California Energy Commission

Alternative and Renewable Fuel and Vehicle Technology Program

FINAL PROJECT REPORT

North Coast PEV Readiness Plan Implementation

Prepared for: California Energy Commission

Prepared by: Redwood Coast Energy Authority
Schatz Energy Research Center
Local Government Commission

California Energy Commission

Edmund G. Brown Jr., Governor

April 2017 | CEC-XXX-XXXX-XXX

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Contract Number:
ARV-14-046

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ACKNOWLEDGEMENTS

The North Coast PEV Readiness Plan Implementation project was made possible by funding from the California Energy Commission in the form of an Alternative and Renewable Fuel and Vehicle Technology Program grant awarded to the Redwood Coast Energy Authority. Input from several organizations and individuals informed this project. The Redwood Coast Energy Authority and Schatz Energy Research Center would like to acknowledge the following project partners for their contributions.

Project Partners:

- California Department of Transportation (Caltrans) District 1
- Charge Across Town
- City of Arcata
- City of Eureka
- City of Fortuna
- City of Rio Dell
- California Division of the State Architect (DSA)
- Humboldt County
- Local Government Commission
- OurEvolution Energy & Engineering
- Pacific Gas and Electric
- Pacific Power
- Siskiyou Economic Development Council
- Trinity Public Utilities District
- Trinity County Department of Transportation
- and the many potential EVCS site host businesses and organizations

PREFACE

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

The ARFVTP has an annual budget of approximately $100 million and provides financial support for projects that:

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

To be eligible for funding under the ARFVTP, a project must be consistent with the Energy Commission's ARFVTP Investment Plan, updated annually. The Energy Commission issued PON-14-603 to fund grant projects that support new and existing planning efforts for plug-in electric vehicles and fuel-cell electric vehicles. In response to PON-14-603, the recipient submitted an application which was proposed for funding in the Energy Commission's Notice of Proposed Awards January 16th, 2015 and the agreement was executed as ARV-14-046 on May 8th, 2015.

ABSTRACT

The North Coast PEV Readiness Plan Implementation Project carried out core elements of the North Coast PEV Readiness Plan in Humboldt, Del Norte, and Trinity Counties. Key tasks included engagement with jurisdictions on EVCS permitting, codes, and standards, the development of an EVCS selection guide and development of resources for contractors, siting the next phase of a regional EVCS network, the installation of trailblazing signage to existing EVCS, and PEV awareness campaigns.

The project team successfully executed these key tasks. Engagement with jurisdictions resulted in productive discussion and sharing of best practices. A suite of resources was developed to address EVCS selection, planning, zoning, permitting, and installation. Engineering designs, drawings and cost estimates were developed to the 10% level for 26 site host locations for EVCS. EVCS trailblazing signage was installed across the County, directing PEV drivers to regional EVCS. Finally, the benefits of PEVs were communicated to a wide audience, with a diversity of outreach methods employed.

Keywords: Plug-in electric vehicles, PEV Readiness Plan, electric vehicle charging station, permitting, codes, standards, fleet vehicles, Ride-and-Drives, outreach, education, electric vehicle infrastructure, planning, rural, hard-to-reach

Please use the following citation for this report:

Boudreau, Dana, Jerome Carman, Greg Chapman, Elliot Goodrich, Andrew Harris, Kristen Radecsky, Pierce Schwalb. Redwood Coast Energy Authority, Schatz Energy Research Center. 2017. *PEV Readiness Plan Implementation*. California Energy Commission. Publication Number: CEC-XXX-201X-XXX.

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

EXECUTIVE SUMMARY

The goal of the North Coast PEV Readiness Plan Implementation project was to support and promote the continued growth of PEV adoption in Del Norte, Humboldt and Trinity Counties. This was facilitated by implementing key tasks called for in the North Coast PEV Readiness Plan.

- **Engage with regional municipalities in a coordinated effort to streamline processes for the permitting and inspection of residential, commercial, and public EVCS.** Through one-on-one meetings, a workshop, and the development and distribution of relevant EVCS resources, regional municipalities were provided with information and support regarding updating and streamlining zoning and permitting processes. Engagement resulted in productive discussions about challenges faced by building and planning staff in rural communities, as well as best practices for facilitating EVCS installation.
- **Develop streamlined EVCS installation processes and conduct detailed regional siting assessments and engagement with potential site hosts.** A comprehensive EVCS selection Guide was developed and distributed to assist contractors and EVCS owners streamline the EVCS installation process. In addition, regional siting assessments were conducted at locations in alignment with the North Coast PEV Readiness Plan. The project team solicited feedback from willing site hosts on site design through concept drawings. 10% engineering designs and cost estimates for 26 locations were completed and distributed.
- **Promote PEV adoption through profile raising campaigns and installation of trailblazing signage for existing EVCS.** PEV education and outreach was conducted through a variety of engagement methods, including Ride-and-Drive events, PEV car shows, presentations and social media. Engagement activities resulted in an estimated 8,000+ impressions. Specific outreach targeting fleet managers was also conducted, in the form of two comprehensive fleet analyses. In addition, 24 EVCS trailblazing signs were installed throughout the County both help PEV drivers locate stations and increase awareness of the network by conventional vehicle drivers.

CHAPTER 1:
Introduction

1.1 Problem Statement

In July 2014, the North Coast PEVCC's North Coast PEV Readiness Plan was completed, developed by RCEA in partnership with SERC and other regional stakeholders. The plan called for a variety of implementation measures to encourage uptake of PEVs including streamlining permitting and inspection processes for EVCS, siting and installing EVCS, and conducting public outreach and education campaigns. The primary barrier preventing the implementation of these measures was financial. While RCEA received funding to install nine EVCS in the region, there were no resources available to plan the next round of installations or to enact the other critical implementation measures identified in the readiness plan. To continue the acceleration of the local PEV market, it is critical that these support activities be addressed as soon as possible.

1.2 Goals and Objectives

Goals of the Agreement:

The goal of this Agreement was to implement the North Coast PEV Readiness Plan in the counties of Humboldt, Del Norte, and Trinity by conducting detailed siting assessments for new EVCS; by engaging regional municipalities in streamlining permitting and inspection processes and adopting PEV friendly codes; and by conducting outreach and publicity campaigns (including the installation of directional signage) to encourage adoption of PEVs.

Objectives of the Agreement:

The objectives of this Agreement are listed in the following table along with quantitative and measurable outcomes against which the success of the proposed project can be measured.

Table 1: Project Objectives and Measurable Outcomes

Objective	*Measurable Outcome*
Engage with regional municipalities in a coordinated effort to streamline processes for the permitting and inspection of residential, commercial, and public EVCS	▪ Encourage all eleven regional government entities to adopt streamlined processes ▪ Successfully see at least four jurisdictions adopt new processes for permitting EVCS
Develop streamlined EVCS installation processes and conduct detailed regional siting assessments and engagement with potential site hosts	▪ Develop standardize specifications for charging station equipment and engage with at least three local contractors to encourage best practices ▪ Produce at least 30 and as many as 40 detailed EVCS designs and cost estimates in locations consistent with the Readiness Plan and with willing site hosts
Promote PEV adoption through profile raising campaigns and installation of trailblazing signage for existing EVCS	▪ Conduct at least 5 ride and drive events to promote the latest PEVs on the market ▪ Table at 6 or more public events ▪ Publish at least 6 newsletter editions ▪ Achieve at least 4 media spots highlighting regional PEV activities ▪ Make at least 6 presentations to community organizations and/or fleet operators ▪ Install trailblazing signage guiding PEV drivers to at least 10 existing and soon to be installed EVCS

Source: Redwood Coast Energy Authority

1.3 Project Team

Redwood Coast Energy Authority

The Redwood Coast Energy Authority (RCEA) was formed in 2003 to develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient, and renewable resources available in the region. RCEA is a local government Joint Powers Authority (JPA), representing the County of Humboldt, all incorporated cities in Humboldt County, and the Humboldt Bay Municipal Water District. In addition to projects related to energy and energy efficiency, RCEA has acted as the lead agency for three Alternative and Renewable Fuel and Vehicle Technology Program grants.

Schatz Energy Research Center

The Schatz Energy Research Center (SERC) at Humboldt State University was founded in 1989 with a mission to promote the use of clean and renewable energy resources. Over the years SERC has been involved in extensive research, planning, design, and analysis activities for the development and implementation of sustainable energy systems. SERC conducts research, analysis, policy and planning studies; designs, builds, operates, and demonstrates clean and renewable energy technologies; develops curriculum and provides training; and educates key decision makes and the general public about the advantages of clean and renewable energy technologies. This work has included promotion of sustainable transportation options, including hydrogen fuel cell vehicles and plug-in electric vehicles.

