











Regional Alternative Fuel Vehicle and Infrastructure Barriers Table

Barrier: Education	Barrier Pertains To	Guidance Materials	Action Items
<p><b>1. Lack of Public Knowledge on Alternative Fuels</b></p> <p>- Lack of knowledge and misconceptions about alternative fuels and advanced vehicle technology.</p> <p>-Additional education on hydrogen is needed since it is a newer vehicle technology.</p>		<p>Promote Clean Cities vehicle guides, handbooks, and other relevant documents.</p> <p>Leverage consumer-focused resources available.</p>	<p>Recommendation: Develop materials/toolkits that allow general consumers to better understand AFVs, and provide a baseline understanding of AFVs useful to local governments. Includes:</p> <ul style="list-style-type: none"> <li>• Reviewing existing consumer outreach materials</li> <li>• General "myths" and realities of each fuel (how the fuel is made, what vehicles use the fuel, range, etc.)</li> <li>• Relevant state policies that create the motivation for adopting AFVs</li> <li>• Guidance for local EV encouragement efforts- Work with South Bay Energy Action Collaborative to document best practices</li> </ul>
<p><b>2. Training and Education for Municipal Staff</b></p> <p>-Lack of knowledge about alternative fuels and advanced vehicle technology.</p> <p>-Additional education on hydrogen is needed since it is a newer vehicle technology.</p> <p>-Need to further plan for AFVs in energy planning documents and implement strategies in municipal fleets.</p>		<p>Existing Conditions Report public agency survey results. The survey results reveal what municipalities have done to prepare for alternative fuels and what resources they lack in order to further adopt alternative fuel-friendly policies and strategies.</p> <p>Existing Conditions Report's section on codes and standards can serve as guidance for installations.</p> <p>Leverage National Renewable Energy Laboratory (NREL) developed codes and standards handbooks.</p> <p>Replacing government fleet vehicles with alternative fuel vehicles is a strategy noted in some Climate Action Plans (CAPs), or other energy planning documents.</p> <p>Ensuring open communication among fleet managers and planning staff to secure the success of CAP strategies.</p>	<p>Recommendation: Develop materials and toolkits that allow fleet managers and municipal staff to integrate AFVs and create/promote AF-friendly policies. Includes:</p> <ul style="list-style-type: none"> <li>• Reviewing existing educational programs/materials</li> <li>• Reviewing past and current training programs &amp; promote them</li> <li>• Planning documents to better assist jurisdictions in achieving GHG reduction strategies using alternative fuels</li> <li>• How to choose optimal locations for alternative fuel infrastructure</li> <li>• Relevant state policies that motivate greater AFV adoption</li> <li>• Sample policies that support the growth of AFVs</li> </ul>


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<p><b>3. Training and Education for Emergency Personnel and Transportation Fleet Staff</b></p> <p>-Lack of safety and technical training for AFVs and AFI.</p> <p>-Need specific fleet data to better understand AFV performance.</p>		<p>Needs Assessment for Alternative Fuel Vehicle Training in California offer insight to training needs.</p> <p>Existing Conditions Report offers a section on training for emergency personnel and fleet staff.</p> <p>Existing Conditions Report fleet survey results. The survey results reveal what alternative fuels fleets around the San Diego region have already adopted. It informs about resources desired by fleet managers in order to integrate more alternative fuels into their fleet.</p>	<p>Recommendation: Develop materials and toolkits that will help train emergency personnel on how to handle AFVs and fleet staff on how to service AFVs. Includes:</p> <ul style="list-style-type: none"> <li>• Reviewing past and current training programs</li> <li>• Developing training resources one pager, which includes contacts for training facilities within and near San Diego County and provide course/topic recommendations for each fuel type</li> <li>• Promoting trainings</li> <li>• Specific fleet data that allow fleets to understand the technical capacities/build of an AFV</li> </ul>
<p><b>4. TOU Utility Rates/ Grid Integration</b></p> <p>-Need to discourage charging when electricity supplies are in high demand and cost more. Support of time of use (TOU) pricing.</p> <p>-High demand charges that impact EVSE host utility bills. Expensive metering options to access TOU rates.</p> <p>-Need further education on how PEVs integrate with the electricity grid, and how to reduce its grid impact.</p>		<p>Educate public on SDG&amp;E EV time of use rates.</p> <p>Promote Plug-In Electric Vehicle Collaborative (PEVC) materials and guidance documents from the PEV Readiness Plan.</p> <p>Information on minimizing utility charges from natural gas station operation.</p> <p>Maintain regular updates and communication from SDG&amp;E regarding its work with a proposed vehicle-to-grid pilot project.</p>	<p>Recommendation: Develop guidance and toolkits that help AFV users understand the way vehicles integrate with the electricity grid and general EV charging time of use information. Includes:</p> <ul style="list-style-type: none"> <li>• Promoting information and guidance on utility rates/ grid integration</li> <li>• How vehicle charging time affects overall electricity/grid capacity (i.e. duck curve)</li> <li>• How used PEV batteries can be integrated into the electrical grid.</li> <li>• Optimizing natural gas infrastructure for limited electrical demand</li> </ul>

