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Electric Vehicles:

*Implementing a Comprehensive EV Strategy for
Healthy Communities & Economic Vitality through
Zero-Emission Transportation in Marin*

RTP/SCS Project Proposal submitted to:

- Transportation Authority of Marin

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Contents

About the Authors	3
Introduction: Creating a Zero-Emission Land Use in Marin County	5
Executive Summary	7
Description of RTP/Sustainable Communities Strategy Project	10
Why Implement a Comprehensive Countywide Infrastructure Plan?	14
Marin Needs More than Transit-Oriented Housing & Improved Mass Transit to Meet AB 32 & SB 375 Climate Change Targets	17
Electric Vehicles = Sustainable Communities Strategy	18
Will Marin Lead by Example?	20
The Key Capital Investment: Public Charging Stations	21
Building a Market While Conserving Funds: Electrifying Vehicle Fleets	23
Site & Design Considerations	26
Marin's Advantage	27
The Role of Electric Vehicles in Addressing Climate Change	28
Appendix: How Electric Vehicles Accelerate Achievement of MTC's Climate Change Goals in Marin	29
Acknowledgements	39



About the Authors

Jan Alff Wiegel, Dale Miller, and William Carney serve on the Electric Vehicle Working Group of the Transportation Authority of Marin. They are pleased to submit this project proposal and accompanying information on the benefits of electric vehicle transportation in planning for sustainable communities in Marin County.



JAN ALFF WIEGEL reports on a wide variety of Marin County sustainability issues on her new website, *BrightGreenMarin.com*. She was the sustainability reporter for *MoreMarin.com* before opening her own website this year. Ms. Alff Wiegel has written about electric vehicles, sudden oak death, AB 32, waste, and renewable energy, and other important topics.

Long an advocate of sensible land use planning and environmental protection, Ms. Alff Wiegel graduated from the Sustainable Practices Certificate Program at Dominican University of California and *Environmental Forum of Marin's* Sustainable Earth Forum curriculum. She advocates on behalf of the *Golden Gate Electric Vehicle Association* and is a member of *Marin Conservation League*.

She was appointed by the Board of Supervisors to the Marin County Planning Commission in 1990, and served through 2001. She served several terms as Chair of the Commission, overseeing contentious projects proposed by Lucasfilm, the Buck Center for Research on Aging, and Marin City USA. She contributed to the preparation of the *1994 Marin Countywide Plan*.

She also serves as vice-president and director of sustainability for *Wiegel Law Group PLC*, San Francisco. She and her husband are awaiting the delivery a Nissan Leaf.



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He regularly collaborates with vehicle manufacturers, charging equipment makers, government agencies, electric vehicle dealers, and others to raise awareness of the benefits of electric vehicles and speed the transition to clean transportation in the Bay Area. GGEVA also provides support to individuals, companies, and organizations who convert vehicles with internal combustion engines to electric drive.

Mr. Miller has been a strong voice in advocating to the *Marin County Board of Supervisors*, the *Transportation Authority of Marin*, and sustainability organizations to plan, install, and expand the necessary EV charging infrastructure throughout the County.

Mr. Miller also delivers presentations on electric vehicles at events and conferences. He curated the *Electric Wheels Car Show* at the 2009 Marin County Fair and the electric vehicle section of the *Alt-Fuel Vehicle Expo* at the award-winning 2008 Marin County Fair.

Mr. Miller lives in San Rafael and drives an electric car powered by solar panels on the roof of his home.



WILLIAM CARNEY has been president of *Sustainable San Rafael* for the past two years and represents the organization on issues relating to climate change, electric vehicles, and land use.. A thoughtful and articulate proponent of sustainability, he served on the 'green teams' which helped create San Rafael's *Climate Change Action Plan*.

He currently serves on the San Rafael's *Citizens Advisory Committee on Redevelopment* which is engaged in planning the area around the city's downtown SMART station.

In his professional career as a landscape architect, Mr. Carney helped oversee the design and construction of Yerba Buena Gardens in San Francisco and managed the Yerba Buena, Transbay, and South of Market redevelopment project areas. He is principal of Landscript Associates, which focuses on environmental writing, interpretation and design.

He looks forward to the delivery of a Nissan Leaf electric vehicle in the next few months.



Introduction: Creating a Zero-Emission Land Use in Marin

Why it's time to shift attitudes and move towards non-polluting vehicles

When we think of land use and zoning, we tend to overlook land devoted to transportation. Instead, we think of roads as being land parcel "separators" which don't have their own designated zoning. Roads aren't "zoned" for driving, but everyone knows that is how that land is used – for driving. "Driving" is a land use.

Now, in order to comply with AB 32, SB 375, and Sustainable Communities Strategy policies, the time has come to look at that "driving" land use and find a way to make that use more sustainable and less polluting.

If we can view driving as an activity that can reduce, rather than increase, local greenhouse gas emissions, we can help the region achieve greenhouse gas reduction targets set by the Metropolitan Transportation Commission, the Bay Area Air Quality Management District, and the California Air Resources Board. To accomplish this goal, a shift in political and consumer attitudes, along with adoption of non-polluting vehicles, will be needed.

According to SB 375's mandates, counties and cities are urged to build affordable housing on infill land near transit hubs and thoroughfares. This planning policy breaks no new ground in Marin County, where infill development has been recommended for more than 25 years to create walkable communities with higher densities in the city-centered corridor.

However, transit-oriented infill development has achieved mixed results in Marin, in part because housing near transportation is viewed as undesirable, noisy, and unhealthy. Highway 101, Sir Francis Drake Boulevard, and several other arteries form the backbone of Marin's transportation network. Some affordable housing developments have been slow to succeed partially due to proximity to these routes and their attendant highway noise and pollution. Marin City USA and the recently completed Fireside project in Mill Valley come to mind.

Poor air quality from transportation not only triggers asthma and raises public health costs, it also significantly undermines the desirability of using infill lands in low lying inundation zones along Highway 101 and other corridors to meet affordable housing needs.

According to *Sustainable Marin: Nature, Built Environment, & People*, an executive summary of the *2007 Marin Countywide Plan*, vehicle travel is responsible for more than 50% of nitrogen-oxide emissions and 75% of carbon monoxide and particulate emissions in Marin. San Rafael's *Climate Action Plan* estimates that the city's community-wide GHG emissions in 2005 amounted to 524,148 tons of CO₂e (equivalent carbon dioxide units, including nitrous oxides and methane).

According to the recently released *Miles from Home* workforce report, Marin employees drive 2.6 million miles a day to get to their jobs, contributing 2.37 million pounds of carbon dioxide into the atmosphere every day. This translates into 2.45 metric tons of greenhouse gases per worker per

year. If half of those commute trips were traveled in an EV, total emissions would be immediately cut in half – the equivalent of eliminating the energy consumption of 10,900 homes.

According to a presentation to the Marin County Board of Supervisors in September, 2005, transportation produced more than 1,983,000 tons of CO₂ entering the air in Marin County due to the continued consumption of gasoline to power these miles driven. More than half (52%) of the County government's share of total emissions were produced by County employees while driving to and from work. Another 25% of these emissions resulted from use of County fleet vehicles.

In announcing a Bay Area EV corridor project earlier this month, the Association of Bay Area Governments estimated that "electric vehicles will annually displace over 430 gallons of gasoline and reduce greenhouse gas emissions by over 4.6 tons per vehicle."

Marin County's historical development patterns have not supported a widely-used public transit system. Our rugged terrain, narrow winding roads, and widespread rural areas, mean that local drivers and visitors don't have the transportation choices enjoyed in other regions.

Marin County drivers are largely dependent upon personal autos to get around, contributing to the region's poor air quality with every mile traveled in a gasoline-powered vehicle. Although Marin enjoys better air quality due to cleansing coastal fog, our transportation-caused pollution is blown eastward to other communities.

