

California Energy Commission  
**CONSULTANT REPORT**

# North Coast and Upstate Fuel Cell Vehicle Readiness Project

Task 2.3 Fleet Engagement Summary Report

Prepared by: **Schatz Energy Research Center and Redwood Coast  
Energy Authority**



**California Energy Commission**

Edmund G. Brown Jr., Governor



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# California Energy Commission

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## PREFACE

Assembly Bill (AB) 118 (Núñez, 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 Energy Commission has an annual program budget of approximately \$100 million and provides financial support for projects that:

- Develop and improve alternative and renewable low-carbon fuels;
- Optimize alternative and renewable fuels for existing and developing engine technologies;
- Produce alternative and renewable low-carbon fuels in California;
- Decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability;
- Expand fuel infrastructure, fueling stations, and equipment;
- Improve light-, medium-, and heavy-duty vehicle technologies;
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets;
- Expand infrastructure connected with existing fleets, public transit, and transportation corridors; and
- Establish workforce training programs, conduct public education and promotion, and create technology centers.

The California Energy Commission (Energy Commission) issued solicitation PON-14-607 to fund Zero Emission Vehicle (ZEV) Readiness activities. To be eligible for funding under PON- 14-607, the projects must also be consistent with the Energy Commission's ARFVT Investment Plan updated annually. In response to PON-14-607, the Redwood Coast Energy Authority (Recipient) submitted application number 11, which was proposed for funding in the Energy Commission's Notice of Proposed Awards on March 17<sup>th</sup>, 2015, and the agreement was executed as ARV-14-055 on May 8<sup>th</sup>, 2015.

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## ABSTRACT

This report presents a summary of fleet engagement work conducted for the *North Coast and Upstate Fuel Cell Vehicle Readiness Plan Project*. Fleet engagement, as articulated in the ARV-14-055 grant agreement, involves conducting fleet vehicle assessments on the feasibility of switching fleet vehicles to FCEVs, assisting fleet managers with replacement strategies, and communicating potential fleet fuel demand to local fuel distributors and/or potential fueling site hosts. The work conducted for this report summarizes efforts made to satisfy these objectives, with a specific focus on outreach and engagement intended to educate fleet operators about FCEV technology and identify fleet partners for the development of the first fueling stations in the cities of Redding and Eureka.

**Keywords:** hydrogen, fuel, cell, vehicle, FCEV, station, fleet, hydrogen fueling infrastructure, planning, ARVTP, AB 8, AB 118, North Coast, Upstate, Eureka, Redding, California Department of Transportation, California Department of General Services, California Department of Fish and Wildlife, California Department of Government Operations

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## EXECUTIVE SUMMARY

This *Task 2.3 Fleet Engagement Summary Report* is an interim deliverable within the larger *North Coast and Upstate Fuel Cell Electric Vehicle Readiness Plan* project which covers an 8-county region in California. The goals of this report are to:

- Briefly summarize the results of the project team’s fleet engagement efforts.
- Centralize the information associated with the fleet outreach and engagement efforts to garner support and interest in the development of a local FCEV market by automobile OEMs and early market anchor fueling stations in the cities of Redding and Eureka, and
- Document next steps needed to build upon and further these efforts.

Vehicle fleets play a particularly important role in developing the early FCEV market in the project region. Currently, there are no FCEVs or hydrogen fueling stations in the North Coast and Upstate. As such, establishing a “seed” population of vehicles would create dependable demand and prevent stranded assets. Given the high capital costs associated with installing a hydrogen fueling station, establishing a base level of demand for the fuel in conjunction with station installation is necessary to achieve at least a minimum level of return on investment. Fleet use of FCEVs would provide this base level of demand.

Other advantages of engaging fleets to deploy FCEVs include:

- **Centralized operation and maintenance.** FCEVs are a new technology and mechanics will need to receive training to service this new technology. With centralized O&M, only a few mechanics will need to be trained initially which will be more cost-efficient. If fleet vehicles experience mechanical problems, it will be quicker to service the vehicles at a dedicated service shop, versus seeking out public-facing shops that may or may not have FCEV expertise.
- **Consistent and well-understood usage profiles.** FCEV ranges are still ~100 miles below the average internal combustion engine models; with limited infrastructure, range anxiety is still a consumer concern. If fleets pilot FCEVs, there will be a larger sample size with which to demonstrate FCEV performance in a variety of scenarios including landscapes with dynamic elevation, rural roads, long trips, utility vehicles with low vehicle miles travelled, etc. The more case studies that demonstrate how FCEVs perform in real-world conditions, the better.
- **Simplified refueling at a central depot.** Hydrogen fueling stations are expensive. Deploying FCEVs on the retail market requires redundant fueling infrastructure to meet the needs of drivers dispersed across any given landscape. With fleets, one central station can serve numerous vehicles, which makes it easier to service the station. Additionally, it is more cost efficient to deliver fuel to one fueling location versus several across a region.

- **Consistent tracking and evaluation of vehicle operating costs and total cost of ownership.** When determining the cost of incorporating new technologies, specifically vehicles, long-term maintenance and fuel expenses influence the economic feasibility of adopting said technology. Fleet managers tend to track vehicle O&M expenses, making it easier to calculate the payback period of FCEV adoption. When dealing with the average retail customer, it is much more difficult to provide an accurate picture of overall costs to inform their vehicle purchasing decisions as annual VMT varies greatly.
- **In the case of government fleets, an opportunity to shift early adoption risk to the public sector.** Government fleets are good guinea pigs for early technologies just leaving (or still existing within) the R&D phase. If technology fails for a given agency, the financial losses aren't borne by any single individual, which helps mitigate any market spoiling impacts while the technology is refined.

To promote the adoption of FCEVs in local vehicle fleets, the project team proposed the following objectives in the ARV-14-055 grant agreement:

- Work with municipal fleet managers and public transit operators, targeting those that operate within the municipalities of phase-1 anchor sites identified in Task 2.1, to conduct fleet vehicle assessments on the feasibility of switching to FCEVs;
- Assist fleet managers with fleet replacement strategies;
- Communicate potential fleet fuel demand to local fuel distributors and/or potential fueling site hosts;
- Create a Task 2.3 Summary Report of task activities including outcomes of fleet evaluations and fleet vehicle replacement plans.

In an effort to achieve these objectives, the project team completed the following activities:

- Identified fleets in the region;
- Distributed a Request for Information seeking information and interest from fleets throughout the region;
- Compiled resources for fleet managers;
- Evaluated the application of a fleet analysis tool to determine the economic feasibility of FCEV integration for local fleets;
- Surveyed local fleet operators;
- Educated fleet operators about the benefits of FCEVs;
- Focused follow-up efforts on engagement with phase-1 (Eureka and Redding) fleet managers;
- And offered fleet evaluations to the contacted parties.