SERC has participated in the development of data collection and analysis programs for a wide variety of energy and transportation systems, including playing a lead role in the development of PEVI, the agent-based PEV Infrastructure model used to site charging stations throughout the North Coast region.

Local Government Commission

The Local Government Commission (LGC) is a nonprofit organization fostering innovation in environmental sustainability, economic prosperity and social equity. The LGC is helping to transform communities through inspiration, practical assistance and a network of visionary local elected officials and other community leaders.

LGC is currently leading “CivicSpark,” a statewide Governor’s Initiative focused on supporting local-government energy and climate action programs. This program is being implemented in partnership with the State of California through the Governor’s Office of Planning and Research along with a network of regional organizations including the Redwood Coast Energy Authority as the North Coast regional coordinator.

CivicSpark provides high-quality, technical support to local and regional local governments, helping California communities pursue clean energy, reduce greenhouse gas emissions, safeguard against climate change impacts, and implement sustainable community strategies. To do this, 48 CivicSpark AmeriCorps members work with nine regional partners to provide capacity-building support to local governments through research, planning and implementation activities, while simultaneously supporting volunteer engagement.

1.4 Background

The North Coast PEV Readiness Plan, completed in July of 2014, contained a suite of actions necessary to support the successful introduction of PEVs and the strategic development of charging infrastructure in the region. The plan was funded by the California Energy Commission and included these key components:

- Creation of a Plug-in Electric Vehicle Coordinating Council (PEVCC)
- Development of an infrastructure deployment plan
- Assessment of local permitting and installation requirements for electric vehicle supply equipment (EVSE) and development of a plan to support streamlining those processes
- Development of a plan to accelerate PEV adoption in vehicle fleets
- Development of an education and outreach program to promote PEV adoption in the community

In addition to the PEV Readiness Plan, RCEA received funding from the CEC through ARV-13-029 to install ten EVCS across nine locations in Humboldt County. This installation represented the first phase of the charging network called for in the PEV Readiness Plan, which identified a total of 41 charging sites as the minimum number required to accommodate an anticipated penetration of 3,000 PEVs.

To plan for the next phase of EVCS deployment in the region, and to implement core elements of the North Coast PEV Readiness Plan, RCEA responded to the CEC's solicitation PON-14-603. In June of 2014, RCEA was awarded funding through ARV-14-046. The following Chapter outlines the activities and results from this project.

CHAPTER 2:
Project Activities and Results

2.1 Engagement with Jurisdictions

The goal of this task was to engage with regional Authority Holding Jurisdictions (AHJs) to encourage the adoption of streamlined EVCS permitting and inspection processes, and to provide education on the potential to adopt local building codes that promote PEV adoption. This was accomplished through the development and distribution of relevant PEV resources, one-on-one meetings, and a workshop for building and planning staff.

2.1.1 Resources Developed

2.1.1.1 EVCS Zoning and Permitting Resource Binder

To ensure planning and building staff from AHJs in the region had easy access to resources for EVCS permitting and inspection, Jerome Carman from SERC developed a comprehensive EVCS resource binder. This binder was designed to assist AHJs in preparing for EVCS, including: planning and zoning, relevant codes and standards, and streamlining permitting processes. Specifically, the binder contained the following resources:

- Planning and Zoning
    - Text from AB 1236 requiring jurisdictions to streamline their EVCS permitting process
    - North Coast and Upstate Planning documents with information relevant to EVs
    - The Governor's Office of Planning and Research (OPR) EVCS Zoning Example
    - The City of Chelan EVCS Zoning Code
- Codes and Standards
    - Relevant industry codes and standards from the Society of Automotive Engineers, CHAdeMO. National Fire Protection Association, National Electric Code, Nationally Recognized Testing Laboratories, and Underwriters Laboratory.
    - Relevant sections from the 2016 California Building Code
    - Relevant Caltrans Policy Directives
    - Relevant California Vehicle Code
        - Including guidance on compliance with new EVCS accessibility standards
    - OPR's PEV Parking Code Template
    - Relevant Health and Safety Code
    - Example 10% engineering drawings of EVCS sites

    - EVCS signage specifications
- Permitting
    - Electric Load Calculation Worksheets
    - Permit Templates for Residential Installations
    - Residential and Commercial Installation Checklists
    - National Electrical Contractors Association Inspection Checklist
    - OPR's General EVCS Permitting Checklist

*Full text of the binder is included as Appendix A.

While useful as a stand-alone resource, the binder was designed to complement a meeting or workshop. It aggregates materials building or planning staff may find useful as they prepare their jurisdiction for EVCS. RCEA and SERC met with jurisdictions throughout the project region to provide them with these resources.

2.1.1.2 Accessible EVCS Fact Sheet

Contained within the aforementioned EVCS Resource Binder was an "Accessible EVCS Fact Sheet". This fact sheet was developed by RCEA and SERC to assist municipalities and contractors with designing EVCS sites for ADA compliance. Prior to the 2016 edition of the California Building Code, there were no requirements explicitly written for EVCS. However, requirements were codified in the 2016 edition of the Building Code, and the project team identified a need for a fact sheet aggregating and clarifying these new requirements.

The fact sheet outlines the new accessibility requirements, provides diagrams of compliant site configurations, and includes links to additional resources. The project team worked with Dennis Corelis at the Division of the State Architect to verify the accuracy of the document. The full fact sheet is included as Appendix B.

Beyond its inclusion in the resource binder for planning and building staff, the Accessible EVCS fact sheet was useful in outreach to potential site hosts. The dedication of sufficient parking and location along an accessible route were important considerations when selecting potential site hosts. A clear understanding of accessibility requirements in the Building Code helped the project team identify potential sites and assisted in the development of site drawings. The fact sheet also helped potential site hosts understand the new requirements and clarify why the project team proposed particular locations and designs for EVCS on the site host's property.

2.1.1.3 Jurisdiction-Specific Permitting Guides

Background

Team member Pierce Schwalb met with staff from the City of Eureka and the City of Arcata Building Departments to discuss their permitting processes for EVCS. After learning about the current permitting processes, Mr. Schwalb provided staff with example streamlined processes used by other jurisdictions. Staff expressed hesitation about adopting alternative processes due to unfamiliarity with the mechanics of EVCS, particularly how they might affect the electrical grid in oversubscribed areas. It was determined that a guide document clarifying the current process would be a good first

step before considering any updates. Development of similar EVCS permitting process summary guides were pursued for additional jurisdictions in Humboldt County.

Guide Development

To assist contractors and homeowners pursuing the installation of a residential EVCS, the project team created residential EVCS permitting guides for distribution by planning and building departments. The purpose of these guides was to clarify the EVCS permitting process used by a particular jurisdiction. A secondary benefit of the development of these guides was an opportunity for planning and building officials to review their municipalities' current process. By working with the project team to get the process down on paper, it became an opportunity to discuss examples of more streamlined permitting processes used by other jurisdictions.

Once approved, the guides were delivered to the jurisdiction's planning and/or building offices where they would be made available to the public. EVCS Permitting Guides were completed for Humboldt County and the City of Eureka. While draft guides were developed for the remaining jurisdictions, either a lack of staffing or interest prevented their ultimate approval. The EVCS Permitting Guides for Humboldt County and the City of Eureka are included as Appendix C.

2.1.2 Meetings and Workshops

Coordination with planning and building staff in rural Del Norte and Trinity Counties proved to be challenging. Del Norte County typically has only one planner on staff, but that position remained vacant for the duration of this project. Trinity County's planner position was also vacant, though outreach to other County staff was completed successfully.

Due to the vacant planner position in Trinity County, Jerome Carman from SERC met with Rick Tippet, the County's Transportation Planner. Mr. Carman presented the materials contained in the resource binder and provided guidance on best practices for EVCS planning, zoning, codes, standards, and permitting. Potential locations for EVCS in the County were also discussed. Mr. Tippet expressed support for the installation of EVCS in the County and offered to host an EVCS at the Trinity County Department of Transportation. He also noted that building staff had previously attended a training on EVCS in Redding, California.

In addition to meeting with the Transportation Planner, Mr. Carman met with staff from the Trinity County Building Department. During this meeting, the County's current permitting process for EVCS was reviewed and discussed. They currently require 10% site designs and one line diagrams before a permit will be issued. Due to funding and staffing concerns, it was determined that Trinity County will not be able to streamline their EVCS permitting process in the near future. A resources binder was left with the Department to assist them with future evaluations of their permitting process.