And, even in areas supported by public transportation, diesel-powered transit vehicles run on fixed routes and schedules, often with few passengers.

Additionally, Marin is not immune to global influences. Numerous experts believe that we have surpassed "peak oil" and that there will not be enough oil to meet worldwide demands over the next 50-100 years. With ongoing socio-political unrest in oil-producing regions and increasing energy demands around the world, it is essential that our dependency on oil for transportation be cut significantly. Moving the personal transportation sector away from being entirely dependent on fossil fuels will reduce that dependency and free up oil to be used for more critical needs.

In Marin, the future of transportation will always include the personal automobile. However, the use of gasoline-powered automobiles comes at a high social and environmental price and is proving to be increasingly unjustifiable. More explicitly stated, continuing to rely solely on gasoline-powered vehicles is inconsistent with public policy relating to climate change.

Let's change how we use land devoted to driving to be sustainable and non-polluting.



Executive Summary

TARGET: 20% Electric Vehicle DMV Registration in Marin by 2020

PROJECT: Implement a comprehensive strategy for the transition to electric vehicles in Marin that includes municipal fleet purchases, and the installation of charging stations at public parking facilities, public employee lots, and key transit and housing sites.

The Transportation Authority of Marin (TAM) is well positioned to implement a countywide, comprehensive strategy to encourage and support the rapid roll out of electric vehicles (EVs) in Marin. Electric vehicles offer a key strategy to meet AB 32 climate change goals, since cars and trucks account for approximately 62% of greenhouse gas emissions in Marin County. EVs also supercharge achievement of the greenhouse gas (GHG) reduction goals of Senate Bill 375 by reducing emissions from vehicles in the near term, while longer range land use, in-fill housing, and transportation policies steadily reduce overall vehicle miles traveled.

Just as the effects of climate change are beginning to be felt — and as scientists and the public are being jolted awake to the scale of the problem and the rapidity of its onslaught — electric vehicles now becoming available offer a means to significantly cut the emissions that are fueling the crisis.

Marin is particularly well-suited to lead this essential transition to electric transportation. Its population includes many environmentally-conscious early adopters. The proportion of its carbon footprint attributable to transportation is among the largest in the Bay Area. And since the establishment of Marin Clean Energy (MCE) in 2009, most residents and businesses have the option of plugging their electric vehicles into a growing local supply of 100% renewable, carbon-free energy.

In fact, a Marin resident or business with an EV, plugged into MCE or rooftop solar, can achieve close to the 80% carbon reduction which scientists say must be achieved in the next few decades to stave off unstoppable climate chaos. And like the dollars spent on clean energy, the dollars spent on electric vehicles are not additional expenditures when compared with a comparably priced gasoline car.

A Comprehensive Electric Vehicle Strategy seeks to tap this huge potential through:

- Development of a Comprehensive Electric Vehicle Infrastructure Plan.
- A coherent and sustained public outreach and media campaign.
- Installation of EV charging stations at public parking facilities, public employee lots, and key transit and affordable housing sites.
- Widespread municipal fleet purchases of EVs and conversion of existing assets to electric power

- Encouraging private sector EV investments through outreach, streamlined permitting, development standards, and incentives.
- Utilizing proactive, ongoing, and centralized coordination of EV efforts among Marin jurisdictions.

In support of the capital costs of the public charging stations and municipal fleet purchases that form the core of this strategy, we recommend that TAM propose a Regional Transportation Plan allocation of \$10 million over the next ten years, to be matched by local allocations of at least \$100,000 each year from Measure B revenues and other sources.

The program's aggressive target is that 20% of the vehicles registered in Marin will be electric by 2020 (46,000 vehicles), constituting a 20% reduction of Marin's transportation-generated greenhouse gas emissions (and overall carbon footprint by approximately 12%), while opening the doors to more dramatic reductions through 2035.

With RTP support, Marin could become a model for encouraging electric vehicles as a strategic means to address climate change, energy independence, and air pollution. By purchasing and supporting electric vehicles, Marin's public jurisdictions can 'lead by example' and spark the county and region as a whole to do likewise.

Core Public Capital Investments to Support Electric Vehicles

At the core of Marin's EV strategy are three public capital investments, which will catalyze widespread adoption of electric vehicles by residents and businesses:

- **Public charging stations throughout Marin** would assure drivers that electric vehicles can serve most of their driving needs within the county. Combined with overnight home charging, which is itself sufficient to satisfy most charging needs, publicly available charging stations will add convenience and security to the experience of driving EVs in Marin. They will be especially useful to those whose business or activities take them to multiple destinations during a given day, and to visitors and commuters driving into the County from elsewhere in the region.

Those charging stations located at public parking facilities in downtown shopping, civic districts, and transit centers will be usable while people attend to other business. Those located in affordable housing developments will serve people who might not otherwise be able to benefit from the cost savings of operating an electric vehicle.

In addition to serving a specific need that will catalyze the adoption of EVs, widespread public charging stations will provide a model for private investments in charging stations at destination shopping centers, places of employment, and visitor destination sites.

- **Charging stations at public employee lots** will provide a valuable incentive for a large pool of workers to purchase electric vehicles. These public-minded employees provide a likely nucleus for widespread adoption of EVs. Again, by providing employees with access to charging stations, the public sector can model such investments by private sector businesses.
- **Municipal fleet purchases** of electric cars and vans introduce employees to EVs and can provide a similar model for purchases by businesses and individuals. Such purchases can also provide critical early demand for accelerating the production of EVs. At the same time, the dollars that must be budgeted for replacement vehicles can drive purchases that will both conserve scarce maintenance and fueling funds and help meet municipal emission reduction goals.

Maximizing the Impact of Public Investments in EVs

Perhaps the greatest impact of these public investments in support of electric vehicles is that they help establish in the public mind that EVs are here, are practical, and can be a major part of the solution of climate change and other sustainability issues. Marin's EV Strategy seeks to maximize this impact through these proactive steps:

- **Creating a Comprehensive Electric Infrastructure Plan.** The Plan will provide the framework for guiding the location of charging stations at key locations throughout the County, in alignment with municipal and county planning objectives.
- **Promoting EV adoption through coherent and sustained public outreach.** A professionally designed and implemented promotional strategy will utilize all available media and platforms—newspapers, broadcast, web sites, social media, printed material and others. Every public installation and action will be highlighted by press releases and press events, and taken as an opportunity to promote the adoption of electric vehicles. The promotion of 'Green & EV-friendly' Marin destinations will be an ongoing theme.
- **Enabling and encouraging private sector investments in EVs.** Major employers and destinations will be proactively encouraged to follow the example set by public sector installation of charging stations, employee incentives and fleet purchases. In particular, public utilities and franchisees will be encouraged to consider EV fleets. At the same time, streamlined permitting and inspection of charging infrastructure and 'EV-ready' development standards will be applied countywide to ease the adoption. Incentive programs can include charging stations for homes and businesses.
- **Supporting integrated countywide implementation of EV programs.** TAM will dedicate staff to oversee a dynamic and ongoing EV planning and implementation process, providing a single point of contact to further adoption throughout the County. This will include coordination with local jurisdictions, businesses and non-profit stakeholders. The continuing development and distribution of funding to support EV infrastructure and fleet purchases will be key. The inclusion of EVs in local Climate Change Action Plans, as is the case in San Rafael, is also a critical ingredient. A huge opportunity lies in working with the Marin Clean Energy program to provide renewable energy for electric vehicles.

Key Actions and Funding to Date

With the adoption of Measure B in the fall of 2010, the Transportation Authority of Marin successfully secured a portion of vehicle registration fees for the support of EV adoption. These funds provide a potential source for a local share of the costs of implementing a comprehensive EV strategy, especially for the costs of ongoing planning, promotion, and coordination. Combined with the major capital investment funds available through the Regional Transportation Plan process, a program with significant impact can be achieved.