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Barrier: Infrastructure	Barrier Pertains To	Guidance Materials	Action Items
<p><b>5. Station Development: Codes &amp; Permitting</b>                      -Need for increased guidance on EVSE, propane, natural gas, and hydrogen station installation processes.</p> <p>-Direction on how city staff and station developers can work together to ease station deployment process.</p>	<p><b>Biodiesel Electricity</b></p>  <p><b>Ethanol Hydrogen</b></p>  <p><b>Natural Gas Propane</b></p> 	<p>Promote Best Practice documents generated through the California Statewide Alternative Fuels and Fleets project.</p> <p>Propane, hydrogen, and biofuel Refuel subcommittees devoted a portion of time identifying barriers to station installation.</p> <p>Existing Conditions Report section on codes and standards serves as guidance for installations.</p>	<p>Recommendation: Address problems that frequently occur when stations are being installed (e.g., when propane station is built, screens are often required to be surrounding the propane tanks; not favored by propane providers). Includes:</p> <ul style="list-style-type: none"> <li>• Fuel-specific permitting best practices to help jurisdictions facilitate station installations(Reference existing codes)</li> <li>• Successful installation case studies</li> <li>• Compiled station installation processes as discussed through Refuel subcommittees</li> </ul>
<p><b>6. Station Development: Site Assessment</b>                      -Station developers have come across right of way and easement issues.</p> <p>-Stations should be located along fleet routes.</p>	<p><b>Biodiesel Electricity</b></p>  <p><b>Ethanol Hydrogen</b></p>  <p><b>Natural Gas Propane</b></p> 	<p>Assist municipal staff through Clean Cities tools on zoning, station design, and assessment of station fueling needs.</p> <p>Conduct fleet route assessment to determine best locations for AFI.</p> <p>Promote electric, natural gas and hydrogen best practice documents generated through the California Statewide Alternative Fuels and Fleets project.</p>	<p>Recommendation: Provide solutions and guidance for municipal staff and other fleets on where to place fueling infrastructure. Includes:</p> <ul style="list-style-type: none"> <li>• Enabling cities to site fueling stations based on their fleets’ routes and fuel usage (i.e., how to conduct fueling analysis)</li> <li>• Enabling private fleets to site fueling stations based on their fleets’ routes and fuel usage (i.e., how to conduct fleet analysis)</li> <li>• Enabling public agencies to determine best locations to install infrastructure for the public (i.e. providing relevant variables, methods, etc.)</li> </ul>