Due to the remoteness of Del Norte and Trinity Counties, and a lack of planning staff, it was determined that EVCS workshops were not feasible for those areas. However, many AHJs in Humboldt County do have planning staff, and RCEA's central location in the County made it an ideal location to host a workshop. On February 16th, 2017, SERC and RCEA hosted a workshop for planning and building staff at RCEA's office in Eureka.

The project team recruited planning and building staff through emails, phone calls, and physical distribution of an event flyer. Conversations with smaller AHJs in Humboldt County, like the cities of Blue Lake and Trinidad, revealed that all planning work is contracted through local planning firms. Therefore, outreach was also targeted to local planning firms that service AHJs in Humboldt County.

Staff members from the cities of Eureka, Arcata and Fortuna attended the workshop, along with representatives from the private firms of GHD and Greenway Partners. Mr. Carman delivered a presentation on EVCS planning, zoning, codes, standards, and permitting. The full presentation is included as Appendix D. In particular, sections of the presentation on new EVCS accessibility requirements and streamlining recommendations generated productive discussion. It was evident from these discussions that some smaller cities are feeling squeezed by the new EVCS accessibility requirements, due to the higher number of required parking spaces, and the requirements to streamline permitting processes, due to lack of staff and low familiarity with the mechanics of EVCS.

In addition to the presentation and discussion, the workshop included a site visit to an operating EVCS. This presented an opportunity for planning and building staff to become more familiar with the form and operation of an EVCS, as well as explore important site planning considerations. The particular EVCS visited by the group was not in compliance with the latest version of the California Building Code, which enabled a discussion on how a new installation would need to be different to achieve compliance.

2.1.3 Results

Feedback from participants in the workshop and meetings was positive, and the project team received follow up requests for additional information. While no attendees expressed any immediate plans to streamline their EVCS permitting and inspection processes, they were provided with all the resources they would need to initiate the process. Resource binders were also delivered to the AHJ's unable to attend the workshop.

In addition, the development of EVCS Permitting Guides provided another opportunity for AHJs to examine their own permitting processes. These guides are currently available to contractors and the general public at the Planning and Building Department offices for Humboldt County and the City of Eureka. These guides are included as Appendix C.

2.2 EVCS Installation Process

The goal of this task was to produce a streamlined set of EVCS criteria to assist potential EVCS owners/operators in choosing what equipment to install and to assist contractors with adopting best practices and understanding regional permitting requirements. This was accomplished through the development and distribution of a comprehensive EVCS selection guide and distribution of materials developed through tasks 2.1 and 2.6.

2.2.1 EVCS Selection Guide

RCEA in partnership with SERC, developed a comprehensive selection guide of available EVCS models. The purpose of this guide was to assist contractors, municipalities, and site hosts in general assess the available EVCS options, and select a model most suited to their needs.

2.2.1.1 Guide Structure

The guide provides an objective comparison of EVCS models based on standardized criteria. To begin, the guide poses these questions to help users assess their needs:

- What type of charging do you want to provide?
- Do you want a networked charger or a stand-alone charger?
- Do you wish to charge for access to an EVC? What costs are you willing to incur?

To help users answer the first question, the guide provides a thorough discussion of different charging types, including charging levels, standards, and operational considerations. This is followed by a comparison of networked versus stand-alone EVCS, with a breakdown of additional features offered by networked EVCS and additional cost/reliability considerations. To help answer the final question, the guide provides information on potential costs incurred by a site host, like network fees and meter fees, and information on price structures for EV drivers, such as per kWh fees and time-based fees.

However, the essence of the guide is a series of tables giving users side-by-side comparisons of EVCS specifications. Users can compare hardware specifications, software features, payment systems, and certifications from 17 different EVCS manufacturers. Specifications are provided for the following categories:

- Hardware – Electrical
    - Number of Charging Ports/Type, Input Power, Output Power, Cross Vendor Software Compatibility, and Operating Conditions
- Hardware – Mechanical
    - Mounting, Cable Management, Number of Charging Ports/Type, Theft Deterrence, Power Rating input(s), and Operating conditions
- Management Software
    - Remote Management, Cross Vendor Hardware Compatibility, Network Protocol, Demand response capability, and Data Reporting
- Payment System

    - Open Access, Customer Payment, Price Setting Option, and Owner Payment
- Certifications
    - Listings, Accessibility Features, First Entry to EVSE Market, and Installation Rating

The Full EVCS Selection Guide is included as Appendix E.

2.2.1.2 Guide Development

The project team had the opportunity to leverage additional funding for the development of the guide through collaboration with the Upstate PEV Readiness Project. The lead agency for this project, the Siskiyou Economic Development Council (SEDC), has partnered with RCEA and SERC on a number of alternative fuels projects in the region. SEDC's goals for their Readiness Project also included the development of a resource to assist regional entities with EVCS selection, and thus were an obvious partner in the development of the EVCS Selection Guide.

Development of the guide began with collecting EVCS specifications. While some EVCS specifications were available on manufacturer's websites, much of the needed information was not made publicly available. To obtain EVCS specifications not listed on manufacturer's websites, the project team developed a form cover letter and distributed it to manufacturers. Response from manufacturers was mixed; some responded immediately with the requested information, some required multiple follow up emails and phone calls, and a few never responded despite the project team's best efforts.

2.2.2 Engagement

Once completed, the EVCS Selection Guide was distributed locally to contractors and municipalities, and nationally to the Department of Energy and the National Renewable Energy Laboratory. The Hawaii State Energy Office has the guide listed as a resource on their website.[1] It was also posted on the RCEA website.[2] In addition to wholesale distribution, the guide has been useful as follow-up material to consultation services provided by RCEA. As a regional PEV resource, RCEA is often consulted by contractors and municipalities with questions about EVCS. Soon after the guide was completed, The City of Arcata and Danco Builders both contacted RCEA for assistance in evaluating EVCS, and were provided the EVCS Selection Guide as a follow-up resource.

In addition to the EVCS Selection Guide, a suite of resources was compiled and distributed to local contractors. These materials were designed to equip contractors with all the resources needed to make informed decisions and provide sound advice to clients about EVCS. These resources included the following documents:

- "Contractor's Checklist for Residential EVCS Installation," adapted from the Governor's Office of Planning and Research's "Plug-in Electric Vehicle

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1 http://energy.hawaii.gov/testbeds-initiatives/ev-ready-program/electric-vehicle-ev-charging-stations-in-hawaii

2 http://www.redwoodenergy.org/index.php/services/alternative-fuels

Infrastructure Permitting Checklist." This document provides contractors with a six-phase technical checklist for installing EVCS at residential locations.
- "Humboldt County EVCS Permitting Guide," a copy of the most generic version of the permitting guides described in section 2.2.1.

These resources were distributed to local contractors and to the Humboldt Builders' Exchange for distribution to its members. The Humboldt Builders' Exchange is a local non-profit consortium of over 300 contractors that provides education and support services for its member businesses.

2.3 EVCS Siting

RCEA contracted with SERC to provide technical support and services for implementing the North Coast Plug-In Electric Vehicle Readiness Plan (Plan). This task focused on micrositing potential site host locations of electric vehicle (EV) chargers in order to support the accelerated adoption of electric vehicles in the planning region of Del Norte, Humboldt, and Trinity counties. The primary goals were to:

- Visit site hosts previously mentioned in the Plan,
- Conduct outreach to new potential site hosts,
- Conduct site visits and site evaluations for new potential site hosts,
- Engage with all potential site hosts to inform them of their options and negotiate terms for future agreements between possible EVCS owners/administrators and site hosts, and
- Prepare and submit 30 – 40 engineering designs, drawings, and cost estimates for sites with the highest favorability and most willing site hosts.

Guided by macrositing recommendations from the Plan, SERC focused on obtaining geographic coverage over the planning region with the expectation that the private market will more likely focus on the higher population centers. 75 new potential site host locations were identified. Table 2 shows the breakdown of identified sites by county.

Table 2: The total number of locations that were considered and scored for the development of 10% engineering designs and cost estimates. A total of 26 of these locations were chosen. Six of these were funded and will be developed by ChargePoint.

	Potential Locations		
	AC	**DC**	**Total**
Del Norte	17	3	20
Humboldt	31	8	39
Trinity	15	1	16
Total	63	12	75

Source: SERC, 2017

Of the 75 identified sites, 36 (48%) are located in more rural areas of the planning region. Challenges with identifying favorable sites with a willingness to host charging

stations in the more rural areas of the planning region hampered SERC's ability to meet the geographic coverage objective. The focus on geographic coverage also conflicted with the goal of micrositing 30 – 40 sites because of challenges in rural areas. SERC was able to successfully complete engineering designs, drawings, and cost estimates for 26 sites. Thirteen of these sites (50%) are located in smaller outlying population centers.