TAM has already made important strides by securing California Energy Commission funding for an initial twenty public charging stations. With support from the Marin Community Foundation, the TAM has also conducted an initial inventory and planning process for charging station locations with local jurisdictions and hosted several public workshops on EVs. It has also convened an *Electric Vehicle Working Group* to advise it on its EV activities. In short, if long-term capital funding can be secured, TAM is ready to proceed with a program that holds immense promise for dramatically reducing greenhouse gas and other transportation-related emissions.



Description of RTP-Sustainable Communities Project Proposal

TARGET: 20% Electric Vehicle DMV Registration in Marin by 2020

FUNDING REQUEST: \$10,000,000 over 10 years

PROJECT: Implement a comprehensive strategy for the transition to electric vehicles in Marin that includes municipal fleet purchases, and the installation of charging stations at public parking facilities, public employee lots, and key transit and housing sites.

Building and expanding upon information already developed by the Transportation Authority of Marin, the County of Marin, and the 11 municipal jurisdictions, we propose that \$10 million in funds be applied for and allocated over the next ten years, to be matched by local allocations of at least \$100,000 each year from Measure B revenues and other sources, in order to generally accomplish the following:

- **Create a designated staff responsibility** within the Transportation Authority of Marin to oversee the creation and implementation of the Plan.
- **Expand the Electric Vehicle Working Group** to include key representatives from all jurisdictions and a wide range of stakeholder constituencies.
- **Establish a Model EV Infrastructure Project** that includes installation of charging stations in top priority and high visibility locations. In order to drive rapid adoption of EVs in Marin, the Model EV Project should be in place as quickly as possible and could include the charging infrastructure currently planned by Marin jurisdictions.
- **Consider preparation of a Request for Proposals** to be distributed to consultants experienced in preparing regional charging infrastructure plans and contract with the most qualified team to assist Marin decision-makers in developing an electric vehicle infrastructure plan.
- **Develop a Comprehensive Electric Vehicle Infrastructure Plan** with the goal of increasing the number of electric vehicles registered in Marin to 20% by 2020. (The general tasks associated with developing the Plan are described on Page 12.)
- **Develop Countywide Electric Vehicle Deployment Guidelines** in order to create a common knowledge base of EV requirements for stakeholders and jurisdictions involved in the development of EV charging infrastructure. (The general tasks associated with developing the Guidelines are described on Pages 12 - 13.)

- **Create an Electric Vehicle Model Ordinance** to streamline and incentivize private sector installation of charging stations and other EV infrastructure for recommended adoption by all Marin County jurisdictions and agencies.
- **Create a Fleet Sustainability Program** to guide municipal and corporate fleet operators in transitioning existing assets and future purchases towards electric vehicles.
- **Purchase municipal fleet vehicles and install charging stations** in appropriate fleet service locations.
- **Install a network of publicly accessible charging stations** as designated in the Plan.
- **Conduct a Professionally-Designed Public Education, Outreach, and Marketing Campaign** directed towards all stakeholder constituencies and decision-makers to support rapid EV adoption and ensure successful use of charging infrastructure.



The following highlights some of the general tasks likely to be associated with developing the Plan and the Deployment Guidelines. Because we anticipate that most readers of this document will not be familiar with what an electric vehicle plan would contain, we are providing more specificity in this section to explain the types of planning issues and information that preparers of the documents would need to address.

- Development of a Comprehensive Electric Vehicle Infrastructure Plan would include, but not be limited to, the following tasks:
 - 1) Conduct a series of scoping sessions to solicit public input and stakeholder involvement in identifying EV needs, opportunities and priorities.
 - 2) Develop a scope of work to guide preparation of the Plan.
 - 3) Draft a Request for Proposals to be distributed to consultants experienced in preparing regional EV charging infrastructure plans and contract with the most qualified team to assist Marin decision-makers in developing the Plan.
 - 4) Engage all stakeholders in EV needs assessments, desired outcomes.
 - 5) Determine locations and types of charging stations.
 - 6) Identify and prioritize the locations for a minimum number of charging stations to be installed within six months (Model EV Infrastructure Project).
 - 7) Identify and prioritize the locations for additional charging stations to be installed in a subsequent phase.
 - 8) Identify, map, and prioritize charging station locations throughout the County.
 - 9) Identify municipal and corporate fleet opportunities, goals, and needs.
 - 10) Establish preliminary budget and schedule.
 - 11) Identify funding needs, potential matching funds, revenue streams, and grant sources.
 - 12) Establish performance metrics, monitoring systems, and reporting mechanisms.

- Development of the Electric Vehicle Deployment Guidelines would create a common knowledge base of EV requirements for stakeholders and jurisdictions involved in the development of EV charging infrastructure. At a minimum, the Deployment Guidelines should address and include the following:
 - 1) Electric vehicle and infrastructure terminology.
 - 2) Types of vehicles for specific purposes.
 - 3) Requirements for charging facilities for specific types of vehicles, e.g., electric bicycles, scooters, motorcycles, trucks, cars, and watercraft.

- 4) Level 1 vs. Level 2 vs. DC Fast Charger considerations and requirements.
- 5) Single attached and detached garages.
- 6) Carports.
- 7) Multi-family dwellings.
- 8) Municipal and commercial fleets.
- 9) Publicly available charging stations.
- 10) Curbside charging.
- 11) Site selection criteria.
- 12) Streamlining building permit processing.
- 13) Train building inspectors to recognize/solve issues inherent in EV infrastructure.
- 14) Standardized electrical requirements, building code compliance.
- 15) Parking space specifications.
- 16) Lighting and shelter requirements.
- 17) Signage.
- 18) Americans with Disabilities accessibility.
- 19) Point of sale operations.
- 20) Safety issues related to indoor and outdoor charging.
- 21) Installations located in flood zones.
- 22) Integration with utilities and grid.
- 23) Electrical supply metering.
- 24) Charging station performance monitoring.
- 25) Station ownership.
- 26) System maintenance and servicing of individual charging stations.



Why Implement a Comprehensive EV Infrastructure Strategy?

Cost, Time, Results

In order to provide the optimum infrastructure to support and encourage the adoption of electric vehicles in Marin County, it is recommended that all jurisdictions and stakeholders work together to create a logical, accessible, cost-conscious, and non-redundant electric vehicle plan. A comprehensive EV infrastructure strategy can serve as a streamlined, cost-effective framework for individual jurisdictions seeking to expand transportation choices in their communities.

Implementing a countywide EV infrastructure plan will create a blueprint for developing a vibrant electric vehicle community and has the following benefits:

- Saves money by eliminating the need for each jurisdiction to allocate staff resources and funding to develop separate plans.
- County jurisdictions can apply jointly for MTC funding through TAM.
- Sharing infrastructure costs and deployment methodologies among multiple jurisdictions brings down the cost of use for all.
- Saves time by streamlining the public process.
- Allows early installation of public charging stations in strategic locations (Model EV Infrastructure Project) while Plan is being developed.
- Accelerates achievement of greenhouse gas reduction goals beyond that possible if jurisdictions were to rely solely on the reducing vehicle miles traveled model.
- Anticipates future resident and visitor EV charging needs in accordance with SB 375 Sustainable Communities Strategy.
- Facilitates EV charging links with networks established by other regions.
- Speeds dissemination of electric vehicle information to fleet managers and large employers.
- Coordinated “roll out” of infrastructure throughout the county possible.
- Eliminates redundancy and duplication in infrastructure.
- Expansion of Electric Vehicle Working Group simplifies coordination and solicitation of input from numerous and distinct stakeholders.
- Provides for greater public awareness of EVs and the availability of local infrastructure.

