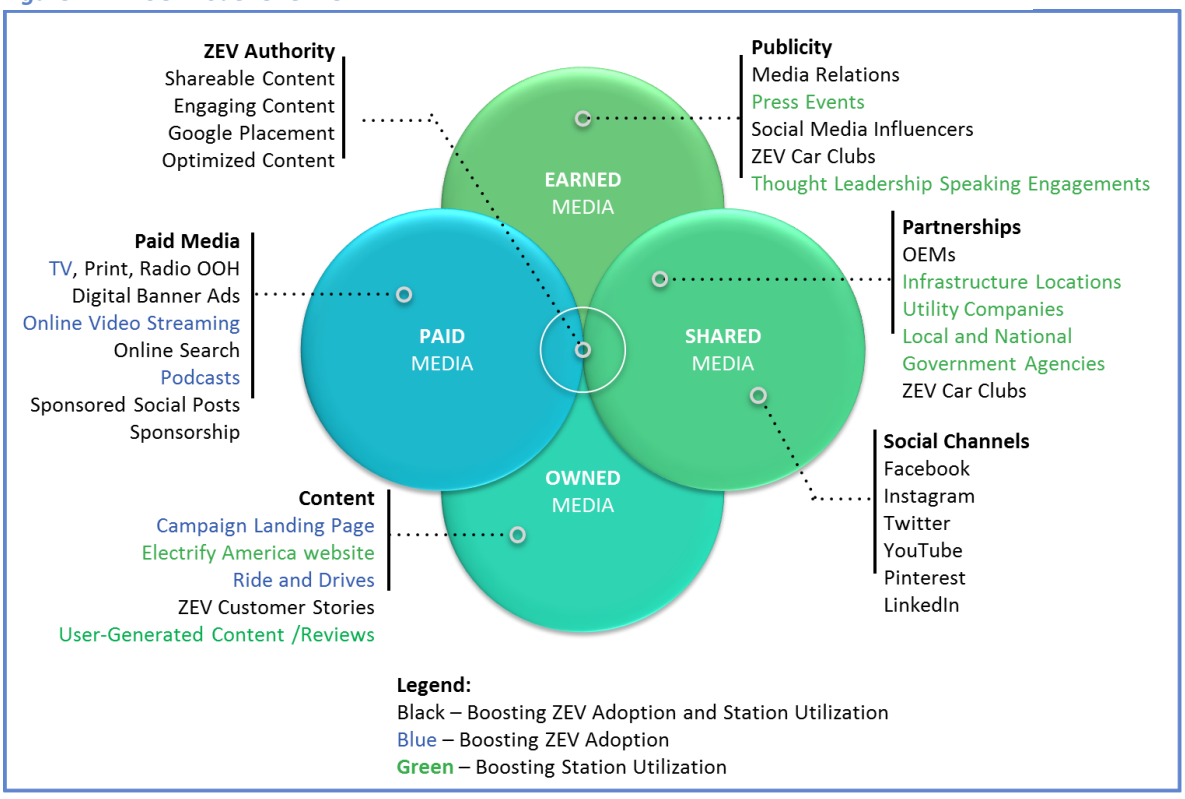
4.1. Public Education, Awareness, and Marketing Framework

Electrify America has developed two holistic marketing campaigns to educate and inspire likely buyers about ZEV technology, vehicle models, financial incentives, and fueling availability. The campaigns together leverage all four corners of the marketing sphere - Paid, Earned, Shared, and Owned (PESO) content (Robinson, 2016) – and are designed to deliver a consistent message across media types.

- Paid Media is content that is distributed based on financial compensation to place the message, and control its distribution, including traditional TV, radio, and out of home (billboard) advertising and sponsored content on social media.
- Earned Media is the published coverage of a company, cause, or person's message by a credible third party, such as a journalist, blogger, trade analyst, or industry influencer. Examples of this include press release content published in newspapers or magazines.
- Shared Media is the practice of distributing content through an entity's own loyal user base or audience. Examples of shared media include posts on Twitter, LinkedIn, and Instagram.
- Owned Media is the aggregation and dissemination of content from loyal customers/followers and then redistributing this content. Examples include customer/employee stories published on a company's website.

Electrify America's efforts to boost ZEV adoption in a brand-neutral manner and to drive Electrify America station utilization will both use this model because it allows for amplifying the message across platforms and targeting spend to the most effective channels. The breakdown of activities, by channel, is shown in Figure 27.

Figure 27: PESO Model Overview

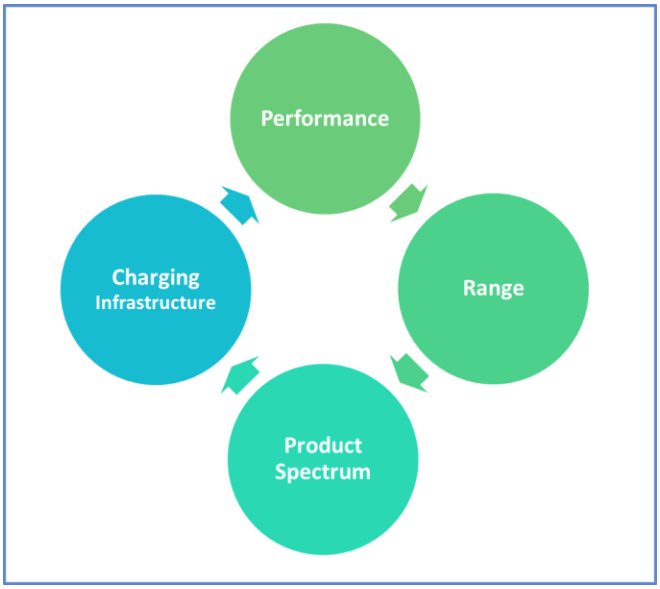


4.2. Boosting ZEV Adoption through Education and Awareness (~$17 million)

Electrify America will spend approximately $17 million in Cycle 2 to boost ZEV adoption through informing mainstream car buyers on the key benefits offered by ZEVs in a brand-neutral manner. In its 2017 New Vehicle Experience Study, Strategic Vision found that drivers identify performance (handling and cornering) and comfort (ride quality and quiet interior) as two of the top four 'Extremely Important' characteristics when shopping for a vehicle. As such, Cycle 2 efforts to drive ZEV adoption will focus on four messaging pillars around ZEVs: performance, range, product spectrum, and charging infrastructure (see Figure 28).