Macrositing recommendations from the Plan provide guidance on the number of ports needed for a 2% penetration of EVs into the on-road community fleet. A focus on geographic coverage made significant progress towards meeting the recommended geographic distribution of the Plan. However, there is indication that the planning region may already be approaching an overbuild of necessary early market infrastructure in the population centers. The total number of ports recommended by the Plan for the three-county region is 101 AC and 5 DC. The total number of existing, known funded, and currently microsited plugs is 97 AC and 19 DC. Table 3 below provides a high-level summary of the macrositing results from the Plan.

Table 3: High level summary of the number of AC and DC plugs that are recommended by macrositing results from the Readiness Plan, are already existing, are funded but are not yet installed, or have been proposed under this project. Remaining indicates the number of plugs that remain to be installed to obtain the geographic distribution recommended by the macrositing results.

					Microsited for this Project								
County	Recommended		Existing		Funded				Proposed			Remaining	
	AC	DC	AC	DC	ReCargo		ChargePoint		AC		DC	AC	DC
					AC	DC	AC	DC	Pub	Fleet	Pub		
Del Norte	16	2	3	0	2	2	3	4	4	2	0	7	0
Humboldt	66	2	37	0	4	6	3	6	29	2	0	31	2
Trinity	19	1	1	0	0	0	0	0	7	0	1	12	0
Total	101	5	41	0	6	8	6	10	40	4	1	50	2

Source: SERC, 2017

However, the continued need for wider geographic coverage results in a shortfall of 50 AC plugs and 2 DC plugs (total shortfall is so large because there are numerous areas that have substantially more plugs than macrositing results indicate are needed)[3]. This shortfall occurs primarily in the more rural areas of the planning region. This result is due to the following factors:

- The local communities, who are historically early adopters, are funding their own installations primarily in the population centers,
- The state-funded West Coast Electric Highway effort exceeds projected early market needs, and

3 See Appendix F for additional details.

- It is challenging to find locations in rural areas that have both favorable existing infrastructure and willing property owners.

New California Building Code requirements presented additional challenges to identifying potential locations with favorable existing infrastructure and willing site hosts. The main challenges were:

- The requirement to label EV charging spaces as "EV Charging Only". The majority of businesses in the planning region have limited parking. With few EVs currently on the road many business owners see this requirement as reducing their ability to attract customers.
- Americans with Disabilities Act (ADA) requirements further impact existing parking space. All designs require at least one EV charging space to be van accessible which requires the space of two standard parking spaces.

Furthermore, existing parking lot and path of travel infrastructure is often not well designed to accommodate the addition of EV chargers. Curbs, bollards, and wheel stops can present pedestrian path of travel hazards between the EV charger and the vehicle. ADA path of travel can be particularly challenging when the EV charger is located on a different elevation than the vehicle, such as a sidewalk. We also learned it is extremely important to be mindful of the fact that the driver will need to safely navigate this path of travel while also pulling a long electrical cord.

The designs and drawings developed successfully highlight and address these challenges. Solutions to these challenges developed during the micrositing effort were communicated to numerous permitting and planning staff in the region. The drawings developed will also inform the site hosts and contractors who implement them. The full Micrositing Results Summary Report developed by SERC is included as Appendix F.

2.4 Signage

RCEA, in coordination with Caltrans District 1 and Public Works Departments across multiple jurisdictions, planned and constructed a network of EVCS trailblazing signage. Signage routes now direct drivers to nine regional EVCS off of Highway 101 and State Route 255. By completing signage routes between the EVCS and the state right-of-way, Caltrans will install EVCS signage on highway exit signs.[4]

2.4.1 Sign Placement

The first step in the process of establishing a network of EVCS trailblazing signage was to select top priority EVCS in the region. EVCS were ranked based on the number of trailblazing signs that would be required to complete a route, the number of resulting highway signage installed by Caltrans, and the willingness of the jurisdiction to host the signs. The objective was to maximize the number of signs installed on the state right-of-

[4] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/documents/alternative_fuels_signage_fact_sheet-final.pdf

way while minimizing the number of trailblazing signs installed by RCEA. EVCS with signage routes that resulted in a higher ratio of state right-of-way signs to city trailblazing signs were considered to have a higher return on investment (ROI). Table 4 below lists all of the regional EVCS and assigned priority level.

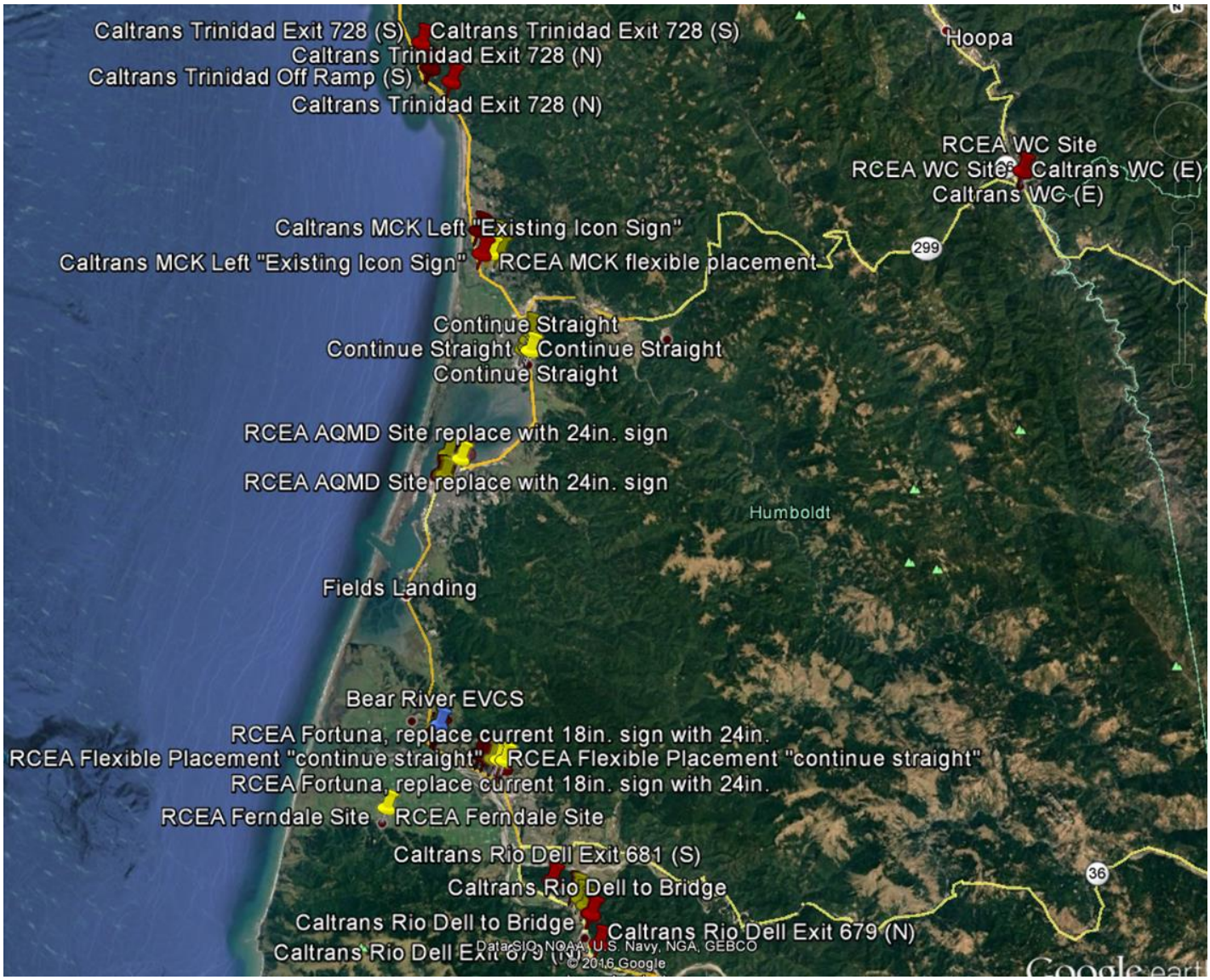
Table 4: Priority List of Sign Placements for Trailblazing Routes