In reflecting upon the objectives in the 2015 grant agreement today, the outcomes look different from what was initially envisioned. Whereas the project team planned to engage at length with municipal fleet managers and public transit operators to conduct fleet vehicle assessments, the most fruitful returns arose from engagement with State agencies. The project team did assist fleet managers with fleet replacement strategies, but conversations were stymied because there are no planned station installations for the project region at present. This development underscored the need to focus regional readiness efforts on accelerating infrastructure installation. Engagement with local fueling distributors and potential site hosts evolved over time as well to adjust the focus on the region's most immediate readiness needs.

# CHAPTER 1: Fleet Vehicle Assessments

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The project region covers 8 counties in total; Del Norte, Glenn, Humboldt, Mendocino, Shasta, Siskiyou, Tehama, and Trinity. To effectively engage each County, RCEA partnered with community-based organizations across the project region to conduct fleet engagement work. To facilitate the incorporation of FCEVs into municipal fleets, each County partner was directed to identify ten key fleets in their respective County and engage with three of those fleets to assess the feasibility of FCEV integration.

Each partner participated in a “Train-the-Trainer” webinar so they could speak with confidence to fleet managers regarding the status of FCEV and hydrogen fueling station technology. Each partner also had a fleet-specific handout (Appendix A) to share with managers which outlined the current models, incentives, and training resources for FCEV fleet applications. Thereafter, each partner sought to directly engage managers via informational interviews (Appendix B) that gathered information such as the number and types of vehicles in each fleet, interest and knowledge of FCEVs, interest in hosting a hydrogen fueling station, and interest in receiving a fleet assessment. In conjunction with the informational interviews, all project partners were asked to distribute a Request for Information (RFI) throughout their regional network.

## Fleet Information Gathering

Ten key fleets were identified for each County. Direct engagement with fleets was met with varied levels of success. The major conclusions drawn from these informational interviews were:

- Few fleets engaged via these informational interviews expressed interest in receiving a detailed assessment because the vehicles and fueling stations are not available locally;
- And, most fleets did not have sufficient funds to cover capital costs.

These results are similar to those described in Chapter 6 of the *Tri-Counties Hydrogen Readiness Plan*<sup>1</sup>.

## Fleet Evaluations

In 2017, the project team considered revamping an internal fleet analysis tool to include all ZEV vehicle options—namely fuel cell electric vehicles— in consultation with the City of Arcata, a municipality in Humboldt County. The project team was conducting a quantitative fleet assessment for Arcata, and sought to do a pilot assessment of FCEV replacements. After evaluating this application, the team determined that it would not

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<sup>1</sup> Santa Barbara County Air Pollution Control District. 2017. *Tri-Counties Hydrogen Readiness Plan*. California Energy Commission. Publication Number: CEC-XXX-XXXX-XXX.

be prudent to do quantitative assessments because the payback period for FCEVs would not be low enough to justify a departure from municipalities' default replacement ICE vehicles.

With this lesson learned, the project team determined that qualitative assessments would be provided in lieu of robust economic analyses. These "qualitative" assessments took the following form:

- 1) Approach fleet operators with requests for vehicle types and number of each class. If the fleet operator responded favorably to this data request and expressed interest in exploring replacement options, then step #2 was taken.
- 2) Assess vehicles in each class and replacement year, and compare to current market availability of FCEV options to determine to what extent FCEVs could be incorporated, and
- 3) Inform the fleet manager of this assessment, and determine next steps to expedite the adoption of FCEVs.

The results of these qualitative assessments are detailed below.

### **Caltrans**

The Caltrans Division of Equipment (DOE) purchased 20 FCEVs for the 2016-2017 fiscal year. Following this development, the Schatz Energy Research Center (SERC) engaged Caltrans regarding siting potential fueling stations in Districts 1 and 2. District 1 covers Del Norte, Humboldt, Lake, and Mendocino Counties. District 2 covers Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties. Glenn County is the only ARV-14-055 project partner that was not covered by this district engagement.

SERC decided *not* to offer a fleet vehicle assessment because Caltrans Districts 1 and 2 staff stated that Caltrans State headquarters would provide one or more vehicles to District 1 fleet as long as local fueling stations were installed. The benefit of a fleet assessment is to determine the type and number of fleet vehicles that would be eligible for replacement by an organization. The ultimate end goal of a fleet assessment is to expedite the adoption of FCEVs, and in this instance infrastructure was the primary hurdle—not accessibility or knowledge of FCEVs.

### **California Department of Fish and Wildlife**

The California Department of Fish and Wildlife (CDFW) participated in an informational interview in July 2018. Initially, the Eureka CDFW office was approached for a localized fleet assessment, and the local office communicated that all purchases are coordinated at the State level. As a result, the project team conducted the informational interview with the CDFW Department of Fleet and Asset Management headquartered in Sacramento.

The survey answers indicated that the CDFW owns 9 sedans, 31 SUVs, and 78 light-duty pick-up trucks in the Northern California region. CDFW is enthusiastic about incorporating FCEVs, but has yet to do so in the project region due to a lack of

infrastructure. CDFW is particularly interested in medium-duty FCEVs, specifically large pick-up trucks with 4x4 capability.

Many of the other fleet managers at local businesses and organizations indicated that they would be unlikely to purchase FCEVs due to high capital costs. This concern was *not* raised by CDFW headquarters. Presumably, CDFW would readily procure FCEVs if a local fueling station was located nearby.

Overall, CDFW was well-informed of the applicability of FCEVs and the major hurdle to fleet incorporation was infrastructure availability. As such, the project team focused engagement efforts on identifying sites in the project region that could provide fuel for CDFW fleets.

CDFW identified two potential properties for station installation; one in Yreka in Siskiyou County, and the other in Redding in Shasta County. While the CDFW offices are located on these parcels, they are technically owned by the California Department of General Services (DGS) and several other agencies. To accelerate CDFW FCEV adoption, the project team engaged, and continues to engage, with DGS.

### **California Department of General Services**

The four key goals of DGS engagement included identifying if DGS would be able to host fueling stations on DGS-owned land, identifying land suitable for hydrogen station development, determining if public access to stations on DGS land is possible, and identifying DGS vehicles that would be candidates for FCEV replacement.

The outcomes of the first activity will be covered in the ARV-14-055 final report.