Performance messaging will highlight the acceleration, ride quality, and quietness offered by ZEV technology. Range will focus on the fact that the range of today's fleet of ZEVs meet the needs of the overwhelming majority of drivers. Product Spectrum will describe the diversity of ZEV makes and models, from SUVs to sports cars and luxury vehicles. Finally, Charging Infrastructure will help instill range confidence while highlighting the convenience offered by both public charging infrastructure and home charging today.

Figure 28: ZEV Education and Awareness Messaging Pillars



The majority (~$11 million) of spending on this effort is dedicated to advertising aimed at the top of the 'sales conversion funnel' (see Figure 29). The 'sales conversion funnel' describes a typical customer's journey from complete unawareness of a product, through awareness, consideration, test drive, and ultimate adoption. Figure 30 provides additional details on the contents of each category in the sales conversion funnel.

Figure 29: ZEV Sales Conversion Funnel and Primary Paid Media Categories

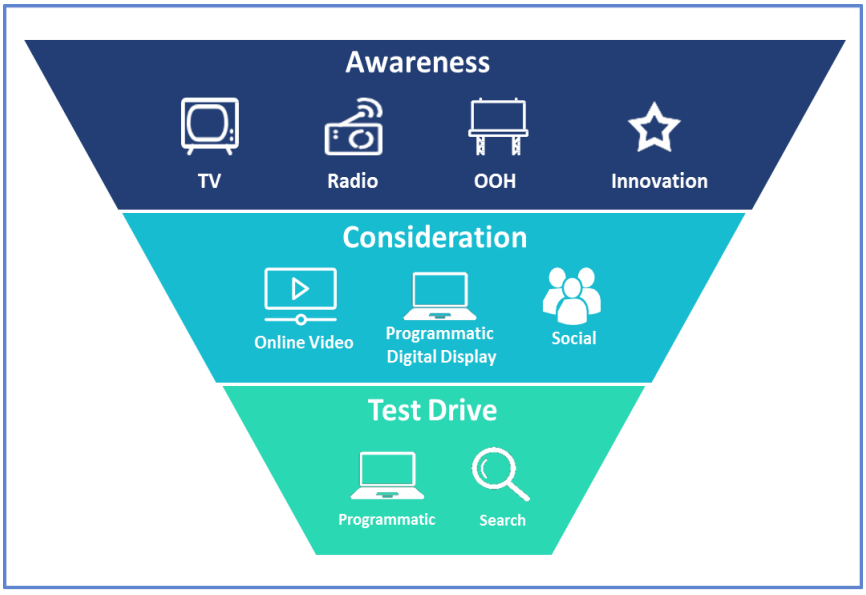
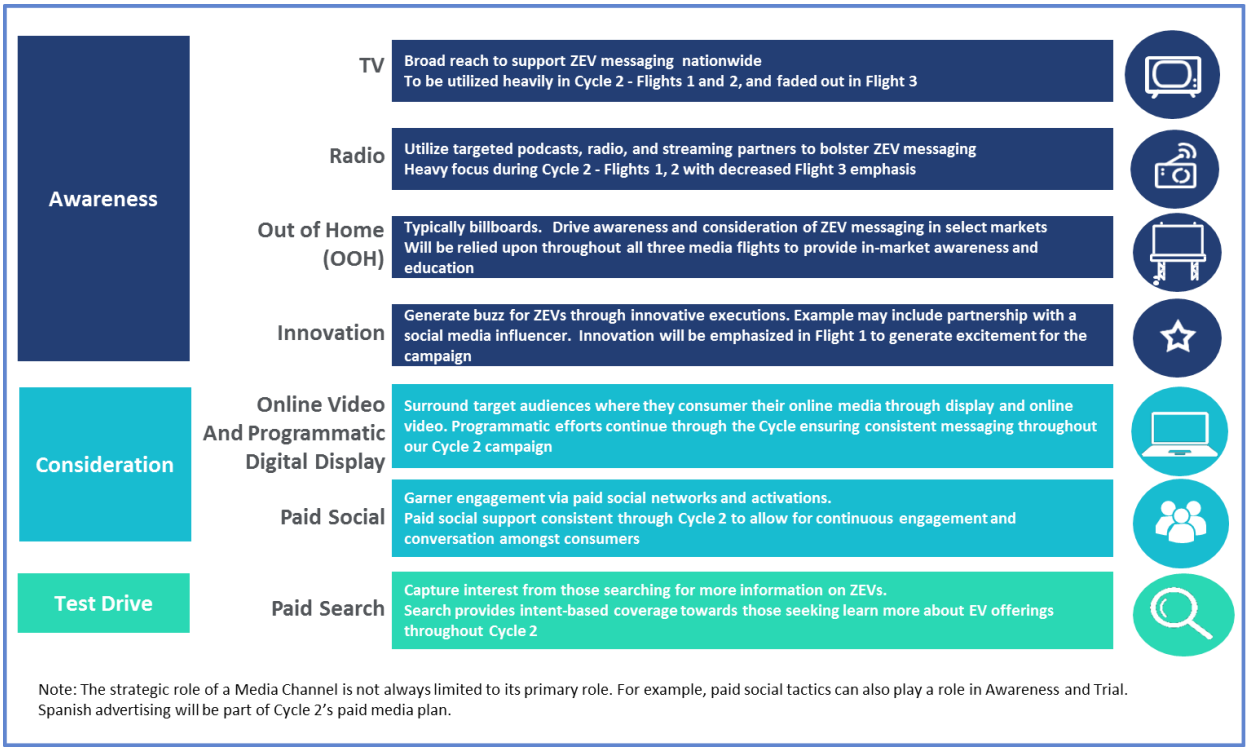