- Creates a public-private investment opportunity with public infrastructure available to EV owners putting up the money to purchase zero-emission vehicles.
- Enhances marketing and branding opportunities by consolidating the “EV message” into one voice.
- Provides certainty to EV drivers outside Marin that charging is available during their visit.
- Allows local contractors to provide cost-effective services to residents because permit procedures and requirements can be standardized.
- Allows Marin jurisdictions to be in compliance with Federal and State policy.
- Supports faster adoption of EVs.

Every jurisdiction planning for EVs will need to adopt and implement measures pursuant to existing State laws and policies, including California’s clean car standards, goods movement measures, and the Low Carbon Fuel Standard. By working together, jurisdictions will save money in staff time required to draft individual policy language that is needed by all.

A comprehensive infrastructure plan will result in a far more effective and efficient transition to electric vehicles than if each of the 11 jurisdictions in the County has a different system. It is important to recognize that countywide consistency in how infrastructure is sited, designed, and operated will speed driver adoption of electric vehicles.

Electric vehicles have different characteristics from internal combustion engine vehicles. Some jurisdictions, stakeholders, and drivers may be unfamiliar with these characteristics. It will be necessary to provide information about electric vehicle terminology, electrical requirements, the latest codes, laws, and deployment standards, if the County is to succeed in reducing transportation-generated greenhouse gas emissions.

Understanding the behaviors of potential EV owners is also paramount to developing and implementing a successful plan. For example, the time needed to re-charge an EV is a factor to be considered in promoting widespread EV adoption. Planning a strategic countywide network of charging sites at locations where drivers park for extended periods of time facilitates the transition to EVs.

Currently, infrastructure to support Marin EVs is practically non-existent when compared to the supporting infrastructure for internal combustion engine vehicles (e.g., gas stations, mechanics). Therefore, it is essential that Marin County be well-equipped with needed infrastructure to support consumer adoption of electric transportation and thereby facilitate improved air quality and reduced greenhouse gas emissions throughout the County.

EV support providers should also be consulted and considered during this planning process, e.g., emergency responders, electricians, utilities, renewable energy contractors, and towing companies.

Residents, fleet managers, employers, auto repair centers, and hospitality organizations need to know how and what they can do to address the servicing requirements of EVs. Local electricians will learn how to install charging systems in residences and commercial locations more quickly if County jurisdictions adopt similar policies. Additionally, a survey of businesses may likely reveal that charging infrastructure will attract customers and boost economic development in certain locations.

By approaching EV infrastructure planning from a countywide perspective, consumer adoption of electric vehicles will occur more quickly.



Marin needs *more* than Transit-Oriented Housing & Improved Mass Transit to reach AB 32 & SB 375 climate change targets

Implementing One Bay Area Plan's *Initial Vision Scenario* results in "a 12% per capita greenhouse gas emission reduction from personal use vehicles by 2035", compared to a 2005 base year. As stated in the scenario, "this reduction falls short of the region's state mandated 15% per capita greenhouse gas emission reduction target." According to the report, "it is clear that *additional strategies* will need to be employed if we want to attain the greenhouse gas targets and other targets previously adopted by the Association of Bay Area Governments and the Metropolitan Transportation Commission."

In other words, even in the best of circumstances, full implementation of the Sustainable Communities Strategy, as set forth in the One Bay Area *Scenario*, will *not* get the region to where it needs to be in terms of improving air quality, reducing health impacts from exposure to particulate emissions, or enhancing non-polluting transportation modes.

The Scenario claims to balance the expected influx of people to the region through 2035, the attendant increased amount of driving within the region, and resulting greenhouse gas emissions by concluding that "the amount of overall driving and greenhouse gas emissions statewide (will still) be less than if the new residents were commuting to Bay Area jobs from communities in neighboring regions" that do not offer housing near transportation and public transit.

Despite the strong effort made by state and Bay Area agencies to address tough climate change challenges, questions remain.

- How will Marin County and the region close that 3% gap in greenhouse gas emissions reductions if the *Initial Vision Scenario* either fails to provide a way to meet the 15% target or, for other reasons, is not carried out as recommended?
- Will building sustainable communities and improving public transit happen quickly enough to make a real impact on global warming?
- What other strategies can Marin County and its jurisdictions employ to make greater strides in reducing greenhouse gas emissions?
- What other strategies can Marin County and its jurisdictions adopt to motivate residents to make substantive changes in their polluting habits?

This project proposal provides some answers.



Electric Vehicles = Sustainable Communities Strategy

Lowering air pollution levels by reducing vehicle miles traveled is a key tool of sustainable communities planning. However, it is not the only tool available and for those who must depend upon a car, it is time to start thinking about how their driving can become a zero-emission land use.

Planning for and installing electric charging infrastructure represents a value-added feature in sustainable communities. Accommodating, even encouraging, electric vehicles within infill housing and commercial development will attract people concerned about the environment, quality of life, clean air, and lowering their cost of living. Electric vehicles in affordable communities mean that lower income populations will be able to save on fuel and maintenance expenses, *and* secure a higher quality of life than they would elsewhere in Marin.

Marin drivers are ideal EV-adopters. They are more concerned about reducing their carbon footprints than their counterparts in other parts of the state. *They want to do the right thing.* Concerns with global warming, oil shortages, energy security, and increasing gas prices, along with the rapid introduction of more fuel-efficient vehicles, are clear indicators of changing consumer preferences and industry direction here in Marin and around the region. As major automotive manufacturers bring electric vehicles to market this year and next, the future of transportation everywhere is being propelled by a fundamental shift to cleaner and more efficient electric drive systems.

According to the *San Francisco Chronicle*, the Bay Area has the largest number of reservations for all-electric automobiles. In fact, drivers in Marin, Sonoma, San Francisco, and the East Bay are already driving electric vehicles, which they charge at home. One dealer in Petaluma, *North Bay Nissan*, is in the process of delivering more than 273 Nissan Leafs to Marin and Bay Area customers. Those Leaf purchases represent approximately .1% of the number vehicles registered in Marin even though no infrastructure is in place and no widespread promotion of EVs has occurred.

Electric vehicle owners will be making a significant financial investment of their own in helping Marin achieve air quality goals. By providing the money to purchase their own vehicles, they will effectively become a financial equity partner with the County, the region, and the State to fight global warming. Owners will not depend upon the County and its jurisdictions to solicit public funds for their EV purchases, resulting in lowering the municipal financial commitment to achieve climate change goals.

Transportation electrification is not only about automobiles, light trucks, and busses. Electric bicycles and electric boats are also becoming popular. It is important to transition people out of cars at every opportunity and electric bikes create opportunities for people and families to leave their cars in the garage while simultaneously reducing the impacts of automobile manufacturing and shipping. Also, some Bay Area marine suppliers are selling electric drive systems to replace both gas and diesel engines in sailboats up to 40 feet, something that will likely be highlighted during the upcoming America's Cup in 2013.

One driving force in the design, construction, and operation of sustainable facilities is the *Leadership in Energy and Environmental Design* (LEED) Green Building Rating System. Developed by the U.S. Green Building Council, LEED provides standards for environmentally-sustainable construction and operation of facilities. Companies and commercial property owners interested in LEED certification are excellent sites for publicly available charging stations. LEED certification requires a study of greenhouse gas emissions and encourages the use of alternative fuel vehicles through monetary incentives or preferred parking. LEED also allows credits for installing EV charging stations and suggests certain percentages of parking be devoted to alternative fuel vehicles. These types of charging locations could be available to employees as well as public visitors using the facility.

Electrifying our modes of transport will attract more success to affordable housing and sustainably-designed communities, close the gap in reaching air quality targets, and lower fuel costs over the long term. By investing in planning and building an accessible network of public and private electric vehicle charging stations and promoting fleet and individual EV purchases, we will also begin to take responsibility for our driving behavior and global warming impacts.