At present, the DGS fleet assessment has not been completed. The project team has asked DGS for fleet characterization data and has specifically asked to identify vehicles which are targeted for immediate replacement, and which are eligible for long term replacement.

The intent behind this activity is to evaluate DGS LDVs that could potentially be replaced by FCEVs within the next 5 years, and a list of LDVs, MDVs and HDVs that could be replaced by FCEVs in the more distant future (i.e. 5 to 10+ years). The project team is engaging with MDV/HDV experts at the California Fuel Cell Partnership (FCP) to assist with this vehicle assessment.

### **City of Arcata**

The project team considered conducting an in-depth quantitative economic analysis for FCEV integration for the City, as mentioned above, but it was ultimately deemed infeasible. The City was interested in engaging on this topic. RCEA will continue to work with the City when possible on fleet replacement options when tools become available.

## **Humboldt Transit Authority**

Of the FCEV options available to fleet managers, fuel cell electric buses (FCEBs) are particularly attractive because they qualify for numerous financial incentives and have been successfully deployed by transit agencies in California.

There are two main financial incentives available to transit agencies

- The Federal Transit Administration's Low/No Emission grant which can be applied toward the lease or purchase of a FCEB, and associated infrastructure.
- The Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)

The Humboldt Transit Authority expressed interest in incorporating FCEBs into their fleet, but expressed that they had applied twice for the FTA grant for battery electric bus funding without success. Again, conducting a vehicle assessment would not have expedited the integration of FCEBs. Instead, access to fueling infrastructure and grant funding are the primary hurdles.

The project team engaged with Sunline Transit, who has successfully integrated FCEBs into their fleet to obtain best practices regarding funding acquisition and general lessons learned. Minutes from this meeting are included in Appendix C.

Following conversations with Sunline Transit, the project team contacted the Center for Transportation and Environment (CTE). In the meeting with CTE, the project team learned that CTE offers technical support for FTA grants, specifically assisting applicants through the application process for the Low/No program. The project team informed HTA of this resource and, in conjunction with engagement with RCEA and the California Fuel Cell Partnership, HTA expressed nascent interest in being connected with CTE for future potential applications.

## CHAPTER 2: Fleet Replacement Strategies

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The second task activity, which consisted of assisting fleet managers with fleet replacement strategies, was initially envisioned to be a follow-up activity to the assessment. Outside of the stakeholders covered in the previous chapter, most of the project region was not interested in discussing fleet replacement strategies as they could not access the vehicles in the first place (this is due to lack of fueling infrastructure and, as such, no auto manufacturers will sell these vehicles to local commercial fleets).

In lieu of replacement strategy assistance, project partners used the informational surveys to educate fleets and evaluate the steps necessary to make replacement strategy discussions pragmatic. Several project partners hosted workshops in their Counties and invited fleet managers as well. A list of fleets for each County can be found in Appendix F. In addition to gathering information from the operators, project partners also educated interviewees about the current vehicles on the market, financial incentives, and training resources.

The other benefit of this exercise was the creation of a consolidated contact list for use by station developers, auto OEMs, and other stakeholders who desire local contacts. The project team held initial conversations with one station developer in particular who has interest in Redding as a future site; the developer expressed that having local contacts makes the site scoping process much easier. They had stepped away from Redding due to a lack of local connections, but interest was rekindled by the project team. Next steps pertaining to developer engagement will be further discussed in the final report.

The key take-aways gained from the informational interviews across the entire project region, as opposed to just the phase I region, include:

- Rural fleet managers are very busy people who often fill multiple professional positions. As such, it is difficult for them to make time to discuss new technologies. In order to get their meaningful attention, their responses should be incentivized in some way.
- Historic wildfires in the project region were occurring during the fleet engagement activity, which made it especially difficult to engage government fleet operators.
- Even with available rebates, FCEV costs are still too high. Budgeting for current fleet vehicles is difficult, let alone finding excess funds to incorporate the marginal cost of new technology. Additional grant funding would help address this issue.
- FCEVs are not available on the local market, and if a fleet were to purchase an FCEV, they would not have access to a fueling station. Of the fleet operators who

were responsive to survey requests, none were interested in hosting a fueling station aside from the California Department of Fish and Wildlife.

- Some operators voiced concerns regarding reliability, uncertainty, and dependability of FCEVs. Operators were informed of basic safety mechanisms in place for FCEVs, but additional information regarding safety features (i.e. solenoid fail-safes) is necessary. Providing more fleet case studies demonstrating successful use of FCEVs would also help address this issue.
- Accessibility to training was another concern. The handout provided to fleet operators included training resources, but additional and targeted training that is easily accessible would presumably address this issue.

# CHAPTER 3: Fleet Fuel Demand

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At the beginning of the grant term, the project team hoped to gather the following information to deduce fuel demand for the region:

- Number of LDVs eligible for immediate replacement and their usage profiles
- Number of MDVs and HDVs eligible for future replacement and their usage profiles

Once fuel demand was deduced, fuel distributors would be informed of this potential demand.

The project team gathered vehicle counts from several fleets, but it was not comprehensive enough to project fuel demand for the entire region. Without concrete fuel demand, the project team determined it was not practical to engage with distributors at this time.

Nevertheless, the project team did gather contacts for regional retail and wholesale fuel distributors in each county. This contact information can be leveraged by future developers and planners to engage with these businesses as the market matures. Fuel distributor contact lists can be obtained upon request from the primary authors, or by referencing the project partner summary reports (Appendix D). These project partner reports were technically created to inform the task 2.2 summary report, but chapters 3 and 4 contain relevant information for task 2.3 tasks.

The team's *Regional Hydrogen Infrastructure Plan*<sup>2</sup>; however, estimated fuel demand and FCEV adoption at a macro-level for the project region:

“According to the 2016 Annual Evaluation, CARB projects 43,600 FCEVs will be on California Roads by 2022, extrapolated to 63,667 FCEVs by 2024. This equates to a 35% reduction in NREL’s estimate of 98,000 FCEVs by 2023-2024. The ratio NREL calculated for the Upstate and North Coast region’s share of total FCEVs was .0051. **Table 2 provides CARB’s most recent FCEV adoption projections by year, along with the Upstate and North Coast region’s share based on NREL’s ratio calculation.** Years 2023-2024 were extrapolated, assuming an increase by 10,033 vehicles per year (based on the rate of change from 2019 to 2022, CARB analysis years).” (emphasis added by author)

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<sup>2</sup> Goodrich, Elliot, Jerome Carman, and Pierce Schwalb. Redwood Coast Energy Authority and Schatz Energy Research Center, 2017. *North Coast and Upstate Fuel Cell Vehicle Readiness Project - Regional Hydrogen Infrastructure Plan*. California Energy Commission. Publication Number: CEC-XXX-XXXX-XXX.