Figure 30: Additional Details on Paid Media Categories

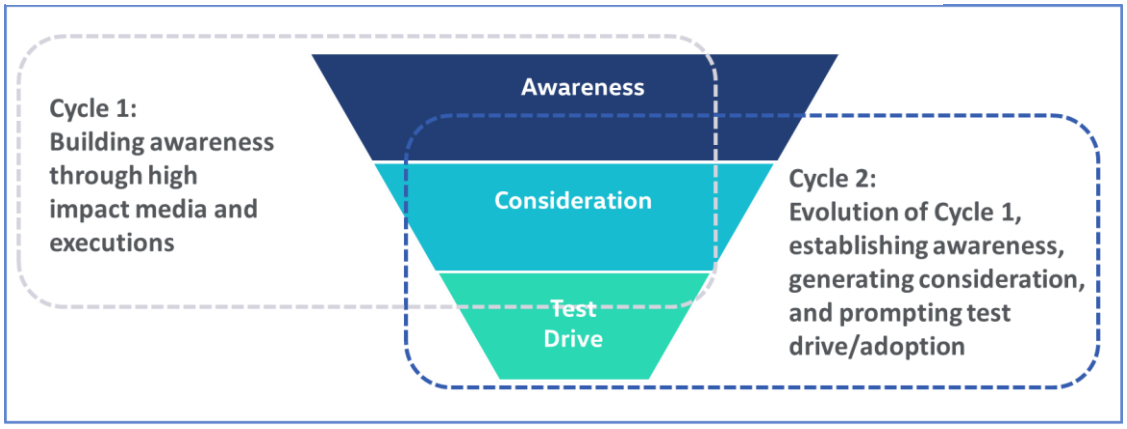


Note: The strategic role of a Media Channel is not always limited to its primary role. For example, paid social tactics can also play a role in Awareness and Trial. Spanish advertising will be part of Cycle 2's paid media plan.

In Cycle 1, Electrify America has focused on building awareness through high impact media executions, with more limited emphasis on consideration and test drives. For example, Electrify America created a TV and radio spot called the 'Jetstones' which highlights that ZEVs are more available, fun to drive, and more affordable than ever.

Over the course of Cycle 2, Electrify America expects consumer awareness to improve as a result of multiple factors. First, Electrify America's hope is that its early efforts, in combination with the activities from many others in the EV community, will boost awareness in the market. In parallel, new EV models will come to market and Electrify America expects their associated launch campaigns to help drive increased awareness. If successful, these combined efforts should drive a bump in overall market awareness.

Figure 31: Comparison of Cycle 1 vs Cycle 2 Education and Awareness Messages



As awareness improves, Electrify America will shift its focus down the 'sales conversion funnel' to tactics that drive ZEV consideration (see Figure 31).

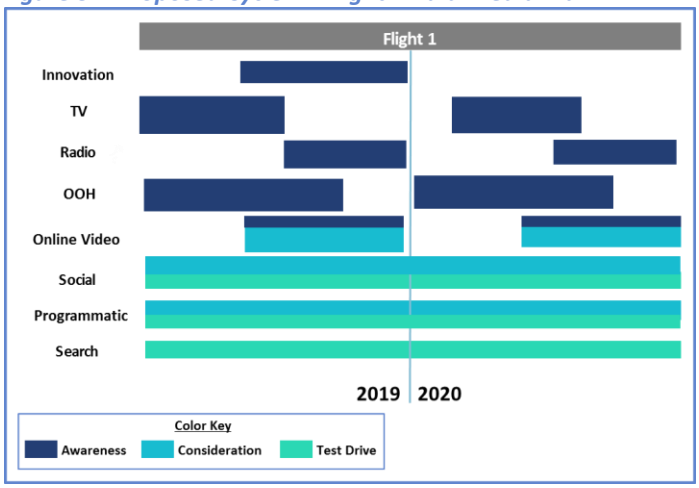
Electrify America's Cycle 2 media strategy will be broken into three flights: Flight 1 will run from July 2019 through mid-2020; Flight 2 will run from mid-2020 through mid-2021; and Flight 3 will run through the end of Cycle 2. The focus of each successive flight will shift further down the sales conversion funnel using those media tactics appropriate for the targeted messaging. Using established geo-targeting methods, 35% of this media spend will be placed in disadvantaged and low-income communities.

This media plan is subject to informed revision, based on market impacts and evidence of effectiveness. The shift in focus laid out in the plan below from awareness building to consideration and test drives will be evaluated based on learnings, results, market conditions, and evidence of general consumer awareness on an ongoing basis. Electrify America may make adjustments to maximize impact on ZEV adoption as necessary and appropriate during Cycle 2.

Cycle 2 – Flight 1 Paid Media Plan: [23]

Our approach to the Flight 1 media plan is to continue the momentum of Cycle 1 messaging and continue driving overall ZEV awareness. Specifically, Electrify America will focus the bulk of spending on 'upper funnel' media such as TV, Radio, and Out of Home (OOH). Electrify America will leverage the momentum of ZEV vehicle launches in 2019 and 2020 to establish additional awareness among car buyers (see Figure 32).

Figure 32: Proposed Cycle 2 - Flight 1 Paid Media Plan

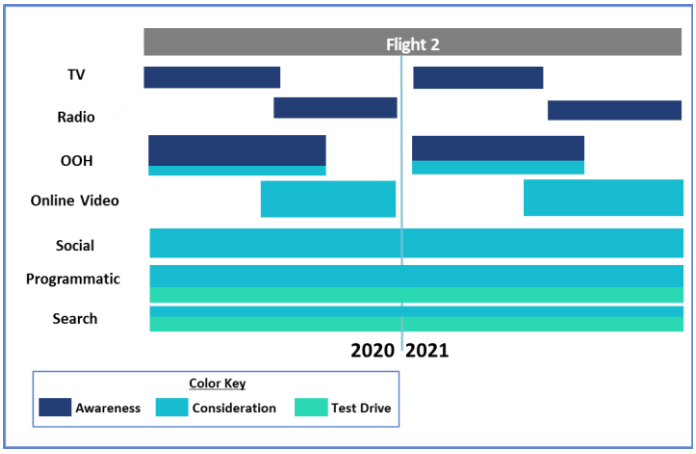


[23] This plan reflects Electrify America's best projection of Cycle 2 media spending at the time of plan drafting. Due to economic, political, and societal shifts in the market, media costs of each component may change, and therefore shift the optimal mix of investments. Electrify America will work with a competitively-selected media agency to optimize media spending for maximum impact on ZEV adoption.

Cycle 2 – Flight 2 Paid Media Plan: [24]

In 2020, ZEV penetration is anticipated to rise and as a result, consumer awareness is expected to be stronger. Flight 2 will evolve by increasing media efforts to drive an already educated audience towards consideration and trial. To capture these audiences, Electrify America will refine our investment[25] towards channels that allow for advanced targeting such as online video, social, and in-stream audio (see Figure 33).