Priority List of Sign Placements						
Trailblazing Route	**# of Signs in Route**	**Caltrans Signs**	**Priority 1**	**Priority 2**	**Priority 3**	**Justification**
Rio Dell	2	4	X			Southern most indication of charging infrastructure, good ROI
Fortuna	2	2		X		Average ROI, likely low utilization
Ferndale	1	0			X	No ROI, likely low utilization
Eureka, Caltrans	2	2		X		Average ROI, frequently occupied, coordination potential with Caltrans
Eureka, C Street	1	2	X			Will likely beapproved, good ROI, first sign in Eureka
Eureka, GHD	2	2			X	Average ROI, City may not approve sign locations
Eureka, AQMD	1	2	X			Good ROI, could locate sign on AQMD property and bypass City
Eureka, St. Joes	3	2			X	Low ROI, only charging infrastructure indication on Myrtle
Arcata, F Street	1	3	X			Good ROI, Caltrans signs gets drivers reasonably close to ATC location
Arcata, ATC	2	1		X		Low ROI, drivers may be able to find without additional sign on 255
McKinleyville	2	2	X			Average ROI, potential for high utilization
Trinidad	1	4	X			Northern most indication of charging infrastructure, good ROI
Redway	2	4			X	High ROI, Not a typical pedestal EVCS, not ADA, no dedicated spaces
Bear River	2	3		X		Low ROI, may be able to coordinate signs with Bear River
Totals:	**24**	**33**	**8**	**8**	**8**	

Source: Redwood Coast Energy Authority

The project team identified six Priority 1 EVCS, four Priority 2 EVCS, and four Priority 3 EVCS. Likely trailblazing sign locations for Priority 1 and 2 EVCS were identified using "pins" on Google Earth. The resulting map was presented to Deb Meredith, the signage coordinator for Caltrans District 1, for feedback. A screenshot of the map is included as Figure 1.

Figure 1: Screenshot of Signage Plan Development on Google Earth



Source: Google Earth, adapted by the Redwood Coast Energy Authority

After incorporating Deb Meredith's feedback, possible trailblazing sign locations were presented to each jurisdiction for approval. Collaboration with representatives from each jurisdiction presented unique advantages and challenges. The following list summarizes RCEA's experiences with representatives from each jurisdiction, organized from South to North.

<u>City of Rio Dell</u>

Representative: Kyle Knopp, City Manager, City of Rio Dell

Summary: The proposed sign route originally submitted to Mr. Knopp included two sign installations. One sign would be located on Wildwood Ave., directly across from the

EVCS. This sign would direct north-bound drivers to turn left. The other sign would either replace or reorient the current EV sign at the entrance to the parking lot. This sign would direct south-bound drivers to turn right.

Mr. Knopp requested additional signs be added at the intersections of Bellview Ave. and Davis St. with Wildwood Ave. This way an EV driver could be directed to the EVCS from every route into the city.

A total of four trailblazing signs were included in the final agreement.

City of Fortuna

Representative: Mike Johnson, General Services Superintendent, City of Fortuna

Summary: The proposed sign route submitted to Mr. Johnson included four sign installations. These signs would direct drivers from Highway 101 to Main Street, then right on 11th Street where the EVCS is located. Mr. Johnson approved all proposed locations.

A total of four trailblazing signs were included in the final agreement.

Humboldt County

Representative: Bob Bronkall, Deputy Director of Public Works, Humboldt County

Summary: The EVCS at the Bear River Casino in Loleta and the EVCS in the McKinleyville shopping center in McKinleyville are both within Humboldt County's jurisdiction. A signage route including one sign for the Loleta EVCS and four signs for the McKinleyville EVCS were submitted for Mr. Bronkall's review. He approved all suggested placements.

A total of five trailblazing signs were included in the final agreement.

City of Eureka

Representative: Scott Ellsmore, Engineering Technician, City of Eureka

Summary: The original signage plan submitted to Mr. Ellsmore included seven signs, directing EV drivers to three EVCS within the city. Mr. Ellsmore denied six of the proposed signs, citing sign blight and the fact that the city does not offer the same signage installation services to gas stations. The selected sign directs EV drivers to the EVCS located on C St.

In addition to discussing trailblazing sign placements, Mr. Ellsmore suggested a new approach to having the signs installed. RCEA had originally planned on soliciting bids from private contractors to perform installations across the County. Instead of this, Mr. Ellsmore suggested approaching Public Works Departments about installing the signs themselves, and offering to reimburse them for time and materials. This was the approach RCEA ultimately ended up taking.

A total of one trailblazing sign was included in the final agreement.

City of Arcata

Representative: Netra Khatri, Assistant City Engineer, City of Arcata

Summary: The original signage plan submitted to Mr. Khatri included three signs, directing drivers to the EVCS at the Arcata Technology Center and the EVCS at the F Street public parking lot. The proposed sign route directed drivers from SR 255 to the EVCS. To provide direction for EV drivers entering the city from Hwy 101 on the Northern end of the City, Mr. Khatri requested adding an additional seven trailblazing signs.

A total of ten trailblazing signs were included in the final agreement.

City of Trinidad

Representative: Bryan Buckman, Director of Public Works, City of Trinidad

Summary: The original sign plan submitted to Mr. Buckman included two signs directing EV drivers to the EVCS on Patrick's Point Drive. These signs were to be located at the intersection of Patrick's Point Drive and Main Street, as well as directly across from the charging station. Mr. Buckman opted not to install either sign, citing sign blight.

No trailblazing signs were included in the final agreement.

2.4.2 Installation Process

To install the network of EV trailblazing signs across Humboldt County, RCEA originally intended to hire a single subcontractor. A Request for Proposals was developed, with the intention of identifying a local contractor to install all of the required signs. However, during a conversation with Scott Ellsmore, an engineer with the City of Eureka, an alternative approach was suggested.

Because a private contractor would have to purchase costly encroachment permits for projects in each jurisdiction's right-of-way, and would be required to coordinate all work with each jurisdiction's Public Works Departments, Mr. Ellsmore suggested forgoing an agreement with a private contractor and instead requesting each jurisdiction perform the installation themselves. Each jurisdiction would be reimbursed for time and materials.

Per California Energy Commission requirements, an agreement was signed with each jurisdiction and they were added as minor subcontractors under agreement ARV-14-046. These agreements included the locations for trailblazing signs with in the jurisdiction and the estimated budget to complete the work. The agreement between RCEA and the City of Eureka is included for example as Appendix H.

After finalizing the agreements with all jurisdictions, the necessary trailblazing signs were ordered. This included standard EV charging symbol signs (MUTCD D9-11b (alternate)), left, right, and straight arrows. The specifications for the EV charging symbol sign are included in Appendix H. Extras were ordered should any signs get damaged and need to be replaced. RCEA financial protocol requires obtaining three quotes for any purchases between $500 and $4,000. Therefore, quotes were requested from three local sign shops, with Statewide Traffic and Safety in Arcata, CA providing the lowest quote.

After signs arrived from Statwide Traffic and Safety, they were delivered to each jurisdiction for installation. A representative from each Public Works Department signed

a receipt to confirm delivery. All signs were installed over the course of the next few months. Deb Meredith with Caltrans was kept up-to-date with the progress of installations, with the final sign being installed in April of 2017.

2.4.3 Results

Trailblazing signage was installed for nine EVCS in Humboldt County. A total of 24 trailblazing signs were installed, while the installation of 27 highway signs is planned by Caltrans. Coordination with local jurisdiction's Public Works Departments, as an alternative to using a private contractor, provided the project with significant cost savings. In addition, the Caltrans sign coordinator proved to be an invaluable resource for identifying the best locations for trailblazing signs. Table 5 below includes a listing of the selected EVCS, number of trailblazing signs installed, and planned # of Caltrans sign installations. Pictures of all EVCS trailblazing signs are included as Appendix I.

Table 5: Selected EVCS and Number of Signs Installed

Station Location	Station Address	Jurisdiction	# of Signs (RCEA)	# of Signs (Caltrans)
Rio Dell Public Parking	203 Wildwood Ave, Rio Dell, CA 95562	City of Rio Dell	4	5
Fortuna Public Parking	638 11th St, Fortuna CA 95540	City of Fortuna	4	4
Bear River Hotel	11 Bear Paws Way, Loleta, CA 95551	Humboldt County	1	4
Fishermen's Market Square	4 C St, Eureka, CA 95501	City of Eureka	1	2
North Coast AQMD	707 L St, Eureka, CA 95501	City of Eureka	0	2
F Street Arcata Public Parking	685 F St Arcata, CA 95521	City of Arcata	8	4
Greenway Building	1459 8th St., Arcata CA 95521	City of Arcata	2	2
McKinleyville Shopping Center	1514 City Center Rd, McKinleyville, CA 95519	Humboldt County	4	2
Willow Creek China Flat Museum	38949 CA-299, Willow Creek, CA 95573	Humboldt County	0	2
Total:			**24**	**27**

Source: Redwood Coast Energy Authority

2.5 PEV Awareness

Even with the proliferation of commercial PEV models, educating people about the benefits of PEVs is still critical to supporting PEV adoption. In a survey conducted by the Air Resource Board in 2016, 77% of respondents, representing car-buying households in California, had yet to seriously consider a PEV.[5] Promoting awareness of PEVs was a central goal of ARV-14-046, and was successfully implemented through a variety of

5 Kurani, K., Caperello, N., TyreeHageman, J. (2016). New car buyers' valuation of zero-emission vehicles: California. California Air Resources Board. www.arb.ca.gov/research/apr/past/12-332.pdf

outreach activities. Table 6 provides a listing of outreach activities conducted as part of this project.