Year	California	North Coast and Upstate Regions
2018	10,500 FCEVs	54 FCEVs
2019	13,500 FCEVs	69 FCEVs
2020	18,465 FCEVs	94 FCEVs
2021	34,300 FCEVs	175 FCEVs
2022	43,600 FCEVs	222 FCEVs
2023	53,633 FCEVs (extrapolated)	274 FCEVs
2024	63,667 FCEVs (extrapolated)	325 FCEVs

Source: California Air Resources Board and Redwood Coast Energy Authority Analysis. 2016 Annual Evaluation of Hydrogen Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development.

**Figure 1 CARB estimates of FCEV adoption, adjusted by population**

In addition to estimating fuel demand, the project team approached fleets who demonstrated the greatest interest in FCEVs with a letter-of-intent to demonstrate fuel demand which could then be used to draw developer interest. While rough fuel demand estimates surely demonstrate regional need to developers, tangible fleet commitments offer assurance that a station will continue to operate once CEC funding for capex and start-up O&M expires. The current process for funding stations, at a high-level, is:

- 1) California Energy Commission posts solicitation for hydrogen station capital and time-bound O&M funding
- 2) Station developers (most common applicant for solicitations) apply for funding, asking for location-specific funding
- 3) CEC awards capex funds to developer, with some O&M funds for a 3-year period

At the time of this report’s submission, a letter of intent was prepared for consideration by Caltrans (Appendix E). By the time the final report is submitted, the project team hopes to share an executed letter from the Caltrans District 1 Director. It is possible that conversations with CDFW and DGS will progress to a similar stage, where securing a letter of intent will be prudent, but this remains to be seen during the remaining two months of the project. Nevertheless, these three entities continue to be the most promising leads for station developers as they seek a foothold in the region.

# CHAPTER 4: Lessons Learned and Next Steps

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## Lessons Learned

Project progress was mainly stunted by three developments:

- 1) Delayed FCEV market across the State, and especially in the rural project region
- 2) Delayed interest in regional hydrogen infrastructure installation by State entities and private developers
- 3) Lack of continuity in staffing

Caltrans was the key fleet partner identified through early project efforts, but localized engagement outside of the Humboldt County area was somewhat delayed until Winter 2018 due to staffing turn-over.

The “Train-the-Trainer” webinar was delivered in Winter 2018, which then enabled localized fleet education and engagement. Had time permitted, project partners would have benefited from additional, fleet-specific training prior to conducting informational interviews. Some of the questions raised by fleets, according to the responses received in the informational interviews, indicated lack of knowledge regarding training for FCEV maintenance and vehicle availability. The fleet handout provided this information, but it could be that the information was not as comprehensive as it could be, or project partners were not able to fully communicate the material due to time-constrained interviews.

Even with a compacted timeline, the train-the-trainer approach to regional fleet outreach was overall successful. Fleets are more responsive to phone calls and information requests from local organizations than unknown third parties. Project partners served as a trusted community member which eased educational efforts.

Admittedly, the project region is comprised of rural regions with very small fleets, staff, and budgets. State agencies, on the other hand, are directly accountable to fleet mandates, have a larger resource pool for new vehicle purchases, and are generally more informed regarding potential funding pools. As such, the project team recommends engagement with State fleets first and foremost during the early adopter stage. As the market matures past early adoption, engagement with local fleet managers of all shapes and sizes is necessary if the regional FCEV market is to truly flourish.

## Next Steps

Immediate next steps to complete fleet engagement activities under ARV-14-055 include concluding assessments for the Department of General Services and approaching Caltrans with a letter-of-intent for fuel demand.

Beyond the project term, the project team echoes the suggestion raised in the *Tri-Counties Hydrogen Readiness Plan* that the CEC create a solicitation for an FCEV-specific ombudsman grant. One potential ombudsman activity, grabbed from an existing ombudsman grant awarded by the CEC, includes facilitating a scholarship for fleet manager participation in workshops and conferences. Conferences provide comprehensive education (i.e. fleet case studies, education regarding vehicle safety features, funding pathways employed by other fleets for FCEVs and stations) that can remove hurdles to FCEV adoption for fleet managers who don't typically have the resources to receive education about new technologies.

The San Francisco Clean Cities office hosted a successful FCEV fleet training in 2018. San Francisco Clean Cities brought in an FCEV expert to provide a regional FCEV training for local operators. A North Coast and Upstate regional fleet training provided by an FCEV expert would do much to improve fleet reception.

Another suggested next step is for the CEC to administer streamlined grant programs tailored to fleet needs; the SB110 electric school bus solicitation is a model of a GFO that was very accessible to fleet managers with limited administrative time to compete for funding. A similarly structured GFO could provide funding for fleets to purchase an FCEV in regions with hydrogen fueling stations. There is regional interest in fuel cell school buses, as well as ample funding for these buses through the Rural School Bus Pilot Project, but fuel cell school buses are not commercially available. CEC funding for manufacturer R&D could help fill this gap.

As station developers begin to consider development in the project region, they are encouraged to leverage the fuel distributor and fleet contacts compiled in the project partner summary reports to cast a wide net of potential partnerships.

For our region, the most important next step is installing a fueling station. Readiness funds have allowed us to do the majority of the planning work, but additional funding to facilitate station developer relationships with local potential site hosts would be necessary to accelerate station installation in our region.

For any parties interested in furthering market penetration and infrastructure development in the region, they are invited to contact the primary authors listed at the beginning of this report. Any additional inquiries regarding contact information can also be requested by contacting the primary authors.

## REFERENCES

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Santa Barbara County Air Pollution Control District. 2017. *Tri-Counties Hydrogen Readiness Plan*. California Energy Commission. Publication Number: CEC-XXX-XXXX-XXX.

# APPENDIX A: Educational Fleet Flyer

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Click on image below to view entire flyer:

## Fuel Cell Electric Vehicles

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Adding a fuel cell electric vehicle (FCEV) to your fleet is a great way to reduce your emissions and help advance this technology in the North Coast and Upstate region.

Light-duty vehicles are the most readily available commercial FCEVs, but there are also fuel cell buses and forklifts currently on the market. Medium and heavy-duty vehicles such as semi-trucks, pick-up trucks, and delivery and transit vans are already being road-tested and should become commercially available in the near future.