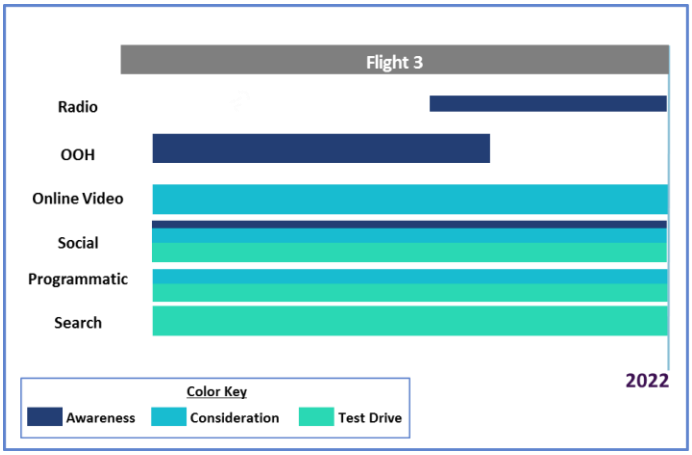
Figure 33: Proposed Cycle 2 - Flight 2 Paid Media Plan



Cycle 2 – Flight 3 Paid Media Plan: [26]

By the latter stage of Cycle 2, Electrify America will focus on driving consumers toward ZEV test drive opportunities at their local dealers and ultimately to purchasing ZEVs. To promote test drives, Electrify America will utilize channels that capture consumer intent including social, search, and programmatic display (see Figure 34).

Figure 34: Proposed Cycle 2 - Flight 3 Paid Media Plan



Additional Education and Awareness Tactics

In addition to paid media efforts that will be conducted in the three flights described above, Electrify America plans to leverage additional tactics to drive ZEV adoption throughout the cycle. These represent a much smaller slice of the overall Education and Awareness budget, but provide consumers another touch point and unique interaction with ZEVs. These investments are highly dependent on specific projects or opportunities, and thus are difficult to identify in advance. However, some ideas under consideration include:

- Social Influencers: Working with key social media influencers, such as bloggers or tech reviewers to develop ZEV related content. Influencers could be provided with a range of ZEV technologies to review, educate, and boost awareness around the "fun to drive" aspect of ZEVs. The goal of this activity will be to promote ZEV awareness in social media channels using "trusted" influencers to spread positive reviews of living with a ZEV on a regular basis. The City of Los Angeles also offered to collaborate to "publish stories of community members and organizations

[24] See footnote 23.
[25] According to Appendix C, budget items related to education, awareness, access, and marketing are defined as a category of "ZEV investment." Traditional accounting practices categorize these items as spending due to their lack of a forecastable rate of return.
[26] See footnote 23.

which have benefited from the charging infrastructure and use of ZEVs." If appropriate, Electrify America will work with local social influencers that can provide content in other languages.

- Memberships and Sponsorships: As proposed by numerous submitters to Electrify America's National Outreach Process, including the County of Los Angeles, Plug In America, and Veloz, establishing partnerships with consumer-oriented organizations to create content/events/test drives that promote ZEV adoption.[27]

- Experience Centers: Including refueling infrastructure and education materials at a ZEV experience center with high visibility and public exposure.

- STEM Education: As referenced in 17 National Outreach Process submissions from California, potential concepts include providing curriculums to Kindergarten through 12th grade classrooms, vocational schools, community colleges, vehicle dealerships, and professional training on ZEVs and charging infrastructure. Other education activities may include sponsoring programs to "certify" qualified dealers that have dedicated and trained staff that are fully versed in ZEVs and their associated purchase considerations (wall box installation, discounted utility offers, local/state/federal incentives, public charging subscriptions, etc.)

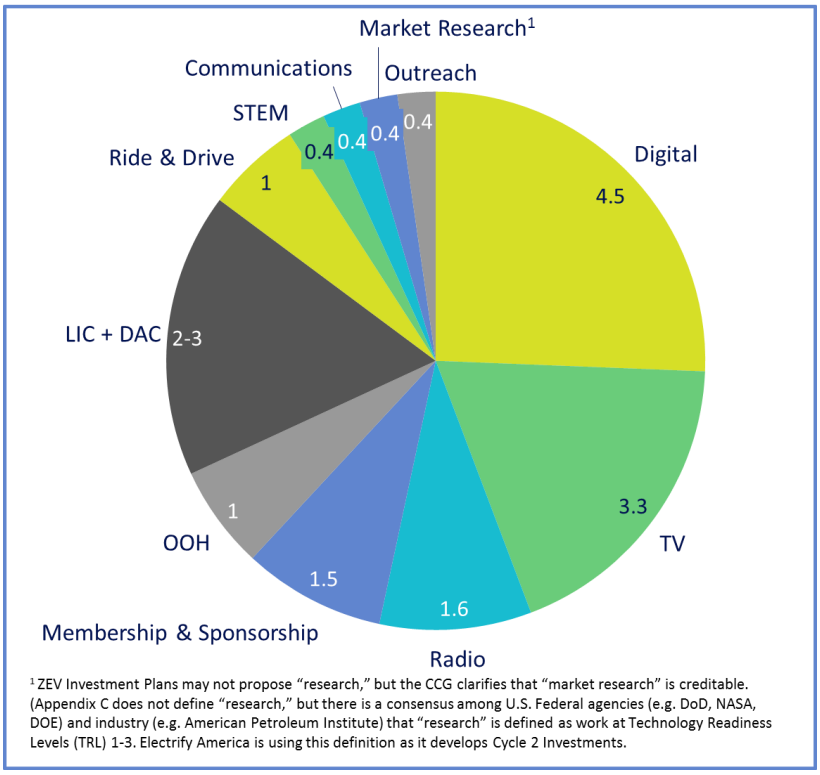
- Supporting Local Entities Building Awareness in Low-Income and Disadvantaged Communities: In addition to directing 35% of mass media spending to low-income and disadvantaged communities, Electrify America will also dedicate $2 to $3 million to support local entities, such as community-based organizations (CBOs), which promote awareness and consideration of ZEVs. Together with these entities, Electrify America will develop information and campaign tools highlighting the incentives available for low-income and disadvantaged community residents. Similar to Cycle 1, low-income and disadvantaged community activities may include 'Discover and Drive' events[28] and STEM programs to train the next generation. Depending on the effectiveness of both: (1) community level outreach efforts and (2) mass market media targeted to build awareness and consideration in low-income and disadvantaged communities in Cycle 1, Electrify America may choose to divert a portion of the 35% media budget to additional programs focused on community-level efforts.