Table 6: Outreach Activities

Outreach Activity	Number Conducted	Estimated Impressions
Presentations	7	400+
Ride and Drives	4	300+
Tabling at Community Events	24	2000+
PEV Car Shows	6	2000+
PEV Newsletters	6	852
Earned Media	18	2000+
Facebook Posts	28	819

Source: Redwood Coast Energy Authority

2.5.1 Awareness Campaigns

RCEA hosted and participated in community events throughout the County to promote PEVs. In addition, RCEA maintained a constant presence online through Facebook posts, earned media placements, and PEV newsletters.

2.5.1.1 Outreach Events

Presentations

The project team presented to local, regional, and state-wide groups to promote PEV awareness and encourage adoption. Presentations were given at the following events:

- Humboldt State University's Sustainable Futures Series, Arcata
- The Clean Cities Symposium, Eureka
- The Eureka Rotary Club's monthly meeting, Eureka
- The State-Wide Energy Efficiency Collaborative's (SEEC) Forum, Riverside
- The North Coast Climate Conference, Arcata
- The North State Super Region Annual Meeting, Redding
- Ribbon-cutting ceremony for the St. Joseph Hospital EVCS, Eureka

Ride-and-Drives

Ride-and-Drives were a central part of the overall campaign strategy, as these events are likely to increase PEV sales[6]. Aside from a lack of awareness, myths about the poor driving experience and low quality of PEVs pose a barrier to consumer interest. Ride-and-Drive events are an opportunity to dispel these myths and prove that PEVs can be more fun to drive and better appointed than their ICE vehicle counterparts.

6 Freyschlag, A. (2016). Drive Electric Northern Colorado – A community-wide approach to EV adoption. Retrieved from http://evroadmapconference.com/program/pre-sentations16/AnnieFreyschlag.pdf

RCEA organized Ride-and-Drive events at three locations in Humboldt County – the Redwood Acres Race Track, the Arcata Community Center, and the Humboldt Bay BMW dealership. Events varied in structure, with the first Ride-and-Drive organized as a stand-alone event at the Redwood Acres Fair Grounds. The second Ride-and-Drive was held at the Humboldt Bay BMW dealership, celebrating the launch of the BMW i3 PEV. The third Ride-and-Drive was again held at the Redwood Acres Race Track, in conjunction with the Humboldt County Fair. The final Ride-and-Drive was held at the Arcata Community Center, and participants where shuttled over from the North County Fair half a mile away.

The structure of each event provided unique opportunities and challenges. For example, while a stand-alone event offers the greatest flexibility and autonomy, participation can be low compared to joining a larger event. Hosting an event at a dealership guarantees dealer participation, but may be less enticing for attendees. For all events, RCEA partnered with area dealerships to provide an assortment of PEVs, and dealership staff were onsite to answer questions.

Before all Ride-and-Drive events, RCEA contacted local media outlets and provided them with marketing materials and information. Event details were posted on news websites and online event calendars. In addition, event details were posted on RCEA's website and Facebook page. A full listing of events, along with features in media, is included as Appendix J.

PEV Car Shows

In October of 2015, RCEA had originally planned to organize another Ride-and-Drive event. However, area dealerships opted not to participate, citing a variety of reasons. Instead, the event was converted into a PEV car show, with community members displaying their personal PEVs. Due to the success of this first event, five more of these PEV car shows were held over the course of the project. In many instances, PEV owners opened up their vehicles and invited attendees to sit inside, play with the controls, and evaluate the interior. As early adopters, they were eager to share their experiences owning a PEV and explain its benefits. Hearing this message from fellow community members was especially impactful, as event attendees often engaged with PEV owners longer than with dealership staff. One event in particular, the PEV car show at the 4th of July parade in Eureka, resulted in 1,450 impressions and had 6 different PEVs on display.

Tabling at Community Events

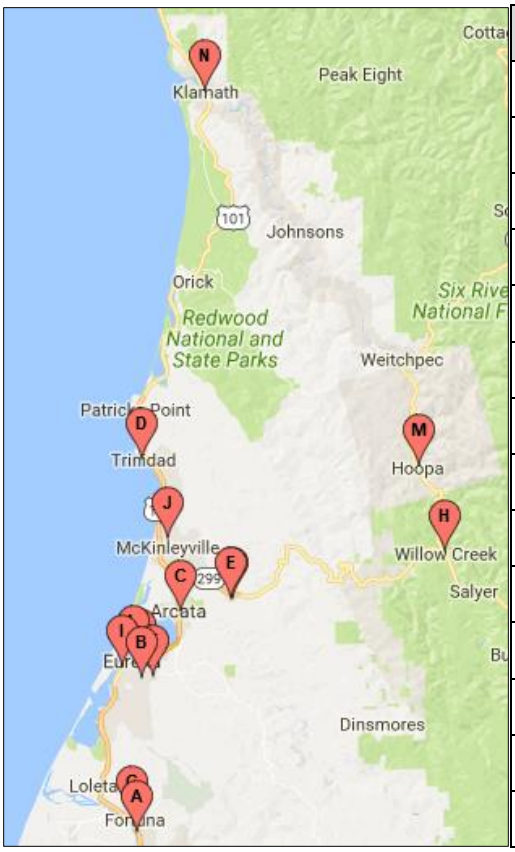
RCEA staff tabled at 24 community events over the course of the project. By participating in a wide range of community events, the project team was able to educate a diverse cross section of County residents about the benefits of PEVs. In particular, participation in events that did not have a sustainability focus, like Pony Express Days in McKinleyville, initiated beneficial conversations about PEVs with residents that had never been exposed to PEVs. PEV promotional material was displayed and the following materials were distributed:

- Clean Cities Vehicle Buyer's Guide
- Map of public electric vehicle charging stations

- The latest version of RCEA's PEV newsletter
- PG&E PEV collateral
- Information on CEC funded alternative fuels projects in the region
- RCEA promotional items, like pens and stickers

Events selected for this project were carefully chosen to reach the widest possible demographic. Participation in events like the Sustainable Living Expo in Arcata and the Party for the Planet at the Sequoia Park Zoo targeted environmentally conscious consumers, while participation in the Trinidad Fish Festival and Pony Express Days in McKinleyville reached a wider audience. Figure 2 provides the location and distribution of outreach events throughout the County.

Figure 2: Map and Locations of Community Events



Letter	Event Location	# of Events
A	Eel River Brewing, Fortuna	1
B	Sequoia Park Zoo, Eureka	2
C	Arcata Community Center, Arcata	2
D	Trinidad School, Trinidad	1
E	Mad River Brewing, Blue Lake	2
F	Redwood Acres Fairgrounds, Eureka	3
G	Fortuna Chamber of Commerce, Fortuna	2
H	Bigfoot Museum, Willow Creek	2
I	Eureka Natural Foods, Eureka	2
J	Central Ave, McKinleyville	2
K	Humboldt County School District, Eureka	1
L	3rd Street, Eureka	2
M	Hoopa Valley, Hoopa	1
N	Klamath Community Center, Klamath	1

Source: Batch Geo, adapted by the Redwood Coast Energy Authority

2.5.1.2 Online Outreach

Earned Media

Over the course of the project, 18 earned media placements were achieved. The following organizations included content on project successes on their websites:

- Humboldt Visitors Bureau
- Lost Coast Outpost
- News Channel 3
- NGT News
- North Coast Journal
- North Coast News Channel 23
- The Times Standard

Write ups in media outlets promoted the current EVCS network and upcoming PEV events like car shows and ride-and-drives. Members of the project team were also consulted for articles discussing the current status of transportation in the region and opportunities for improvement through the incorporation of PEVs.

Facebook Posts

RCEA maintained an active social media presence over the course of the project. 28 posts relating to PEV promotion were included on the RCEA Facebook Page. These posts highlighted relevant PEV articles, events, and statistics. In addition, posts promoted the regional EVCS network and PEV efforts by RCEA's partners, like the North Coast Unified Air Quality Management District and Humboldt State University.