**Light duty vehicles** [Honda Clarity](#)  
3 year lease includes \$15,000 worth of fuel



[Hyundai Nexo](#)  
The next-generation FCEV, replacing the Hyundai Tucson, set for release in 2019.



[Toyota Mirai](#)  
3 year lease includes \$15,000 worth of fuel



**Transit Buses** [New Flyer of America](#)  
Xcelsior Hydrogen Fuel Cell

[Eldorado](#)  
AXESS-FC



**Forklifts** [Plug Power, Inc.](#)  
GenDrive fuel cell power integrates with existing electric forklifts

[Nuvera Fuel Cells](#)  
Nuvera fuel cells power Hyster-Yale forklifts.



[Raymond Corporation](#)  
Applies fuel cells to battery-powered lift trucks.

# **APPENDIX B: Fleet Survey**

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Questions are listed below. Each project partner executed interviews via slightly different avenues; google docs, e-mail, and the RFI were used, but overall phone calls witnessed the highest response rate across the region:

- 1. Number of vehicles in the fleet?**
- 2. Average VMT per month per vehicle?**
- 3. Number of Diesel Vehicles?**
- 4. Types of vehicles (light, medium, and heavy duty) and number of each type?**
- 5. The function of Vehicles?**
- 6. The average age of vehicles in years?**
- 7. The average lifespan of vehicles in years?**
- 8. Main considerations when buying new vehicles?**
- 9. Primary decision makers on fleet purchases?**
- 10. Description of the decision-making process (specific to purchasing new vehicles)?**
- 11. Mandates or requirements pertaining to alternative fuels?**
- 12. Who is your fuel supplier?**
- 13. What is the location of the fueling station you use for fleet vehicles?**
- 14. Have they considered hydrogen fuel cell electric vehicles?**
- 15. Have they considered other alternative fuel options (hybrids, electric cars, etc.)?**
- 16. Interest in on-site hydrogen fueling station?**
- 17. What is needed to consider hydrogen fuel cell electric vehicles seriously?**
- 18. Barriers to Hydrogen Fuel Cell Electric Vehicles?**
- 19. Received any alternative fuels training in past / Aware of available Training resources for fleet managers and technicians**
- 20. Additional feedback**

# APPENDIX C: Sunline Transit Meeting Minutes

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Click the image below to access meeting minutes:

**4/25/18**

**Meeting Agenda:** Sunline Transit and Redwood Coast Energy Authority (RCEA) Fuel Cell Electric Bus Discussion

**Attendees:** Mare Johnson (Sunline Transit), Rudy LeFlore (Sunline Transit), Aisha Cissna (RCEA)

**Agenda:**

1:30 to 1:35

RCEA Introduction

1:35 to 1:40

Sunline Transit Introduction

- Calstart was the grant administrator FCEBs (10 on property , 7 upcoming buses)
- Project was an idea about 3-4 years ago (Center of Excellence), Sunline had already implemented other alt. fuel vehicles (BEVs)
- They connected with Center for Transportation and Environment who eventually funded them for Center of Excellence (National Fuel Cell Bus funding, no longer exists but CTE had given them leftover funding, it inactive at this point)
- 3 phase project: training, brick-and-mortar for facility (low/no), and funding to draw customers in/standardize management and maintenance
- Looking into sending trainers out
- OEM for buses: BEV BYB bus, FCEVs: El Dorado bus/Ballard powertrain, New Flyer/Ballard powertrain
- OEM fueling stations: Not sure who installed original station, but they do their own O&M; new station: Air Quality Improvement Plan (AQIP) is funding the refurbishment of old station for internal use, Proton is the OEM for a retail station, haven't done retail sales to date since they have been using everything they produce, they produce hydrogen via SMR
- They have one manager and one technician for their fueling station
- 1 supervisor who is a subject matter expert on their buses
- First demonstration workshop will hopefully be in the fall

1:40 to 1:45

Address questions related to workforce training:

- Is it still active?
  - In development still, did a collaborative workshop where they initiated all OEM, higher education partners, other advocacy and funding groups for a one-day workshop. They reviewed ideas for what they would want in the Center for Excellence. Had 50 participants.
- What parts of the workforce participated?
  - Maintenance staff/technician, BOD, and management

# **APPENDIX D: Project Partner Summary Reports**

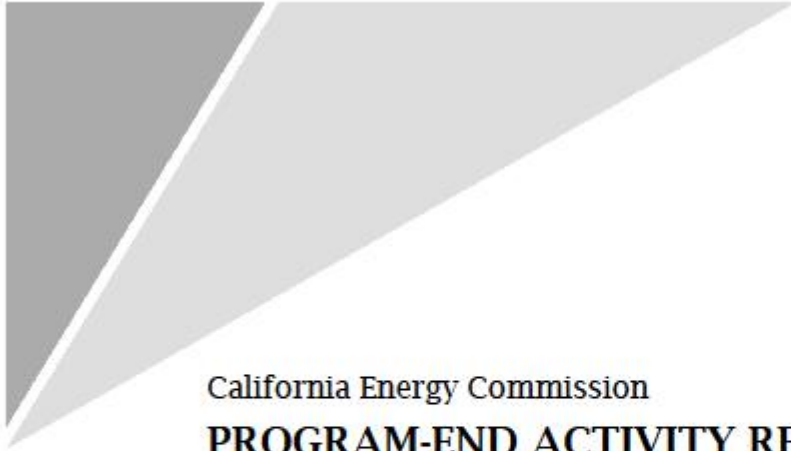
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Chapters 3, 4, and the appendix will contain fleet operator and fuel distributor lists compiled for this project.

Double click on the images below to access each county's summary report.



Glenn County



California Energy Commission  
**PROGRAM-END ACTIVITY REPORT**

# North Coast and Upstate Fuel Cell Vehicle Readiness Project

Task 2.2 Promotion of FCEV Use

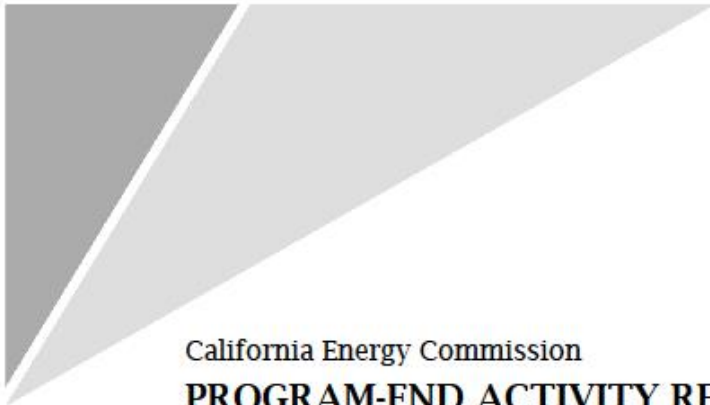
Prepared for: Redwood Coast Energy Authority  
Prepared by: Glenn County Air Pollution Control District