In total, the approximately $17 million budget breaks down as shown in Figure 35.

[27] For further details on creditability of memberships and sponsorships, please see Appendix 2

[28] Cycle 1 'Discover and Drive' events had an outsized impact on low-income populations. Approximately 53 percent of all participants reported incomes at or below California's definition for low-income.

Figure 35: California Education and Awareness Budget ($ million)



[1] ZEV Investment Plans may not propose "research," but the CCG clarifies that "market research" is creditable. (Appendix C does not define "research," but there is a consensus among U.S. Federal agencies (e.g. DoD, NASA, DOE) and industry (e.g. American Petroleum Institute) that "research" is defined as work at Technology Readiness Levels (TRL) 1-3. Electrify America is using this definition as it develops Cycle 2 Investments.

4.3. Boosting Station Utilization through Marketing (~$10 million)

One of the core metrics by which Electrify America investments are measured is station utilization. Specifically, Electrify America must drive utilization to demonstrate its investments are "addressing an existing need or supporting a reasonably anticipated need" as outlined in the Partial Consent Decree, and Electrify America reports station utilization in its annual reports. To address this, Electrify America is targeting $10 million of spending on marketing and will communicate four key pillars:

- Location: Highlighting the locations of Electrify America's chargers to customers and instilling range confidence.
- Speed: Conveying the high-powered speeds at which Electrify America chargers can charge a BEV, offering consumers a more convenient charging experience.
- Affordability: Promoting the affordability of charging offered by Electrify America's network, including subscription plans and charging bundles provided by automotive manufacturers that will be available to customers.
- Customer-centricity: Showcasing that Electrify America's infrastructure is designed with the consumer experience first – stations are located near retail and amenities, accept nearly all payment methods, and the charger and app interfaces are user friendly.

Our messaging goal is to change range anxiety to range confidence by generating awareness of our charging stations including our convenient metro and highway locations, our customer-centric charging experience (credit card access/no membership required to access our chargers), and our high-powered offerings of up to 350kW that will allow for 200 miles of charging in as little as 10 minutes (depending upon vehicle capacity to access such fast charging).

The largest portion of Electrify America's activities will be digital advertising targeted at specific groups that are most likely to be able to utilize the Electrify America charging network. Electrify America will use digital tools including online search and programmatic digital display to reach these prospects and deliver the right message (e.g., promotion of closest EV charging location) at the right time (e.g., when someone is searching for a EV charger). Examples of potential targeted audiences include: new and used ZEV buyers, EV customers graduating out of embedded OEM charging programs, EV driver club members, and prospective ZEV considerers/researchers.[29]

In addition to digital advertising, Electrify America will leverage alternative tactics with a much smaller portion of the overall budget. These tactics include:

- **Partner Marketing:** Exploring the opportunity to work with OEMs and site hosts to promote Electrify America's ever-expanding network of locations.
- **Customer Relations Management (CRM):** As charger utilization increases, it is important to keep customers and prospects informed of the new charger installations. Electrify America will establish

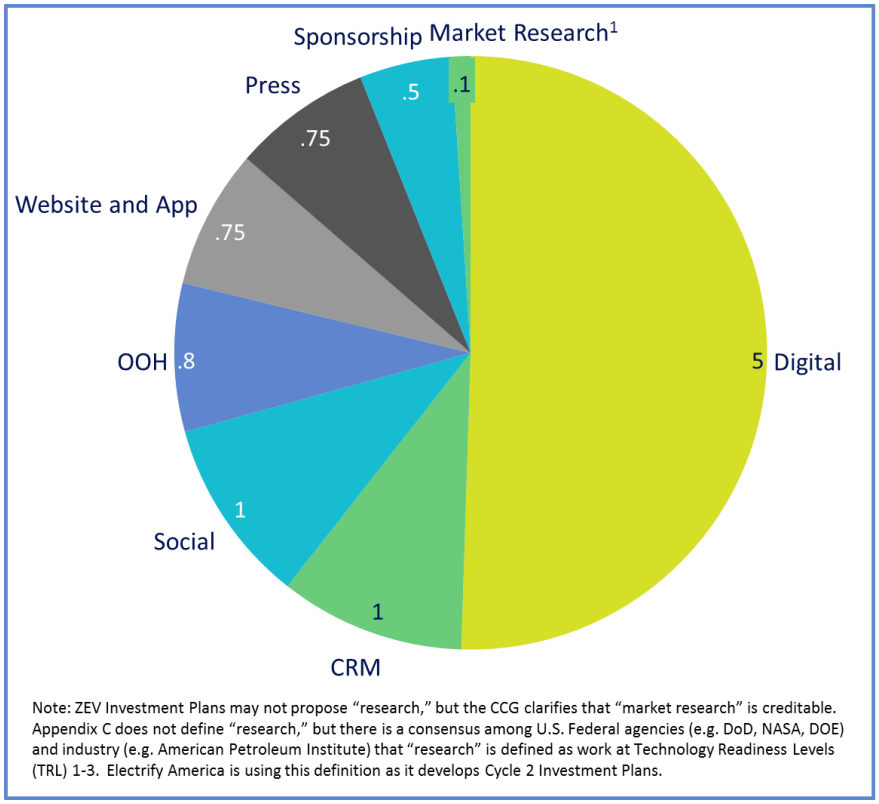
[29] Station utilization spending will be targeted at likely customers/prospects, whether or not the target lives within a low-income and/or disadvantaged community. As ZEV awareness and adoption improve over time, residents of low-income and disadvantaged communities are expected to become an increasing portion of the target audience, a trend Electrify America intends to track. Electrify America will use programmatic/digital media tools (e.g., search term optimization, digital banner ads) to reach these prospects when they are actively in market.

a cadence of electronic communications via email to keep our customers and prospects informed. Additionally, leveraging online video, Electrify America may create a video series that showcases how to use our DCFC and the customer benefits of charging at our stations.