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<p><b>7. Access to Public Alternative Fuel Stations</b>                  -Lack of AFV adoption due to limited infrastructure near where fleets and the public need to refuel.                   -Lack of station access for heavy-duty vehicles.</p>		<p>Increase awareness of current and planned alternative fuel stations to fleet managers.</p> <p>Compile resource list of station locator maps.</p> <p>Guidance to station developers on building stations that are accessible to heavy-duty vehicles.</p> <p>Examples of outreach activities San Diego Regional Clean Cities Coalition has performed with local alternative fuel providers.</p> <p>Clean Cities Coalition guide on costs associated with CNG and propane fueling stations.</p> <p>San Diego Regional Clean Cities Coalition-developed maps of San Diego County infrastructure and proximity to residences.</p>	<p>Recommendation: Develop ways for fuel providers and local jurisdictions to increase awareness of public alternative fuel station locations. Includes:</p> <ul style="list-style-type: none"> <li>• Reviewing existing resources and updating as necessary</li> <li>• Mapping tools to encourage more installations</li> <li>• Best practices for promoting alternative fuel stations to the public (e.g., an outreach guide)</li> </ul>
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<p><b>8. EVSE at Multi Unit Dwellings</b></p> <p>-Consumer and property owners have lack of knowledge regarding EVSE installation in these buildings.</p> <p>-Need to educate and work with HOAs to identify and find solutions to unique building challenges.</p>	<p><b>Electricity</b></p> 	<p>Promote PEVC materials and guidance documents from the PEV Readiness Plan.</p> <p>PEVC’s case studies on charging installations at MuDs.</p>	<p>Recommendation: Increase public understanding of complexities of charging at MuDs and gather resources to help facilitate charging installations. Includes:</p> <ul style="list-style-type: none"> <li>• Gathering complementary information about MuD charger installations. Or, developing specific studies for particular charging scenarios (i.e., SB 880 and AB 2565 being ineffective if insurance companies will not add HOA as additionally insured – get examples of this.)</li> <li>• Promoting installation and information about EVSE through future CSE and SANDAG PEV Implementation work. This work may be coordinated in tandem with SDG&amp;E’s vehicle-to-grid pilot project and adjusted as necessary</li> </ul>
<p><b>9. Workplace Charging</b></p> <p>-Lack of understanding regarding benefits and approaches to workplace charging.</p> <p>-Need to further educate employers and property management companies about the benefits of workplace charging</p>	<p><b>Electricity</b></p> 	<p>Promote Calstart’s <a href="#">Best Practices for Workplace Charging</a> and the California Plug-In Electric Vehicle Collaborative guidance documents.</p>	<p>Recommendation: Increase public understanding of complexities of charging at workplaces and gather resources to help facilitate installations. Includes:</p> <ul style="list-style-type: none"> <li>• Promoting installation and information about EVSE through future CSE and SANDAG PEV Implementation work</li> </ul>