California Energy Commission  
Edmund G. Brown Jr., Governor



# Mendocino County



California Energy Commission  
**PROGRAM-END ACTIVITY REPORT**

## **North Coast and Upstate Fuel Cell Vehicle Readiness Project**

Task 2.2 Promotion of FCEV Use

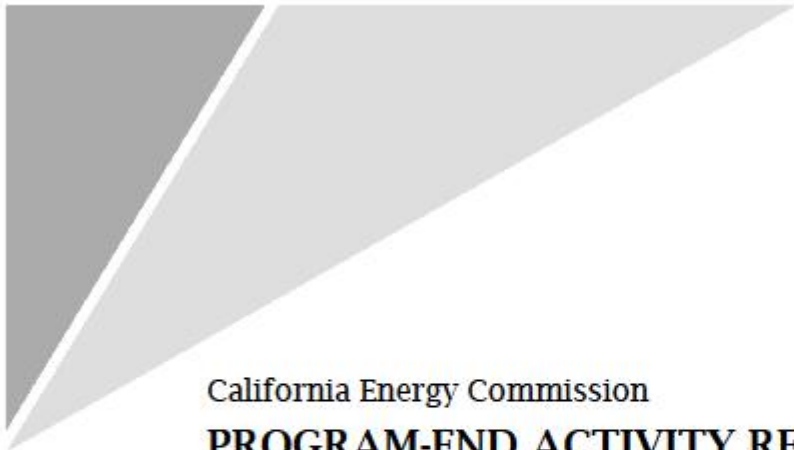
Prepared for: Redwood Coast Energy Authority  
Prepared by: Mendocino Council of Governments



California Energy Commission  
Edmund G. Brown Jr., Governor

September 2018 | CEC-XXX-XXXX-XXX

# Shasta County



California Energy Commission  
**PROGRAM-END ACTIVITY REPORT**

# North Coast and Upstate Fuel Cell Vehicle Readiness Project

Task 2.2 Promotion of FCEV Use

Prepared for: Redwood Coast Energy Authority  
Prepared by: Shasta Regional Transportation Agency

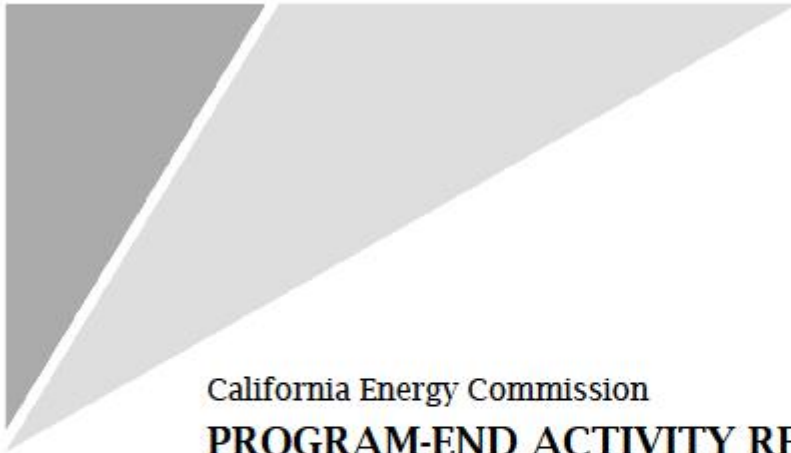


California Energy Commission  
Edmund G. Brown Jr., Governor



October, 2018 | CEC-XXX-XXXX-XXX

# Siskiyou County



California Energy Commission  
**PROGRAM-END ACTIVITY REPORT**

## **North Coast and Upstate Fuel Cell Vehicle Readiness Project**

Task 2.2 Promotion of FCEV Use

Prepared for: Redwood Coast Energy Authority  
Prepared by: Siskiyou Economic Development Council



California Energy Commission  
Edmund G. Brown Jr., Governor



October, 2018 | CEC-XXX-XXXX-XXX

Tehama County

# North Coast and Upstate Fuel Cell Vehicle Readiness Project

Task 2.2 Promotion of FCEV Use

## California Energy Commission PROGRAM-END ACTIVITY REPORT

Prepared for: Redwood Coast Energy Authority

Prepared by: Tehama County Air Pollution Control District

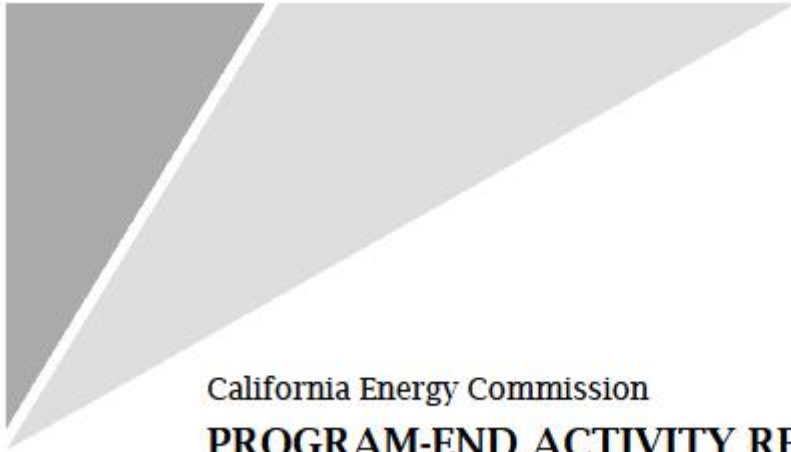
*California Energy Commission*

*Edmund G. Brown Jr., Governor*

October, 2018 | CEC-XXX-XXXX-XXX



# Del Norte, Trinity, and Humboldt Counties



California Energy Commission  
**PROGRAM-END ACTIVITY REPORT**

## **North Coast and Upstate Fuel Cell Vehicle Readiness Project**

Task 2.2 Promotion of FCEV Use

Prepared for: Redwood Coast Energy Authority  
Prepared by: North Coast Unified Air Quality Management District



California Energy Commission  
Edmund G. Brown Jr., Governor



September 4, 2018 | CEC-XXX-XXXX-XXX



# APPENDIX E: Draft Fuel Demand Letter of Intent

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Click image below to access draft letter of intent for fuel demand:

[Agency Letter Head]

[Date]

Attn: California Energy Commission  
Emerging Fuels and Technology Office  
1516 Ninth Street  
Sacramento, CA 95814

Dear Mr. Serrato,

As the District Director for the California Department of Transportation (Caltrans) District 1, and in support of the California Energy Commission *North Coast and Upstate Hydrogen Vehicle Planning Project*, I authorize this letter of intent regarding the use of hydrogen fuel by the District's fleet when a local hydrogen fueling station is developed.