PEV Newsletters

RCEA developed six PEV newsletters for distribution to the general public. Newsletters were distributed using the email campaign management service MailChimp, posted on the RCEA website, and hard copies were handed out at PEV promotion events. Email versions of the newsletter were sent out to 852 subscribers, and email open rates were tracked using Mailchimp's campaign management software.

Article topics included:

- Currently available incentives for PEVs
- The status of PEV adoption locally, state-wide, and nationally
- How PEVs work, different types of PEVs available, and FAQs
- PEV owner testimonials
- Existing and planned EVCS
- Where to buy PEVs, with information from local dealerships
- Work done by the CEC to promote PEVs
- Links to additional resources

All six PEV newsletters distributed as part of this project are included as Appendix K.

2.5.2 Fleet Analyses

The project team performed two comprehensive fleet evaluations as part of this project. Analysis was conducted for municipal fleets operated by the City of Arcata and Humboldt County. These analyses determined the potential costs savings and potential emission reductions achievable by replacing end-of-life conventional vehicles with BEVs or PHEVs.

To conduct these fleet analyses, the project team utilized a comprehensive excel tool developed by SERC as part of the North Coast PEV Readiness Project. This tool, called PEV Fleet Evaluation Tool (PEV_FleET), takes data on fuel economy, average trip distance, annual mileage, percentage city driving, and MSRP of PEV and ICE vehicles and calculates GHG emissions avoided and the payback on a PEV purchase. If the PEV replacement paid for itself within ten years of purchase, it was proposed to the municipality for consideration.

The PEV FleET tool can be customized with different parameters to account for each municipality's unique circumstances. The following inputs can be customized:

- Applicable rebates, tax credits, and other incentives;
- Electric vehicle supply equipment (EVSE), brand, model, and capabilities;

- Number of EVSE units purchased;
- EVSE unit design, engineering, and installation costs;
- Gasoline price;
- Electric utility rate price structure;
- Percentage on/off peak charging;
- PHEV and BEV maintenance costs factors (as function of conventional maintenance costs);
- Real discount rate (net of inflation)

The first step in the analysis process was finding interested fleet partners. A list of fleets in the region was compiled and the project team began making phone calls. Preference was given to local municipalities and fleets with a large number of light duty vehicles. The City of Arcata and Humboldt County expressed interest in analysis and were chosen to participate. The results from their analysis are included in the sections below.

2.5.2.1 The City of Arcata Fleet Analysis

The project team collaborated with Lori Reed from the City of Arcata to complete an analysis of the City's fleet. The City's fleet had received an analysis in 2013 as part of the North Coast PEV Readiness Project, but the composition of the fleet, and available PEV models, had changed substantially since this analysis.

Ms. Reed provided the project team with a full list of vehicles that were eligible for replacement. After discussion with Ms. Reed about the duty requirements of each vehicle, a total of ten vehicles were selected for analysis. These vehicles serve three different departments: Administration (5), Police (3) and Water (2).

2.5.2.2 City of Arcata Results

The City currently operates two GO-4 ICE parking enforcement vehicles. These vehicles represent two of the three vehicles in the Police Department that were selected for analysis. Due to the highly-specialized nature of these aging vehicles, the City was incurring extremely high maintenance costs. The project team proposed replacing the GO-4s with all-electric parking enforcement vehicles. BEVs like the Smart Car EV or Mitsubishi i-Miev would meet the unique duty requirements of parking enforcement and eliminate much of the city's current maintenance cost.

In addition to parking enforcement, the project team recommended replacing vehicles in the Administration Department. A few of the vehicles in the department had high range requirements (300+ miles) and thus required replacement by PHEVs. Due to the relatively higher MSRPs of currently available PHEVs, they did not offer paybacks within the useful life of the current ICE vehicles. However, a few of the department's vehicles did not require such high maximum range, and the City was considering replacing them with a conventional hybrid Toyota Prius. Compared with a Toyota Prius, the BEV Nissan Leaf would pay back in 1.7 years, the BEV Mitsubishi i-MiEV in 4.4 years, and the BEV Chevy Spark EV in 7.3 years.

The Water Department's meter reader vehicle was deemed not to be a good fit for PEV replacement due to the need to carry a ladder. However, because the Department

operated two Ford Rangers, the project team recommended replacing one of them with a Kia Soul EV. Even though this model provided a longer payback period (7.4 years) compared to other BEV models, the cargo capacity requirements of the Water Department necessitated a vehicle with a larger trunk.

The results of the analysis were presented to Julie Neander, deputy director of Environmental Services for the City of Arcata. Along with the analysis report, a Clean Cities Buyer's guide and specifications on proposed PEV replacements were provided. After presenting all the material, Ms. Neander requested information on other jurisdiction's experiences with PEV parking enforcement vehicles. After conducting research, the project team connected Ms. Neander with representatives from cities currently operating PEVs as parking enforcement vehicles.

While not among the top recommendations in the analysis report, the City later decided to purchase two Chevrolet Volt EVs. These Volts replace two conventional vehicles in the Administration Department. RCEA has been working with the City to evaluate different charging options for their new PHEVs.

The full fleet analysis report for the City of Arcata is included as Appendix L.

2.5.2.3 Humboldt County Fleet Analysis

The project team collaborated with Senior Automotive Technician Jo Wattle to complete an analysis of the County fleet, which is the largest in the region. The County submitted eighteen vehicles for evaluation. These vehicles included fifteen Ford Taurus's and three Toyota Prius's that were scheduled for replacement during the 2017-2018 fiscal year. While the County planned on replacing a number of other vehicles during this fiscal year, only vehicles in the medium and full-size sedan classes were considered for the analysis, due to lack of suitable plug-in electric counterparts for vehicles in larger classes.

An early challenge was the timing. The County agreed to collaborate with the project team on the fleet analysis during their process of soliciting bids for new vehicles for fiscal year 2017-2018. This meant that accurate information on the conventional replacements could not be provided immediately. The project team first began collaboration with the County in November, 2016, but did receive accurate data on conventional replacement vehicles until February, 2017.

Because of the lack of information on fiscal year 2017-2018 winning bids for replacement vehicles, the project team, in conjunction with Ms. Wattle, elected to use replacement vehicles from fiscal year 2016-2017 as proxies for 2017-2018 vehicles. The conventional replacement vehicles used in the analysis were the 2017 Dodge Charger as replacement for the Ford Taurus and the 2017 Ford Fusion Hybrid as replacement for the Toyota Prius.

2.5.2.4 Humboldt County Results

Results from the Humboldt County fleet analysis showed significant opportunities for savings through the replacement of conventional vehicles with PEVs. Should the County replace all eighteen vehicles with the cheapest suitable PEV, the 2017 Nissan Leaf, a net present value of $212,000 over the ten-year lifetime of the vehicles was calculated. This was due in large part to rebate and discount opportunities available on this particular

model. The Nissan Leaf is eligible for a Clean Vehicle Rebate Project (CVRP) rebate of $2500 and an $8000 Nissan fleet discount, available if a fleet operator buys two or more vehicles at a time.

The Nissan Leaf was not the only PEV that paid for itself within the ten-year lifetime of the vehicle. Six other 2017-model PEVs – the Mitsubishi i-Miev, Ford Focus Electric, Volkswagen e-Golf, Kia Soul EV, Toyota Prius Prime, and Ford C-Max Energi - had payback times of less than ten years when replacing a Ford Taurus. When replacing a Toyota Prius, two PEVs – the Nissan Leaf and Mitsubishi i-Miev—had payback times of less than ten years.

The potential GHG emission reductions were also calculated. When compared to the Dodge Charger, all cost-effective BEVs achieved emission reductions of 4.4 tons per vehicle per year, while the PHEV Toyota Prius Prime and Ford C-Max Energi achieved reductions of 3.4 and 2.7 tons per vehicle per year respectively. The two cost-effective replacements for the Toyota Prius achieved reductions of 2.1 tons per vehicle per year.

Team member Elliot Goodrich met with Ms. Wattle to present the analysis findings. Ms. Wattle was enthusiastic about the prospect of incorporating PEVs into the County fleet of 420+ vehicles. Ms. Wattle had just taken over as automotive technician in charge of purchasing and fleet management, and was looking for ways to incorporate more cost-effective green vehicles into the fleet. Mr. Goodrich delivered the PEV_FleET tool to Ms. Wattle and provided training on use of the tool.

Ms. Wattle described several of the challenges she faced to incorporating PEVs. The principle barrier was that many municipal fleet operators are required to purchase the lowest cost option in a given class. In the County's case, fleet operators are only permitted to choose from a list of vehicle bids that are submitted by eligible dealers. If the dealers do not bid PEVs, they will not have the option of purchasing these models. She was allowed to account for fuel economy savings in considering bids, but not the savings from reduced maintenance costs. Changing these requirements could be an important mechanism for encouraging PEV adoption in government fleets.