- **Membership and Sponsorship:** Support trade groups and conferences promoting the adoption of EV technology. Such membership dues and sponsorship fees would be associated with the Electrify America brand.[30]
- **Events**: Support key industry events by providing promotional charging sessions and branded materials to encourage charging adoption and membership enrollments.
- **Highway Signs**: Brand state and national highway exit signage for Electrify America charging sites.
- **Public Relations**: Conduct media campaigns that are designed to feature Electrify America metro and highway charging stations. For example, press activities can focus on living with a ZEV on a daily basis without access to a dedicated L2 charger using our metro DCFC infrastructure and/or conducting a cross country media program that uses the company's highway DCFC locations to highlight that "road trips" to popular destinations in a "one car" ZEV family can be easily managed.

In total, the $10 million budget breaks down as shown in below in Figure 36.

Figure 36: California Station Utilization Budget ($ million)



[30] For further details on creditability of memberships and sponsorships, please see Appendix 2.

5. Green City

Electrify America is investing $44 million of its Cycle 1 budget in Sacramento in a Green City Initiative. This $44 million investment is already approved and is not formally part of this Cycle 2 California ZEV Investment Plan, but the mobility projects being provided by Electrify America and its vendors will operate for the duration of Cycle 2.

> *"Our partnership with Electrify America is a key piece of the City of Sacramento's effort to become a national center for testing and development of alternative and autonomous vehicle technologies. And just as importantly, the new shuttles and car services connect this new technology to our neighborhoods by increasing mobility options for residents, particularly in economically disadvantaged areas,"*
>
> *– Sacramento Mayor Darrel Steinberg*

This effort, which includes investments in two BEV car-share programs, two BEV bus/shuttles, and all associated charging infrastructure, will showcase emerging uses of ZEV technology and promote increased ZEV usage. These efforts also provide access to ZEVs to those who do not own or cannot afford to own ZEVs, and therefore represent a key underserved population. Each of the two car-share initiatives will operate in areas comprised of 70% or greater low-income and disadvantaged communities. In addition, the Franklin Boulevard regional on-demand ZEV shuttle service will enhance mobility service in a previously underserved service territory, at least 90%

Green City Investments

BEV Car Share

The Green City BEV car-share programs will deploy ~400 BEVs across Sacramento. The Gig program will be a 'free float' model with 260 electric Chevrolet Bolts. These cars can be picked up and dropped off anywhere within a 13 square mile area. The Envoy-led program will deploy 142 VW e-Golfs across 71 properties. These vehicles will be available to residents of the properties and must be returned to where they started. Vehicles in both programs will be available for use on personal trips or for drivers to participate in the gig-economy (e.g. providing ride-hail services through a TNC). By deploying these two unique services, Electrify America can compare and contrast the models to improve the success of future ZEV car-share investments.

BEV Bus/Shuttle

Electrify America is investing in one bus and one shuttle service in Sacramento. The electric bus service will include 12 new BEV buses that will run between UC Davis main campus and the UC Davis Health campus in Sacramento. The bus service is expected to add more than 400,000 bus rides in the first year of operation. The on-demand micro-shuttle service will be operated by Sacramento Regional Transit in the Franklin Boulevard region of Sacramento. The on-demand micro-shuttle service will include three BEV shuttles, and is expected to provide 26,000 rides in the first year.

Charging Infrastructure

In addition to the BEV car-share and BEV bus/shuttle programs, Electrify America will be installing more than 10 DCFC locations in the Sacramento area. These chargers will not only support the Green City programs, but will also support ZEV adoption in the region more broadly.

of which is a low-income or disadvantaged community.

While the bulk of these programs have been funded using the Cycle 1 California ZEV Investment Plan's $44 million budget, the investments will only begin to reach their full potential and impact on the community in Cycle 2 – new bus offerings take time to catch on as riders adjust their daily commutes, and car-share programs need time to market their services and scale up their customer base. The true changes to transportation patterns and mobility for Sacramento residents will come to life as these services ramp up over the course of Cycle 2. As a result, Electrify America's Cycle 2 Green City efforts will focus on providing operational support and strategic guidance for these fledgling services and closely monitoring progress.

Electrify America also expects to capture key insights and learnings from operating these services. Operating a ZEV car-share service can have added complexity over its ICE counterparts due to challenges in maintaining high levels of charge within the fleet. The two programs will offer valuable insights into how to maintain this service in a cost-effective and operationally sustainable manner. The car-share models will also help Sacramento and Electrify America better understand usage patterns for car-share vehicles, especially with regards to use in the gig economy. The BEV buses offer a unique opportunity to learn how to deploy charging infrastructure for electric shuttles and buses within a region. Understanding the mix of high-speed and long-dwell chargers and the impacts on cost and flexibility for a system will enable better deployments of ZEV buses in the coming years. Sacramento Regional Transit and Yolo County Transportation District will also learn how to integrate electric buses within the broader transit fleet. By the end of Cycle 2, Electrify America will investigate opportunities to leverage these learnings into a second Green City investment in Cycle 3 or Cycle 4.

6. Community Impacts

The Electrify America is committed to making a difference through our investments across the United States. The impacts take many forms.

Economic Impacts

The $2 billion ZEV Investment Commitment is already having a big impact on California businesses. To date, Electrify America has contracted 14 California firms for a total contract value of $77.9 million. In addition, based on figures from the Council of Economic Advisors and U.S. Department of Transportation related to highway and transit investments, the $200 million being invested in California in Cycle 2 is estimated to support up to 1,500 jobs over the 2.5 years of the Cycle.[31] In total, Electrify America's Cycle 2 investments in California are estimated to generate over 100,000 staff-hours of new work.

Clean Energy Access Working Group

Electrify America is an active member of the Clean Energy Access Working Group, launched by Southern California Edison and The Greenlining Institute, to develop community-centric solutions for healthy air and environment, to identify barriers to ZEV adoption in low-income and disadvantaged communities, and to explore viable solutions to these barriers. The Working Group harnesses environmental, faith-based, and community groups to inform members of the public vulnerable to the adverse effects of pollution, which include disadvantaged and low-income communities. The organization highlights the benefits of adopting clean technologies, such as electric vehicles, as pathways to improve the air quality in and around their communities.