The objectives of the *North Coast and Upstate Hydrogen Vehicle Planning Project* and the fleet integration of hydrogen fuel cell electric vehicles (FCEVs) align well with Caltrans's mission which is to "provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability."

The District works to implement this mission in the counties of Del Norte, Humboldt, Lake, and Mendocino.

Caltrans' mission statement expresses a clear agency-wide commitment to sustainability, but there are several State directives that require the incorporation of low-carbon fuels and zero-emissions vehicles into State agency fleets:

- The State's 2016 Zero Emission Vehicle Action Plan
- Department of General Services Memo 16-07: Requires 50% of new purchases to be ZEVs by 2025
- State Administrative Manual (SAM) Section 4121: Executive Order B-16-12 Zero Emission Purchasing Mandate
- State Administrative Manual (SAM) Section 4121.1: ZEV and Hybrid First Purchasing Mandate
- State Administrative Manual (SAM) Section 4121.2: 50 Percent Pure ZEV Purchasing Exemption
- State Administrative Manual (SAM) Section 4121.6: ZEV infrastructure Readiness
- State Administrative Manual (SAM) Section 4126: Replacement Schedule Criteria

Collectively, the District 1 fleet is comprised of **x** light-duty, **y** medium-duty, and **z** heavy-duty vehicles. The average daily vehicle miles traveled for these vehicle classes are **x**, **y**, and **z** respectively.

Fuel cell electric vehicles (FCEVs) are a suitable application for the District 1 fleet as they are one of two ZEV technology options available, and FCEVs have longer ranges and shorter re-fueling times when compared to Battery Electric Vehicles (BEVs). The preference for FCEVs is particularly acute in our rural region. For these reasons, District 1 intends to integrate FCEVs into our fleet once a hydrogen fueling station is installed near the District's headquarters office or in any of the District's satellite offices.

# APPENDIX F: Project Partner Fleet Contacts

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Project partners gathered the fleet information below. Full synopses of fleet engagement in each County can be read in the reports linked in Appendix F.

## Glenn County

Category	Agency name	Contact	Title/position?	E-mail?	Phone Number?
Private Fleet	Wilbur Ellis	Heath Crowe	Branch Manager	NA	(530) 934-3223
Local Government	City of Willows Public Works	James Corneliussen	Superintendent	NA	(530) 934-7041
Local Government	City of Orland	Peter Carr	City Manager	<a href="mailto:peterc@cityoforland.com">peterc@cityoforland.com</a>	(530) 865-1610
Local Government	County of Glenn Public Works	Matt Gomes	Deputy Public Works Director	<a href="mailto:publicworks@countyofglenn.net">publicworks@countyofglenn.net</a>	(530) 934-6530
Private Fleet	Johns Manville	Caren Gozzi	EHS Manager	<a href="mailto:Caren.Gozzi@jm.com">Caren.Gozzi@jm.com</a>	(530) 934-6273
Local Government	Glenn Transit Service	Wanda Gray	Manager	<a href="mailto:transit@countyofglenn.net">transit@countyofglenn.net</a>	(530) 934-6700
Local Government	County of Glenn HHSA	Erin Valdez	Administration Director	<a href="mailto:evaldez@countyofglenn.net">evaldez@countyofglenn.net</a>	(530) 934-6521
Private Fleet	Glenn Colusa Irrigation District	Kevin Nelson	Maintance Superintendent	<a href="mailto:knelson@gcid.net">knelson@gcid.net</a>	(530) 934-8881
Private Fleet	Rumiano Cheese	Distribution	NA	NA	(530) 934-5438
Private Fleet	Sierra Nevada Cheese	NA	Information	<a href="mailto:info@sierranevadacheese.com">info@sierranevadacheese.com</a>	(530) 934-8660
Private Fleet	Olson Meat Co	NA	Accounting	<a href="mailto:info@olsonmeat.com">info@olsonmeat.com</a>	(530) 865-4642
Local Government	Glenn County Office of Education	Tracy Quarne	Superintendent	<a href="mailto:tracequarne@glenncoe.org">tracequarne@glenncoe.org</a>	(530) 934-6475

## Mendocino County

“MCOG staff targeted certain fleet operators to update some of the nine Mendocino County fleet interviews made for the *Northwest California Alternative Transportation Fuels Readiness Project*<sup>3</sup>, completed in 2016. In discussions with RCEA project management, it was agreed to prioritize 1) public transit, due to availability of fuel cell buses, MCOG’s close partnership with MTA, and MTA’s commitment to solar and renewables; 2) the county government’s fleet, as the largest public fleet, developing solar and electric vehicle infrastructure; and 3) the air quality management district, due to its interest in and previous acquisition of alternative fuel vehicles.

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<sup>3</sup> Biondini, Lori (Ed.). Redwood Coast Energy Authority. 2016. *Northwest California Alternative Fuels Readiness Project*. California Energy Commission. Publication Number: CEC-ARV-13-012.



Engaged fleets included:

- Facilities and Fleet Division Manager, County of Mendocino
- Maintenance Manager, Mendocino Transit Authority (MTA)
- Executive Officer, Mendocino County Air Quality Management District”

## **Shasta County**

“Fleet manager interviews were conducted by Michael Kuker, Assistant Transportation Planner for SRTA. The following agencies/organizations/fleet managers were contacted:

- Shasta Union High School District
- Shasta County Office of Education
- Simpson University
- Shasta College
- City of Anderson
- City of Redding
- City of Shasta Lake
- County of Shasta
- First Transit
- Cal Fire
- Pit River Tribe
- Redding Rancheria
- McConnell Foundation
- Whiskeytown National Park Service
- Lassen National Park Service
- Bureau of Reclamation
- City of Redding / Redding Area Bus Authority / TransDev
- Caltrans

SRTA was able to conduct interviews with one organization/fleet manager; TransDev. TransDev is the operator for the Redding Area Bus Authority.”

## **Siskiyou County**

“We identified 242 businesses and governments in Siskiyou County that were identified to likely benefit from fleet management information. We solicited feedback with a request for information from many of these fleets where contact information could be obtained. The only responses we received were from interviews with fleet managers at the City of Weed, the City of Mt. Shasta, and Siskiyou County. The Fleet Manager for Siskiyou County, Rick DeAvilla, managed the largest number of fleet vehicles in our survey. Rick manages 325 vehicles for the County including those used for public works, public transit buses, law enforcement, emergency response, and social services.”