Will Marin Lead by Example?

Eliminating the 'chicken & egg' question

Which comes first? The EV or the charging station?

This has been a common dilemma faced both by drivers and communities. Drivers want to purchase electric vehicles but worry about where they will be able to re-charge their cars. Communities want to support electric vehicles but don't want to incur the expense of installing a charging network if no one has an electric vehicle to charge.

Now that electric vehicles are coming to market, Marin jurisdictions can resolve this confusion by embracing a comprehensive electric vehicle strategy and becoming EV role models. The County, its cities, and towns can lead the way by purchasing electric vehicles for their fleets, installing public charging stations, standardizing and streamlining permitting procedures, and providing consistent information to the public.

Because it is so important to facilitate adoption and serve current EV owners, public charging should be available as soon as possible. It is not necessary to delay EV infrastructure until the Plan is completed.

Installation of a small highly-visible network should be undertaken at the beginning of the planning process to facilitate adoption and meet the needs of current EV drivers. Priority locations for these first chargers can be easily identified by local officials and a few key stakeholders before work is underway on developing a countywide plan. This early network would set the stage for the future expanded network of chargers.

Installing public charging stations and signage in highly visible locations will help market electric vehicles. When drivers see charging stations along their daily routes, they will begin to realize that a local EV infrastructure exists. This does not mean that charging stations must be situated in the most desirable parking spaces, e.g., near building entries, just that directional signage needs to be readily apparent. If how and where to charge vehicles is readily apparent to drivers, a barrier to purchasing or driving an electric vehicle is removed.

Public employers and businesses also have the opportunity to attract customers and retain employees by installing electric vehicle charging stations. The following incentives and programs can be used to encourage electric vehicle use:

- Parking discounts for EV owners
- Preferential parking accommodations
- Free charging for customers or employees
- Employee financing programs

The County and its jurisdictions *can* lead by example.



The Key Capital Investment: Public Charging Stations

So many resources, so many opportunities

There are numerous companies that have developed charging equipment for public and private installations, including the following:

■ AeroVironment	www.avinc.com	Home & Commercial Units
■ Aker Wade	www.akerwade.com	DC Fast Chargers – Fleets
■ Better Place	www.betterplace.com	Battery Switching Systems
■ Coulomb Technologies	www.coulombtech.com	Chargepoint America
■ ClipperCreek	www.clippercreek.net	
■ CurrentWays	www.currentways.com	
■ ECotality	www.ecotality.com	Blink Charging Station
■ EV-Charge America	www.ev-chargeamerica.com	
■ EvaTran	www.pluglesspower.com	Plugless Power Charging
■ EVSE	www.controlmod.com	
■ General Electric	www.ecoimagination.com/technologies/wattstation	
■ GoSmart Technologies	www.gosmarttechnologies.com	
■ GRIDBot	www.gridbot.net	
■ Leviton	www.leviton.com	
■ ParkPod	www.parkpod.com	Turnkey commercial units
■ Shorepower Technologies	www.shorepower.com	Fleet & highway units
■ Square D	www.schneider-electric.us/products-services/products/electric-vehicle-charging/electric-vehicle-charging/	
■ SunPods	www.sunpods.com	

(Note: the above information is provided by the *Golden Gate Electric Vehicle Association* and *Charged Up & Ready to Roll: The Definitive Guide to Plug-in Electric Vehicles*, published by Plug In America, 2011)

Fortunately, despite the number of manufactures, a standard connection and communication protocol, J1772, for charging stations and vehicle connections has been developed by the Society of Automotive Engineers. This means that all makes of vehicles will be able to use all makes of charging stations.

In developing charging station technology, the assumption has been that the majority of charging will take place at the driver's home or business during evening hours when the car is typically idle and electricity rates are lower. However, there will still be a need for convenient charging stations outside the home and business.

The most practical locations for publicly available charging locations should be evaluated by and described in a comprehensive EV infrastructure plan in order to avoid redundancy and unnecessary expense. These stations will have to be located in places where drivers can safely leave their vehicles for hours at a time.

Publicly available charging may be served by either public or commercial charging stations:

- *Public charging stations* are those installed on publicly-owned property, such as city or county property. Curbside charging stations located on city streets are a typical example.
- *Commercial charging stations* are those installed on private or commercial property, such as retail locations, at large employers, or by commercial fleet managers.

The network of publicly available charging sites should focus on locations where the EV owner will park for a significant period of time, i.e., 1 – 3 hours. An appreciable recharge can occur during this time period.

Appropriate locations include:

- Restaurants
- Theaters
- Shopping centers
- County and municipal facilities
- Hotels
- Parks, open space, and recreational areas
- Sports venues
- Museums
- Libraries
- Major retailers
- Downtown commercial centers
- Office buildings with high visitor traffic
- Public parking lots and garages
- Hospitals and medical facilities
- Tourist sites

The determination of publicly available fast charging sites should focus on locations where EV owners will park for a relatively short period of time, e.g., 15 - 30 minutes, during which an appreciable recharge can occur. Locations where owners can be expected to park for a short time include:

- Convenience Stores
- Coffee Houses
- Service Stations
- Drug Stores
- Fast Food Restaurants
- Post Offices
- Laundromats
- High-turnover Parking Lots

Publicly available charge stations will vary greatly in design and requirements. They may also include a number of other requirements not found in residential and fleet applications, such as signage and point-of-sale systems.



Building a Market while Conserving Funds: Electrifying Vehicle Fleets

Municipal and corporate EVs represent huge leadership & GHG-reduction opportunities

A Fleet Sustainability Program, which guides EV deployment for both municipal and commercial fleets, should be one of the key initiatives in Marin's EV strategy. The program must recognize that the San Francisco Bay Area region has an air quality problem and that both public agencies and businesses have a significant role to play in improving air quality by reducing the emissions from their fleet operations.

Most significantly, fleet owners may be more willing than individual consumers to focus on total cost of vehicle ownership as opposed to upfront costs. This approach favors the economic dynamics of electric drive vehicles in cases where the higher upfront costs of an EV over a gasoline-powered vehicle can be demonstrably offset through lower operating and maintenance costs over time.

By distinguishing their vehicles as being battery-powered, public agencies and businesses can accelerate the adoption of electric vehicles because they have continuous public visibility on roadways and on the job. Transitioning gasoline-powered fleets to electric vehicles will visibly communicate an organization's commitment to cost-effectiveness, emissions reduction, environmental leadership, and reducing fossil fuel consumption.

For example, the Bay Area Climate Collaborative (BACC) was created to address the responsibility of municipal fleets to reduce greenhouse gases. The mayors of San Francisco, Oakland, and San Jose launched an initiative to accelerate clean energy in the region and position the Bay Area as a national model.

According to BACC, light-duty pooled fleets with a defined driving range under 100 miles per trip can expect measurable gains from transitioning to electric vehicles. It will be necessary to consider where the vehicles will be parked and where these cars may be charged up as they are used in daily routines.

Closer to home, Sonoma County has developed an EV implementation plan, will be installing 125 public charging stations throughout the County, and will be adding 40 electric vehicles to their municipal fleets.

Electric fleet vehicles also insulate operators from the dramatic increases in fuel costs that the region frequently experiences. BACC estimated in 2008 that EV owners would save \$350 in annual maintenance costs per vehicle and from \$300 to \$1,800 in annual fuel savings per vehicle. Locally, the Marin Municipal Water District is looking at purchasing Ford Transit Connect electric vehicle(s) to add to its fleet.