Recruiting and Hiring Underrepresented Groups

Electrify America believes diversity in backgrounds and experiences within our team is an important part of our cultural fabric and a key to driving ZEV adoption for all Californians. For example, our California-based infrastructure construction team is currently majority female, in an industry where more than 90 percent of the workforce is male (U.S. Department of Labor, 2017, Table 18). To achieve this diversity, Electrify America has implemented a set of recruiting practices that promote career openings to many traditionally underrepresented groups. Volkswagen Group of America, which provides human resource services to Electrify America, participates in INROADS, an organization that prepares young people from disadvantaged backgrounds for careers in corporate America. We also partner with Out and Equal and exhibit at their conference focused on workplace fairness for the LGBT community. We recently launched a Veterans Employee Resource Group and plan to use this group for outreach and recruiting of veterans. Finally, we plan to partner with WorkplaceDiversity.com to promote Electrify America careers across a range of diversity-focused recruiting sites including HispanicDiversity.com, DisabilityConnect.com, VeteransConnect.com, and AllDiversity.com.

[31] The Council of Economic Advisors estimates that every $1 billion in federal highway and transit investment would support 13,000 jobs. This total count includes direct, indirect, and induced jobs. The estimate here is for the number of jobs created by infrastructure investments, and it does not include jobs created through education, awareness, and outreach or Electrify America overhead. The estimate assumes that ZEV investments create a similar number of job-hours per dollar spent as highway and transit investments.

Supporting a Rich Supplier Base

Electrify America is committed to ensuring that investment under its ZEV Investment Commitment reflects the rich and diverse characteristics of California and its people. To meet this commitment, Electrify America staff conducts outreach efforts and activities to: ensure potential new suppliers and contractors are aware of Request for Proposal (RFP) opportunities resulting from the ZEV Investment Commitment; to encourage greater participation by underrepresented groups, including certified veteran-, women-, and minority-owned businesses; and to assist applicants in understanding how to participate in the RPF process.

Electrify America's purchasing team maintains a list of potential minority-, women-, and veteran-owned vendors, and the team has established attracting diverse suppliers as a key internal goal. Electrify America includes language in all RFPs indicating our commitment to a diverse vendor base, and bidders to Electrify America RFPs are asked to include information regarding certified minority-, women-, and veteran-owned business enterprise participation in base bids and options. On a semi-annual basis, Electrify America continues to survey its vendors to assess the job creation and economic activity occurring as a result of the ZEV Investment Commitment, particularly in disadvantaged and low-income communities and among minority-, women- and veteran-owned businesses.

To build on our progress, in 2018 Electrify America is bringing in experts from the Volkswagen Group of America procurement team to train all staff engaged in the RFP process. These award winning experts, who have been frequently recognized for their diversity procurement practices (Chattanoogan.com, April 28, 2017), will train Electrify America staff on best practices for attracting veteran-, minority- and women-owned firms to respond to our RFPs.

And in Cycle 2, Electrify America will hold a Diversity Supplier Trade Show in California. This event will be modeled on Volkswagen Group of America's highly successful diverse supplier trade show held last year, which allowed diverse suppliers to connect with Volkswagen's tier 1 suppliers (Chattanoogan.com, November 8, 2017). In Cycle 2, Electrify America's event in California will give opportunities for minority-, women- and veteran-owned businesses to pitch their abilities to our California-based vendors (e.g. GIG Car Share, Envoy, BTC, Greenlots, and Black and Veatch) who are hiring subcontractors in order to implement their contractual obligations to Electrify America. While Electrify America does not control or direct vendor subcontracting activity, this event would enable valuable connections to be made between our vendors and diverse subcontractors. Electrify America plans to bring onboard outside expertise and assistance from an events vendor and/or California-based minority procurement expert in order to assure that this event is a success.

Advancing ZEV Awareness at Public Events

Electrify America executives and staff are frequently asked to speak or participate in dozens of meetings, conferences, and other events regarding electric vehicles, charging technology, and ZEV mobility. Electrify America does not accept most invitations received, in order to focus resources on ZEV infrastructure and investment executions. However, Electrify America attempts to participate in events which are specifically focused on ZEV technology, which are likely to grow ZEV awareness and which are consistent with Electrify America's obligations and spirit of the National Outreach Process. These forums have allowed Electrify America to increase general awareness of ZEV technology, to introduce audiences to the ZEV Investment Plans, and to collaborate with a small, but ever-growing industry focused on increased ZEV adoption.

7. Closing

Electrify America once again thanks the hundreds of stakeholders, as well as the CARB staff, for providing input, guidance, suggestions, and insights in support of the development of this plan. Building out the largest high-powered, non-propriety ZEV refueling network in the United States is a monumental task, one which would also not be possible without the support of the ZEV community – from consumers, to utilities, suppliers, and government entities. Electrify America looks forward to continued collaboration in pursuit of ZEV adoption in California and across the United States through the ZEV Investment Commitment and beyond. While this investment is ambitious in its size and impact, it is also a pivotal and transformational opportunity to increase the mass-market adoption of ZEVs in California.

We are energized and inspired by California's unwavering resolve to lead ZEV adoption, and we are excited to support this important effort with our investments.

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Appendix

1. Certification of Activities

Electrify America certifies that none of the activities described in the ZEV investment plan described above was/is:

- approved by the Board of Management prior to September 18, 2015
- required by a contract entered prior to the date of lodging of the Partial Consent Decree
- a part of a joint effort with other automobile manufacturers to create ZEV infrastructure
- required to be performed by any federal, state, or local law, or anticipate will be required to perform during the planned 30-month period

2. Memberships and Sponsorships

The Settlement documents do not specifically address memberships or sponsorships. There may be occasions where it would be reasonable for Electrify America to further education and awareness of ZEVs or to market Electrify America infrastructure by joining an industry or non-profit organization or by supporting the programs, activities, or events of an industry or non-profit organization. Under some circumstances, it is reasonable for Electrify America to join entities or sponsor their activities as brand-neutral education and awareness activities from the $17 million education and awareness budget. Under other circumstances, joining the organization or sponsoring its activities may be considered branded marketing activities and fall within the $10 million budget for branded marketing.

Annual reports to CARB with creditable cost schedules for the given year will include these membership and sponsorship costs.