Category	Agency name	Contact	Title/position?	E-mail?	Phone Number?	Number of vehicles in fleet?
Local Government	Siskiyou County	Rick DeAvilla	Automotive Service Supervisor - Siskiyou County Public Works	rdeavilla@co.siskiyou.ca.us	530-842-8283	325
Local Government	City of Mt. Shasta	Jay Polk	Mechanic	jaypolk@mtshastaca.gov	(530) 926-7510	10
Local Government	City of Weed	Craig Sharp	Public Works Director	sharp@ci.weed.ca.us	530-938-5020	19

## Tehama County

Category	Agency name	Contact	Title/position?	E-mail?	Phone Number?
County	Tehama County Public Works	Tim McSorley	Director	<a href="mailto:tmcsorley@tcpw.ca.gov">tmcsorley@tcpw.ca.gov</a>	(530) 385-1462
County	Tehama County Dept. Of Education	Greg Ross	Director of maintenance and operations	<a href="mailto:gross@tehamaschools.org">gross@tehamaschools.org</a>	530-528-7320
City	City of Red Bluff Public Works	Marie Jensen	Public Works Administrative Technician	<a href="mailto:mjensen@cityofredbluff.org">mjensen@cityofredbluff.org</a>	530-527-2605 ext. 3067
City	City of Corning Public Works	Dawn Grine	Director of Public Works	<a href="mailto:dgrine@corning.org">dgrine@corning.org</a>	(530) 824-7029
Education	Antelope School District	Rich Hassay	Superintendent	<a href="mailto:rhassay@antelopeschools.org">rhassay@antelopeschools.org</a>	(530) 527-1272
Education	Corning Union Elementary School District	Richard Fitzpatrick	Superintendent	<a href="mailto:rfitzpatrick@cuesd.net">rfitzpatrick@cuesd.net</a>	(530) 824-7700
Education	Corning Union High School District	John Burch	Dist. Superintendent	<a href="mailto:jburch@cornings.org">jburch@cornings.org</a>	(530) 824-8000
Education	Evergreen Union School District	Lane Bates	Dist. Superintendent	<a href="mailto:bmendenhall@evergreenusd.org">bmendenhall@evergreenusd.org</a>	(530) 347-3411
Education	Gerber Union Elementary School District	Jenny Marr	Superintendent	<a href="mailto:jmarr@gerberschool.org">jmarr@gerberschool.org</a>	(530) 385-1041
Education	Lassen View Union Elementary School District	Jerry Walker	Superintendent	<a href="mailto:jwalker@lassenview.org">jwalker@lassenview.org</a>	(530) 527-5162
Education	Los Molinos Unified School District	Charles Ward	Superintendent	<a href="mailto:cward@lmusd.net">cward@lmusd.net</a>	(530) 384-8700
Education	Red Bluff Joint Union High School District	Todd Brose	Superintendent	<a href="mailto:tbrose@rbhsd.org">tbrose@rbhsd.org</a>	(530) 529-8700
Education	Red Bluff Union Elementary School District	Claudia Salvestrin	Assistant Superintendent	<a href="mailto:csalestrin@rbuesd.org">csalestrin@rbuesd.org</a>	(530) 527-7200
Education	Reeds Creek School District	Dane Hansen	Superintendent	<a href="mailto:dhansen@reeds creek.org">dhansen@reeds creek.org</a>	(530) 527-6006
Education	Richfield School District	Jeff Scheele	Superintendent	<a href="mailto:jscheele@richfieldschool.org">jscheele@richfieldschool.org</a>	(530) 824-3354
State	California Department of Fish and Game	Tony Welch	Wildlife Habitat Supervisor	<a href="mailto:tony_welch@wildlife.ca.gov">tony_welch@wildlife.ca.gov</a>	(530) 597-2201
State	State of California Department of Water Resources Norther Region Office	Mary Randall	Regional Coordinator	<a href="mailto:Mary.Randall@water.ca.gov">Mary.Randall@water.ca.gov</a>	
State	CalFire - Tehama-Glenn Unit	N/A	N/A	N/A	(530) 528-5190
Federal	Mendocino National Forest	Ann Carlson	Forest Supervisor	N/A	(530) 934-3316
Federal	Shasta-Trinity National Forest	Scott Russel	Forest Supervisor	N/A	(530) 527-3043
Federal	Red Bluff Fish and Wildlife Service	N/A	N/A	<a href="mailto:redbluff@fws.gov">redbluff@fws.gov</a>	N/A
Federal	United States Postal Service	Scott A. Wayman	Postmaster	<a href="mailto:scott.a.wayman@usps.gov">scott.a.wayman@usps.gov</a>	N/A
Private	Ben's Truck & Equipment, Inc	Ben Sale	President	<a href="mailto:info@BensTruck.org">info@BensTruck.org</a>	(530) 527-5040
Private	Green Waste of Tehama	N/A	N/A	<a href="mailto:specialwaste4019@wasteconnecti">specialwaste4019@wasteconnecti</a>	(530) 527-4347
Private	Enterprise Rent A Car	N/A	N/A		(530) 529-0177

## Del Norte, Trinity, and Humboldt Counties

On behalf of the North Coast Air Quality Management District, RCEA and SERC contacted the organizations below to conduct fleet interviews. Caltrans was also engaged but was not presented with the survey form. The CA DFW, City of Eureka, and DGS were the only responsive parties, although College of the Redwoods might return a survey before the end of the project term.

Category	Agency/Org Name	Contact	Title/Position	E-mail	Phone Number
State	California Department of Fish and Game	Don Ronalter	Fleet Administrator	Donald.Ronalter@wildlife.ca.gov	916-445-5151
Local	City of Eureka	Brian Issa	Deputy Director of Public Works - Field Operations	bissa@ci.eureka.ca.gov	(707) 441-4290
State	Humboldt State University	Jeanne Rynne	Associate Vice President of Facilities Management	707-826-3646	707-826-3646
Private	Napa Auto Parts	Frank	Store Manager	Frank.eurekanapa@gmail.com	707-442-1786
Federal/State	Redwood National and State Parks	Dave Roemer	Deputy Superintendent	Dave.Roemer@nps.gov	707-465-7700
Local	College of the Redwoods (community college)	Tami Engman	Facilities Staff	tami-engman@redwoods.edu	707-476-4381