Electric vehicles and charging stations make good business sense because:

- Electricity prices are significantly less volatile than oil, allowing greater control over fuel costs.
- Electric miles are cheaper than gas miles (2.5 cents/mile on average vs. 20 cents/mile for a 20-mpg car at \$4.00 per gallon of gas).
- EVs require much less maintenance than gas vehicles.
- Tax credits and incentives increase return on investment.
- EVs contribute to a more sustainable, efficient business.
- Regional infrastructure is expanding rapidly.

As noted in an earlier section, charging stations installed for fleets can also provide value in retaining employees and customers through:

- Parking discounts for EV drivers.
- Preferential parking accommodations.
- Free charging for customers and/or employees.
- Employee financing programs.

Agencies and businesses considering electrifying their fleets have several types of vehicles to choose from:

- Electric Commercial Delivery Vehicles (Trucks)
- Neighborhood Electric Vehicles (NEVs)
- Electric Passenger Cars (EVs)

Federal and state agencies provide substantial grant funding and tax incentives for fleet operators. These incentives are intended to move fleets towards alternative fuels and electricity. Fleet operators are eligible for much more attractive programs than individual consumers. Some of the resources available to fleet operators are provided by:

- Bay Area Air Quality Management District
- California Air Resources Board
- California Energy Commission
- Metropolitan Transportation Commission

A further example, Alameda County has received grant approval from the Metropolitan Transportation Commission to enable it to deploy 20 electric fleet vehicles beginning in the second quarter of 2011. This funding will cover the additional cost beyond the normal cost of conventional gasoline vehicles. Grant funds will also pay for the purchase and installation of 20 electric vehicle charging stations to be deployed in locations throughout Alameda County.

With this financial support, Alameda County looks towards leading the Local Government EV Fleet National Demonstration Project, including coordinated analytics and best practices aggregation, a regional visibility campaign, and national outreach via the fleet associations to catalyze adoption of EVs in fleets nationwide. Anticipated to have a net CO2 emission reduction of 439,639 lbs, the project will also establish infrastructure and regional cooperation to accelerate further EV adoption.

Alameda's grant is a part of MTC's \$33 million *Climate Innovation Grants* pool. Approximately 44% of MTC's fund, or about \$14 million, is currently approved for this and four other major electric vehicle projects in the Bay Area, which altogether would deploy 170 electric vehicles:

- \$7 million for an electric taxi demonstration program based in San Francisco and San Jose that will provide 61 EV taxis with switchable batteries (to cut down on time lost to recharging); with matching funds, the total cost is \$20 million.
- \$2.8 million for a local government EV fleet program that will involve the purchase of 90 electric vehicles (including 79 Nissan Leaf sedans) for use in eight jurisdictions' fleets. With added local matching funds, this two-year, \$5 million national demonstration will showcase electric vehicles in government fleets.
- \$1.7 million for incorporating 19 electric vehicles into car-sharing programs (\$2.4 million total with matching funds).
- \$2.4 million for Bay Area electric vehicle infrastructure and readiness programs, such as installing charging stations.

As budgets permit, gradual replacement of older fleet vehicles with EVs and providing charging stations for employee use will significantly reduce countywide greenhouse gas emissions.

Marin *can* lead by example.



Site & Design Considerations

Best addressed by a comprehensive plan

Site requirements for publicly available charging involve many considerations and should be reviewed in a comprehensive manner through the infrastructure planning process.

Electric vehicles could be fully charged all the time if charging stations were located where we already park our cars. The average person drives his or her vehicle for only an hour or two each day. The rest of the time, the car is parked and idle, whether we are at home, shopping, working, or engaging in recreational activities. These are the places where charging stations should be available.

Also, areas prone to sea-level rise and flooding should be considered by the Plan, as well as issues of standing water and high precipitation. Users will be uncomfortable using a charging station in standing water.

Areas designated for public charging should be located in visible parking areas. Since public areas present a greater threat of vandalism, the planning process should review high pedestrian traffic areas, user safety, security measures, and lighting. The plan should also include guidelines for charger placements which avoid the charge cord or the wheel stop from becoming tripping hazards.

Proximity to electrical service is an important factor in locating charging infrastructure and should be addressed during the planning process. The length of the electrical circuit run and the number of parking stalls to be served will have an impact on installation costs.

The potential number of electric vehicles that may be parked in a facility should be considered to ensure that a sufficient number of charging stations to accommodate the needs of the EV drivers.”

The Plan should also consider desired aesthetic qualities, landscaping, screening walls, user shelter, and other design aspects before charging equipment is proposed. Questions about charging infrastructure ownership, payment for use, maintenance, lighting, parking location preferences, vandalism, and data collection need to be addressed early on as well.



Marin's Advantage

An early adopter market

Potential early adopters of electric vehicles are generally well-educated, high-income individuals with strong environmental values, a profile which describes many Marin residents. Other factors likely to influence the choice to purchase an EV are gas prices, access to a garage, carport, or designated parking space, the number of miles driven, and whether those miles are street or highway.

The potential number of electric vehicles that may be parked in a facility should be considered to ensure that a sufficient number of charging stations are installed to accommodate the needs of the EV drivers.

The *Golden Gate Electric Vehicle Association* holds regular meetings to showcase different models and educate the public. Attendance numbers increase each month. A recent meeting attracted almost 40 individuals, including Marin and San Francisco EV owners, a transportation planner, a County supervisor, students, advocates, and others, and featured nine different electric vehicles on display. During the meeting, a Novato resident shared his experiences driving his new Nissan Leaf, and a representative of the Bay Area Air Quality Management District explained EV rebates, tax credits, and charging station plans.

If the widespread popularity of Toyota *Prius* hybrid vehicles in Marin is any indication, it is likely safe to assume that sales of electric vehicles also will be very successful. And, with electric and battery vehicle technology progressing at an increasingly rapid rate, electric vehicles will become extremely viable for a growing range of people.



The Role of Electric Vehicles in Addressing Climate Change

As stated in *Miles from Home*, a workforce housing report recently published by *Greenbelt Alliance* and the *Non-Profit Housing Association of Northern California* in 2011,

“The consequences of not reducing driving emissions, and not stabilizing our climate, are grim. Potential adverse impacts include worsening air quality problems, reductions in the quality and supply of water from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal residences and businesses, damage to marine ecosystems and the natural environment, and an increase in infectious diseases, asthma, and other human health-related problems.”

By 2035, Marin County must maintain increased mobility for all residents but still meet goals for reduced GHG emissions. With the expansion of EVs throughout the country, new infrastructure components will become a normal part of our coordinated transportation system, as it will be important to ensure that transportation choice continues to diversify.

Expanding public charging infrastructure now will foster new, less polluting behaviors while contributing to a higher quality of life in affordable, sustainable communities. By 2035, Marin drivers will have more choice in how they fuel their cars and will no longer have to rely on fossil fuels.

The *Electrification Roadmap*, a transportation policy document published by the Electrification Coalition in 2009, suggests that in order to reduce the transportation sector’s reliance on oil, 75% of light-duty vehicle miles traveled (VMT) should be electrified by 2040. For Marin County, this equates to more than 1.5 million daily miles driven by our residents, employees, and visitors.

Planning for and installing electric transportation infrastructure will bring far faster reductions in greenhouse gases than in-fill development. Before land development can occur, the economy will need to be much stronger than it is now. And even then, it takes years, if not decades, to secure financing and development entitlements, remediate or clean problematic in-fill sites, and complete construction, before residents can move in.

If we are to meet the challenges set out by AB 32 and SB 375, while going about the long term work of creating more sustainable communities, we must apply every viable technology and technique at our disposal. Electric vehicles are a critical part of this equation.



Appendix

How Electric Vehicles Accelerate Achievement of MTC's Climate Change Goals

The following charts summarize the *Performance Targets for the Sustainability Communities Strategy/Regional Transportation Plan*, as shown on *Attachment A.1: RTP/SCS Goals and Performance Targets* on the *One Bay Area* web site. We show how a Comprehensive Electric Vehicle Strategy would accelerate achievement of these performance targets by Marin County jurisdictions.