The fleet analysis report developed for Humboldt County is included as Appendix M.

CHAPTER 3:
Conclusions and Recommendations

3.1 Assessment of Project Success

The project was successful in implementing core elements of the North Coast PEV Readiness Plan and planning for the next phase of the regional EVCS charging network. The project team had productive engagements with AHJs, contractors, potential site hosts and the general public. Comprehensive and appropriate PEV resources were developed and distributed. In addition, RCEA has secured follow-on funding (CEC-PON-16-601) to continue ZEV outreach work and create an ombudsman position to provide regional ZEV technical assistance. The efforts that have been initiated through this project to educate stakeholders, promote PEVs, and plan for additional charging infrastructure in the North Coast region have been very successful, and it is likely that these efforts will be sustained in the future.

The set of bulleted points that follow evaluate project success based on the set of five project metrics that were stated in Section 1.2 of this report.

- **Encourage all eleven regional government entities to adopt streamlined processes.** Productive engagement was achieved with nine jurisdictions: Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Humboldt County, Rio Dell, Trinidad, and Trinity County. Engagement was attempted with the two remaining jurisdictions of Del Norte County and Crescent City. However, due to vacant planning and building positions, these entities lacked the capacity to engage on EVCS planning. In addition, a suite of resources was developed and distributed to nine jurisdictions to assist in the evaluation and revision of current permitting processes.
- **Successfully see at least four jurisdictions adopt new processes for permitting EVCS.** As of April 2017, the project team is not aware of any new processes formally adopted for permitting EVCS. However, discussions with nine regional jurisdictions has helped raise awareness of the need to streamline processes to achieve state-level goals. The project team provided the necessary resources for jurisdictions to begin reviewing and revising their processes.
- **Develop standardized specifications for charging station equipment and engage with at least three local contractors to encourage best practices.** A comprehensive EVCS Selection Guide was developed to assist potential EVCS owner/operators and contractors identify the most suitable EVCS for their application. This resource has been distributed regionally to contractors and municipalities, as well as nationally to the Department of Energy and the

National Renewable Energy Laboratory. The State of Hawaii Energy Office lists the guide as a resource on their website.[7]

- **Produce at least 30 and as many as 40 detailed EVCS designs and cost estimates in locations consistent with the Readiness Plan and with willing site hosts.** Potential EVCS site hosts were identified based on recommendations from the North Coast PEV Readiness Plan. Completed 10% engineering design drawings and opinions of probable costs were distributed to participating site hosts. A total of 26 detailed site assessments were completed, including a mix of DC and AC EVCS. Additional funding will be pursued to install EVCS at the locations assessed through this project.
- **Conduct outreach activities as specified in the grant agreement to promote the latest PEVs on the market.** The project team held four Ride-and-Drives, presented at seven events, tabled at 24 community events, organized six PEV car shows, distributed six PEV newsletters, earned 18 media placements, and made 28 posts on Facebook. These outreach activities resulted in an estimated 8,000+ impressions. In addition, two comprehensive fleet analyses were completed for the City of Arcata and Humboldt County. Participation in the fleet analysis process led the City to purchase two PHEV Chevrolet Volts.
- **Install directional signage guiding PEV drivers to at least 10 existing and soon to be installed EVCS.** The project team coordinated the installation of 24 trailblazing signs, which direct drivers to nine regional EVCS. These sign installations will result in the installation of an additional 27 signs by Caltrans along state right-of-ways. Sign placement for a tenth EVCS was stymied by two jurisdiction's unwillingness to host the required signs.

3.2 Conclusions and Lessons Learned

The PEV Readiness Plan Implementation Project was a success. The implementation of core elements of the PEV Readiness Plan resulted in a significant increase in regional awareness and capacity to accommodate a growing population of PEVs. While continued funding is required to support the full implementation of the PEV Readiness Plan, this project initiated momentum that will continue into the future.

Below is a summary of a few lessons learned during the project.

- Jurisdictions were appreciative of assistance, but insufficiently staffed and funded to follow through on many recommendations. Building and planning staff expressed frustration at mandates like AB 1236, which require jurisdictions to streamline EVCS permitting processes. A chief complaint was that resources necessary to implement requirements were not included in these mandates.

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7 http://energy.hawaii.gov/testbeds-initiatives/ev-ready-program/electric-vehicle-ev-charging-stations-in-hawaii

- Workshops are an effective venue for initiating discussion between jurisdictions. By getting staff from AHJs, engineering firms, SERC, and RCEA all in the same room, productive discussions were initiated and best practices were shared.
- Working with potential EVCS site hosts to determine an agreed-upon layout took more time than expected, averaging around 3 – 4 weeks per site. As a rural community with few large parking lots, building code requirements significantly impact existing parking infrastructure.
- Requesting that jurisdictions' Public Works Departments install EVCS trailblazing signage, as opposed to a using a private contractor, resulted in significant cost savings. After purchasing the signs and reimbursing each jurisdiction for time and materials, the total cost was under $7,000. The project team had originally budgeted $18,000 to have a contractor purchase and install the signs.
- The community responded positively to PEV car shows. Due to a lack of dealer participation, a switch to an EV car show format was necessitated after the fourth Ride-and-Drive event. Community members had an opportunity to see and discuss EVs driven by their friends and neighbors.

3.3 Recommendations

The following recommendations are made to increase regional PEV adoption and readiness.

- Encourage the organization of more EVCS workshops for building and planning staff. Workshops provide an opportunity for collaboration and the sharing of best practices between AHJs.
- Continue to update and improve the EVCS Selection Guide. The EVCS Selection Guide provides a critical resource to municipalities and contractors attempting to evaluate all of the different EVCS models. This is the only resource of its kind as of the writing of this report and should continue to be updated and distributed.
- Pursue EVCS installation at the sites identified. These sites were selected based on the Infrastructure Deployment Plan developed as part of the North Coast PEV Readiness Plan, and represent locations most critical to the sustainability of a regional EVCS network. Thorough site analysis and willing site hosts make these projects "shovel ready".
- Support research that evaluates the impact of EVCS accessibility requirements in the 2016 California Building Code on rural EVCS deployment. The project team experienced pushback from potential site hosts regarding the parking space requirements.
- Encourage municipalities to embrace EVCS trailblazing signage. The project team received pushback from a few regional municipalities when requesting to install trailblazing signage. These municipalities cited "sign blight" as their primary concern.

- Continue to promote PEVs throughout the region. Ride-and-Drive events and PEV car shows are particularly effective in changing perceptions.
- Provide incentives to fleets for participation in PEV fleet analysis. Access to rebates or credits after participating in an analysis will encourage engagement from fleets with historically low interest in alternative fuels. This is especially true for municipal fleets in rural areas.
- Engage with local fleets, particularly publicly owned fleets, to reduce barriers to the adoption of low and zero emission vehicles, and increase awareness of vehicle availability and fleet appropriateness as the market continues to develop.

Acronyms

Americans with Disabilities Act (ADA)

Alternative and Renewable Fuels and Vehicle Technology Program (ARFVTP)

Authority Holding Jurisdiction (AHJ)

Battery Electric Vehicle (BEV)

Commission Agreement Manager (CAM)

Direct Current Fast Charger (DCFC)

Electric Vehicle Charging Station (EVCS)

Electric Vehicle Supply Equipment (EVSE)

Greenhouse gas (GHG)

Plug-in Electric Vehicle (PEV)

Plug-in Hybrid Electric Vehicle (PHEV)

Redwood Coast Energy Authority (RCEA)

Schatz Energy Research Center (SERC)

Zero Emission Vehicle (ZEV)

APPENDIX A:
EVCS Permitting, Codes, and Standards Resource Binder

APPENDIX B:
Accessible EVCS Fact Sheet

APPENDIX C:
City of Eureka and Humboldt County EVCS Permitting Guides

APPENDIX D:
Workshop Presentation on EVCS Permitting, Codes, and Standards

APPENDIX E:
EVCS Selection Guide

APPENDIX F:
Micrositing Results Summary Report

APPENDIX G:
10% Engineering Designs and Estimates of Probable Cost

APPENDIX H:
Example Signage Installation Agreement

APPENDIX I:
Pictures of EVCS Trailblazing Signs

APPENDIX J:
Media Report

APPENDIX K:
PEV Newsletters

APPENDIX L:
City of Arcata Fleet Analysis Report

APPENDIX M:
Humboldt County Fleet Analysis Report