Brand-neutral education, awareness, and outreach memberships and sponsorships: Electrify America will use the following criteria to determine if a membership or sponsorship is creditable as a brand-neutral education, awareness, and outreach activity as defined in Section 1.10.2 of Appendix C:

1. Membership in organizations will be creditable as brand-neutral if the organization:
    a. Is an organization that Electrify America wishes to join;
    b. Conducts brand-neutral ZEV education and awareness as part of its core mission;
    c. The organization demonstrates a proven track record of success and could align as an brand-neutral education and awareness investment;
    d. The spending of membership dues is not controlled by Electrify America;
    e. To address concerns that Electrify America membership dues cannot be directly overseen, Electrify America has agreed to cap membership dues at no more than 2% of brand-neutral education and public outreach during any given 30-month investment cycle. This cap is applicable to memberships, not sponsored activities, or programs; and
    f. Has a primary presence in the United States and/or California.
2. Sponsorship of events, activities, and programs will be creditable as brand-neutral if the event, activity, or program:
    a. Is an event, activity, or program Electrify America chooses to sponsor or support;
    b. Is brand-neutral and does not feature or favor Volkswagen Group vehicles.
    c. Provides education or awareness with regard to ZEV technology specifically;
    d. Is public facing; and
    e. Will be conducted well in Electrify America's judgement, based on the organization's past experience or other evidence.

Branded marketing memberships and sponsorships: Electrify America may also join organizations or sponsor activities, events, or programs as necessary to increase utilization of it ZEV infrastructure investments through branded marketing. This marketing activity may include business-to-business-oriented activities.

3. ZEV glossary

AC Charging

The majority of ZEV charging is done with alternating current (AC) Level 1 (120 volts or normal household current) or Level 2 (240 volts or an electric dryer power equivalent). AC charging is typically more cost effective for the equipment and installation and takes advantage of longer dwell times to provide lower power to a ZEV over a longer period of time. AC charging is an excellent solution for residential, workplace, multiunit dwelling, and other longer-term parking situations like hotels and municipal or airport parking garages.

Disadvantaged Communities/Low-income Communities

Electrify America uses definitions for low-income and disadvantaged communities established by the State of California, which are published and mapped by CARB on its "Disadvantaged and Low-income Communities Investments" webpage: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/communityinvestments.htm.

DC Fast Charging (DCFC)

Direct current (DC) charging for electric vehicles allows for higher charging speeds, as DC current can be supplied directly to the electric vehicle's battery at power levels normally higher than AC charging. The higher the DC power supplied, the faster the electric vehicle can be charged, provided the vehicle is designed to handle such power. A common DC power level accepted by BEVs on the market today is 50 kW. By 2019, it is expected that 150+ kW DC fast charging will be available on a number of vehicles, and speeds of up to 320 kW (at 350 amps of current at 200V to 920V power source) will be available on a limited basis. To illustrate the charging power difference between Level 2 AC and DC fast charging, a Level 2 7.2 kW AC charger will deliver about 27 miles of ZEV range per hour of charging, whereas a 150 kW or 320 kW DC fast charger can deliver 90 or 200 miles of electric range per 10 minutes respectively.

CHAdeMO

A DC fast charging standard first developed in Japan for the Japanese market and capable in the U.S. of charging several EVs including the Nissan Leaf and Kia Soul.

CCS (Combined Charging System)

CCS is a DC fast charging protocol that is SAE certified and featured on vehicles produced by GM, BMW, Volkswagen Group, Ford, Honda, Hyundai, Proterra, and a number of other vehicle manufacturers. The "combined" term designates the CCS capability to incorporate the level 2 (J1772 standard) plug and DC fast charging connector into the same larger plug.

OCPP and OCPI

Open Charge Point Protocol (OCPP) and Open Charge Point Interface (OCPI) are communications standards that have been developed by numerous public and private ZEV infrastructure leaders. OCPP enables standardized communication between charging hardware and the charging station networks that support them, while OCPI enables communication between different charging station networks. OCPP makes it possible to change the network supporting an individual charging station

at some future time if desired. OCPI on the other hand is the communications standard that enables commercial entities such as charging networks or automotive OEMs to transfer charging station data between each other, such as charger availability or customer information, to enable roaming.

Out of Home (OOH) Advertising

In contrast to television advertising, out of home advertising or media, refers to advertising that communicates to customers while they are not at home. This type of advertising is intended to reach consumers while they are in public and on the go. Out of home advertising categories can include billboards, street furniture (e.g., bus shelters and benches, in stores, kiosks, shopping malls), and transit (buses, metro systems, taxis) to name a few.

Plug-and-charge

Plug-and-charge is part of the latest revision of the CCS standard, featuring the IEC/ISO 15118 standard which prescribes the means by which a charger and network can identify and authenticate a specific vehicle to allow for a charging session automatically, by simply "plugging in," without the need for supplemental membership cards or fobs.

Proprietary/Non-Proprietary Charging Connector and Protocol

A non-proprietary connector is not privately-owned or controlled and is thus easily available as a standard and does not require extensive development to be ready for application. Both CHAdeMO and CCS combo are non-proprietary DC fast charging protocols. A proprietary charging connector is a connector and charging network that is exclusively accessible to one brand of vehicle or type of user.

Traditional Media vs. 'New Media'

Historically, advertising to consumers has taken the form of broad messages on television, radio, in print, or messages on physical items such as billboards or street furniture. These platforms are typically referred to as traditional media. Though this method has been generally effective at communicating messages to consumers, these platforms have limited ability to target specific audiences based on their interests and preferences compared to newer media platforms today. In the 21st century and age of the internet, numerous additional platforms for communicating messages have emerged that allow much more direct and effective communication to customers about products and services such as social media advertising and paid search. These are considered 'new media.'

Zero Emission Vehicle (ZEV)

Under Appendix C, the following three vehicle types are considered Zero Emission Vehicles:

1. An on-road passenger car or light duty vehicle, light duty truck, medium duty vehicle, or heavy duty vehicle that produces zero exhaust emissions of all of the following pollutants: non-methane organic gases, carbon monoxide, particulate matter, carbon dioxide, methane, formaldehyde, oxides of nitrogen, or nitrous oxide, including, but not limited to, battery electric vehicles ("BEV") and fuel cell vehicles ("FEV");

2. An on-road plug-in hybrid electric vehicle (“PHEV”) with zero emission range greater than 35 miles as measured on the federal Urban Dynamometer Driving Schedule (“UDDS”) in the case of passenger cars, light duty vehicles and light duty trucks, and 10 miles as measured on the federal UDDS in the case of medium- and heavy-duty vehicles; or
3. An on-road heavy-duty vehicle with an electric powered takeoff. ZEVs do not include: zero emission off-road equipment and vehicles; zero emission light rail; additions to transit bus fleets utilizing existing catenary electric power; or any vehicle not capable of being licensed for use on public roads.