Goal	Means to Achieve Target
<p>Climate Protection</p> <p>Reduce per-capita CO2 emissions from cars & light trucks by 15%</p> <p><i>* Marin Countywide Plan 2007, Planning Sustainable Communities Introduction</i></p> <p><i>** Miles from Home Workforce Report (2011)</i></p> <p><i>*** Association of Bay Area Governments (3/11)</i></p>	<p>Implementation of a Comprehensive Electric Vehicle Infrastructure Strategy will reduce per-capita CO2 emissions because:</p> <ol style="list-style-type: none"> 1. According to the Marin Countywide Plan 2007, <u>62%</u> of local greenhouse emissions are caused by transportation. * 2. Currently, Marin employees commute 2.6 million miles per day to get to work. ** 3. Driving an EV produces no emissions. 4. EVs will annually displace over 430 gallons of gasoline and reduce greenhouse gas emissions by over 4.6 tons per vehicle. *** 5. Each purchased or leased EV represents an immediate 100% reduction in greenhouse gas emissions for that driver. 6. EVs allow those who must rely on a personal automobile or light truck to travel and commute without polluting the air. 7. Plan implementation will encourage residents to make their next car purchase an EV because they will have confidence that they can charge their cars when necessary. 8. In 1990, County government sources produced 16,857 tons of greenhouse gases. Replacing County vehicles with EVs will help the County achieve its goal of reducing that figure by 15% to 20% by 2015. 9. If 1 of every 7 cars or light trucks is an EV, greenhouse gas emissions will be reduced by 15%. It is reasonable to expect one car in a two-car household to be an EV, resulting in a 50% reduction in emissions for that household. 10. Because EVs can be charged at night, when wind and solar energy is abundant and the grid has excess energy, electricity from renewable sources can be used more effectively, thereby decreasing emissions from gas- and coal-fired electricity generation plants. 11. Residents may charge their EVs with solar power generated from home-installed photovoltaic systems, further reducing regional and statewide greenhouse gas emissions from distant power sources. 12. Reduced demand for gasoline reduces the number of trips to gas stations by petroleum trucks and therefore reduces diesel emissions from the transportation of petroleum. 13. Reduced demand for gasoline and other refinery products reduces the emissions from petroleum refineries. 14. EVs do not need refueling at gas stations. This reduces the gasoline fumes released at gas stations and the number of gas stations needed in the County. 15. With fewer gas stations, fewer incidents of environmental contamination from leaking fuel tanks and oil spills will occur. 16. Improved air quality will support healthy ecosystems which are needed for carbon sequestration, erosion control, wildlife, livestock, and quality of life for all. 17. Supporting EVs is a strategy that will help residents and environmental systems adapt to climate change.

Goal	Means to Achieve Target
<p>Adequate Housing</p> <p>House 100% of the County's projected 25-year growth by income level without displacing current low-income residents</p>	<p>Implementation of a Comprehensive Electric Vehicle Infrastructure Strategy will help ensure the success of existing & SB 375-mandated in-fill and transit-oriented housing development because:</p> <ol style="list-style-type: none"> 1) Encouraging EVs and providing public EV infrastructure will reduce the cost of living for many residents, making Marin County a more desirable place to live for all income levels. 2) Deploying EV infrastructure at town centers and transit hubs will enhance communities, help create additional housing opportunities for low-income residents, and reinforce concentrated development patterns. 3) Cleaner air and quieter vehicles make it more desirable to live closer to transportation centers and in-fill development near major roadways in compliance with SB 375. 4) With improved air quality, existing low-income housing will become healthier and more sustainable. 5) Charging stations require little space and can be installed along existing sidewalks, parking lots, and garages. 6) Implementation of a countywide EV infrastructure plan will NOT displace current low-income residents because there will no need to dedicate large amounts of land for charging stations. 7) Implementation of a countywide plan will NOT require construction of large buildings, terminals, vehicle storage areas, or wider roads that could otherwise displace residents. 8) Implementation of a countywide infrastructure plan will deliver greater benefits per dollar spent in achieving transportation and air quality targets than traditional methodologies, allowing more funds to be spent on affordable housing, bicycle, and pedestrian projects.

Goal	Means to Achieve Target
<p>Healthy & Safe Communities</p> <p>Reduce premature deaths from exposure to particulate emissions</p> <p>Reduce incidence of asthma attributable to particulate emissions</p> <p>Reduce diesel particulate emissions</p> <p>Reduce injuries and fatalities from all collisions by 50%</p> <p>Increase daily walking and biking time per person for transportation by 60% (i.e., by 15 minutes per person per day)</p> <p><i>* CaliforniaBreathing.org Marin County Profile 2006-2008</i></p> <p><i>** Office of Statewide Planning & Development</i></p>	<p>Implementation of a Comprehensive Electric Vehicle Infrastructure Strategy will promote healthy and safe communities because:</p> <ol style="list-style-type: none"> 1) Local particulate and greenhouse gas emissions will be reduced significantly, especially near in-fill development located near major roads and highways. 2) Cleaner air and quieter vehicles make it more desirable to live closer to transportation centers and infill development near major roadways in compliance with SB 375. 3) With more than 15 deaths per 1,000 due to asthma and other respiratory diseases occurring annually in Marin County*, improving air quality through adoption of EVs will dramatically reduce illness and premature deaths due to exposure to particulate emissions.* 4) In 2008, 666 hospitalizations and emergency room visits due to asthma and respiratory illness occurred in Marin, or 27.2% of all visits. ** 5) In Marin, asthma-related hospitalizations account for almost 45% of Medicare and 20% of Medi-Cal payments. ** 6) EVs allow those who must rely on a personal automobile to travel and commute without polluting the air. 7) Communities and town centers with a high percentage of resident-and commercially-owned EVs are quieter than those dominated by gasoline-fueled vehicles. 8) Quiet communities and town centers are more inviting and attractive to residents, businesses, employees, and visitors alike. 9) Local downtown areas will become more economically robust with loss of vehicle fumes and noise, inviting more Pedestrians and bicyclists. 10) Residents and visitors will spend more time walking, dining, shopping, and recreating in vibrant outdoor areas while their vehicles are charged at centrally-located public facilities. 11) Bike paths along roadways are more likely to be used if the air is cleaner along the highway. 12) A higher percentage of EVs versus gasoline cars will produce cleaner air near the bike paths adjacent to 101. 13) New EVs are equipped with the latest safety features. Encouraging the purchase/lease of new EVs by drivers of older cars will result in increasing the number of safer vehicles on county roads. 14) The health of pediatric populations will improve if families drive EVs, e.g., near schools and child care sites. 15) With fewer gas stations, fewer incidents of environmental contamination from leaking gas tanks and oil spills will occur.