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<p><b>10. Infrastructure Costs</b></p> <p>-Lack of capital for station construction and operation costs.</p> <p>-Who pays for the upfront costs of the infrastructure? The grantee, ratepayer or end user.</p> <p>-Risk of investment.</p> <p>-Need justification/incentives for higher costs to build stations.</p> <p>-Need partners to justify investment.</p>	 <p>The image shows a 2x3 grid of fuel dispensing nozzles. The top row features a green nozzle labeled 'Biodiesel' and a red nozzle labeled 'Electricity'. The middle row features a yellow nozzle labeled 'Ethanol' and a grey nozzle labeled 'Hydrogen'. The bottom row features a blue nozzle labeled 'Natural Gas' and a gold nozzle labeled 'Propane'.</p>	<p>Create forum for stakeholders to discuss and form partnerships.</p> <p>Promote Clean Cities tools, such as natural gas Vehicle and Infrastructure Cash-Flow Evaluation (VICE) Model which address payback period for natural gas vehicles and infrastructure.</p> <p>Past success from regions to apply for infrastructure funding from the California Energy Commission.</p>	<p>Recommendation: Provide public agencies and fleets with tools for evaluating and overcoming infrastructure costs. Includes:</p> <ul style="list-style-type: none"> <li>• Evaluating and promoting existing tools</li> <li>• Providing a forum for coordination</li> <li>• Best practices of CEC infrastructure grant recipients so other jurisdictions may have similar success</li> <li>• Developing a guide that allows jurisdictions to better navigate and understand CEC infrastructure grants</li> </ul>
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Barrier: Vehicles	Barrier Pertains To	Guidance Materials	Action Items
<p><b>11. Selecting Appropriate AFVs</b>                      -Advise municipal staff and businesses on choosing alternative fuels that will meet fleet needs.</p>	 <p>Biodiesel Electricity Ethanol Natural Gas Propane</p>	<p>Clean Cities tools such as the Vehicle Cost Calculator and Vehicle Search.</p>	<p>Recommendation: Help fleet staff and businesses choose most appropriate AFVs for their needs.                      Includes:</p> <ul style="list-style-type: none"> <li>Promoting Clean Cities tools</li> <li>Developing guidance on determining most appropriate AFVs</li> </ul>
<p><b>12. Procuring and Financing AFVs</b>                      -Initial higher costs of AFVs barrier to adoption.                       -Need further outreach to fleets and public about incentives for procuring AFVs.</p>	 <p>Biodiesel Electricity Ethanol Natural Gas Propane</p>	<p>Connect municipal staff, businesses and local residents to dealers and vehicle manufactures. Provide guidance on leasing vs. purchasing an EV.</p> <p>Educate public on available incentives.</p> <p>A Public Fleet Pilot Project allows for cities with disadvantaged communities to apply for extra funding to buy new PEVs</p> <p>The CalEnviroScreen, a state-developed tool that identifies “disadvantaged communities” in the state, helps determine who can benefit from additional funding and pilot projects, such as the Public Fleet Pilot Project.<sup>1</sup></p>	<p>Recommendation: Assist fleets to understand the costs of AFVs and provide guidance on procurement and financing AFVs.                      Includes:</p> <ul style="list-style-type: none"> <li>Identifying &amp; promoting best resources on financing and procurement</li> <li>Reaching out to cities with disadvantaged communities to take advantage of extra funding to buy PEVs</li> <li>Costs associated with each type of AFV (provide a cost analysis)</li> <li>Developing models for financing vehicle acquisition</li> </ul>

<sup>1</sup> The lack of San Diego regional communities labeled as “disadvantaged communities” limits the extra funding coming to the region. SANDAG believes this tool is not representative of the underserved communities existing in the region; that is, there are far more than are actually labeled in the tool.

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<p><b>13. Converting Conventional Vehicles to an Alternative Fuel</b>                  - Lack of understanding on the regulations, conversion kits available or companies that provide retrofit services.</p>	<p><b>Natural Gas Propane</b></p> 	<p>Information on CARB acceptable conversion kits and manufacturers.</p>	<p>Recommendation: Provide guidance on how to safely and lawfully convert conventional vehicles to use alternative fuels.</p> <ul style="list-style-type: none"> <li>• Provide guidance on CARB approved conversion kits</li> </ul>
<p><b>14. AFV Technology</b>                  -AFV lifespan and range (especially for PEVs) in some cases is not competitive with conventional vehicles.</p> <p>-People not making the investment until they feel confident of the technology’s reliability.</p> <p>-People are wary of emerging AFV technology, unsure of its reliability.</p>	<p><b>Biodiesel Electricity</b></p>  <p><b>Ethanol Hydrogen</b></p>  <p><b>Natural Gas Propane</b></p> 	<p>Meeting summaries from Refuel subcommittee meetings serve as background for fuels and new technology.</p> <p>Alternative fuel vehicle industry websites also serve as background for new technology.</p>	<p>Recommendation: Provide insight into the up-and-coming technology and emerging fuels. Includes:</p> <ul style="list-style-type: none"> <li>• Guidance on fuel and technology developments: dimethyl ether (DME), hydrogen, algae, renewable natural gas, drop-in fuels in general</li> <li>• Alternative fuel life cycle analysis, including second-life batteries</li> <li>• Discussion on vehicle technology “maturity” – how long have certain fuels been used, by who, and with what kind of results</li> </ul>