Goal	Means to Achieve Target
<p data-bbox="142 205 394 317">Open Space & Agricultural Preservation</p> <p data-bbox="142 352 511 527">Concentrate non-agricultural development within the existing urban footprint and urban growth boundaries</p> <p data-bbox="142 1770 472 1854">* <i>Marin Countywide Plan 2007, Planning Sustainable Communities Introduction</i></p>	<p data-bbox="516 205 1369 331">Implementation of a Comprehensive Electric Vehicle Infrastructure Strategy will protect open space and agricultural resources by supporting development within the city-centered corridor because:</p> <ol data-bbox="565 363 1369 1665" style="list-style-type: none"> 1) Locating EV charging infrastructure within the existing urban fabric will not extend urban growth boundaries into agricultural lands. 2) Although Marin enjoys relatively excellent air quality, transportation emissions generated in the County contribute to global warming and pollution of open space and agricultural resources elsewhere in the region. 3) Transportation generates a wide range of pollutants, including 62% of local greenhouse gases. * This air pollution stresses the County's fragile and sensitive eco-systems that comprise our open space and agricultural lands. 4) Replacing open space district and park land fleets with EVs protects resources. 5) Implementation of a countywide EV infrastructure plan will NOT displace agricultural uses or disturb urban footprints because there will no need to dedicate large amounts of land for charging stations. 6) Charging stations require little space and can be installed within existing agricultural and open space facilities, parking lots, and garages. 7) Implementation of a countywide plan will NOT require construction of large buildings, transit terminals, vehicle storage areas, or wider roads that could otherwise displace other uses or urban growth boundaries. 8) Use of EVs throughout the County will improve air and water quality in open space and agricultural areas, protecting food quality, livestock health, wildlife and natural resources. 9) A network of strategically located public EV charging stations will attract EV-driving tourists to Marin County. 10) Increasingly, tourists attracted to the County's open space resources and agricultural lands will arrive in EVs and will need access to charging before heading to another destination. 11) Reducing global warming will help protect the County's vibrant mari-culture economy, which represents 5% of local agricultural revenue * and is especially sensitive to ocean warming and acidification. 12) The health of the County's urban areas depends in part on healthy agricultural lands, which sequester carbon, collect water, and lower ambient air temperatures. 13) The health of the County's urban areas also depends in part on the vitality of park lands and open space. Healthy forests and other vegetation sequester carbon, inhibit erosion, inhibit flooding, and support the local economy through tourism and education.

Goal	Means to Achieve Target
<p data-bbox="142 205 446 241">Equitable Access</p> <p data-bbox="142 283 503 420">Decrease low-income residents' housing & transportation expenses by 10%</p> <p data-bbox="142 1780 495 1837">* Bay Area Climate Coalition (2008)</p>	<p data-bbox="516 205 1356 304">Implementing a Comprehensive Electric Vehicle Infrastructure Strategy will reduce residents' housing & transportation expenses because:</p> <ol data-bbox="565 331 1356 1344" style="list-style-type: none"> 1) EVs allow those who <u>must</u> rely on a personal automobile to travel and commute without polluting the air. 2) The cost to operate and maintain an EV is 8 to 10 times lower than gasoline-fueled vehicles. 3) The cost to charge an EV is less than 2 cents per mile when charged during evenings when electricity rates are lowest. A typical EV with a completely depleted battery would require from 4 to 8 hours to charge, or less than \$4.00 for an equivalent mileage from a "tank" of gas. Annual fuel savings are estimated to be up to \$2,000. * 4) By using electricity for day-to-day travel, the share of household income that must be spent for daily transportation could be reduced significantly over the cost of gasoline-fueled transportation. 5) EV owners also will save on repair costs normally associated with gasoline-fueled vehicles because EVs do not require oil changes, filter replacement, tune-ups, smog checks, and exhaust system replacement. Some estimate these savings could save an EV owner up to \$400 annually. * 6) The initial purchase price of EVs is nearly comparable to gasoline-fueled cars and spans all price levels. 7) Current regional, state and federal rebates and tax credits can reduce EV purchase costs by as much as \$12,500 per vehicle. These financial incentives DO NOT apply to purchases of gasoline-fueled vehicles. 8) Used EVs will become a more affordable and available option when early adopter 2011 car leases begin expiring in 2014. 9) Employers are more likely to allow employees to "plug in" their cars at work than they are to provide free gasoline, providing convenience as a perk and reducing transportation costs for low income families who must drive to work. 10) Increasing gasoline costs place a heavier economic burden on low income families. Reducing demand for gasoline eventually will force oil companies to set more competitive gas prices for those who don't drive an EV.

Goal	Means to Achieve Target
<p>Economic Vitality</p> <p>Increase gross regional product (GRP) by 90%, an average growth rate of 2% in current dollars</p> <p><i>* Marin Countywide Plan 2007, Natural Systems & Agricultural Element</i></p>	<p>Implementing a Comprehensive Electric Vehicle Infrastructure Strategy will increase economic vitality because:</p> <ol style="list-style-type: none"> 1) A healthier population is more productive. 2) A healthier workforce reduces sick leave and medical care expenses for employers. 3) A healthier population reduces the cost of public health care, including asthma medication and inhalers. 4) In 1990*, County government sources produced 16,857 tons of greenhouse gases. Replacing County vehicles with EVs will help the County achieve its goal of reducing that figure by 15%-20% by 2015. 5) Replacing County, city, and local agency fleets with EVs will save money for other public programs. 6) Local downtown areas will become more economically robust as visitors shop while recharging their vehicles and with loss of vehicle fumes and noise. Residents and visitors will spend more time walking, dining, and recreating in vibrant outdoor areas. 7) EVs will create new green jobs for electricians, solar installers, and designers. 8) Availability of charging infrastructure helps employees save on gas and show commitment to innovative thinking 9) Reduced air pollution will cause fewer cases of childhood asthma, resulting in fewer sick days for children and fewer lost workdays for the parents who care for the children. 10) Jurisdictions will be able to save money because there will be fewer incidents of fuel spills, reduced clean up and road maintenance costs, and hazardous materials disposal. 11) Regions with EV infrastructure plans give automakers confidence to build and deliver more EVs to those communities. 12) EV sales will increase sales tax revenue. 13) Availability of EV charging infrastructure attracts consumers and tourists to driving EVs to Marin.

Goal	Means to Achieve Target
<p>Transportation System Effectiveness</p> <p>Decrease average per-trip travel time by 10% for non-auto modes</p> <p>Decrease automobile vehicle miles traveled (VMT) by 10% per capita</p> <p>Maintain the transportation system in a state of good repair</p>	<p>Implementing a Comprehensive Electric Vehicle Infrastructure Strategy will contribute to a more effective transportation system because:</p> <ol style="list-style-type: none"> 1) EV drivers will know where parking spots are set aside for EV charging. Initially, EV drivers will not have to spend extra time or energy circling the block to find a parking spot in a congested area, thus reducing vehicle miles traveled. 2) EVs do not drip gasoline or motor oil on the pavement, reducing asphalt parking lot and roadway deterioration and cleaning demands. 3) Cleaner roadways and parking lots reduce storm water runoff pollution and habitat contamination of local watersheds and bay lands. 4) Reduced likelihood of gasoline tanker accidents and oil spills that damage bridges and roadways, and pollute waterways will result due to fewer gasoline delivery trips. 5) Reduced likelihood of gasoline tanker accidents will ease accident-related traffic congestion and delays. 6) Reduced likelihood of gasoline spills from other types of traffic accidents. 7) EV weights and sizes are comparable to gasoline-fueled vehicles and are in some cases smaller. Therefore, there is no significant difference in wear and tear on roads and highways.

Goal	Means to Achieve Target
<p>Infrastructure Security</p> <p>In cooperation with State and Federal agencies, protect the security of Bay Area infrastructure, prevent damage to life and structures</p>	<p>Transitioning transportation modes to electricity will help protect national security, regional infrastructure, and prevent damage to the environment because:</p> <ol style="list-style-type: none"> 1) About 60% of the nation’s energy needs are met by fossil fuel imports — much of that from politically unstable regions in the Middle East. Such dependency makes the American economy extremely vulnerable to unfriendly foreign governments, terrorists, and other disruptions in supply. In addition, protecting these resources requires military commitments that are expensive both financially and in terms of human life. 2) If we do not transition to electric transportation and oil supply disruptions impede the mobility of the population, distribution of goods, emergency response capability, commerce, and health and safety could be compromised on a wide scale. 3) Historically, when economies grow, oil demand grows with it. Volatile oil prices are often linked to stock market volatility as well. As oil becomes more expensive and eventually unavailable, supply disruptions will have a strong effect on our economy and other economies around the world. 4) Adoption of EVs will reduce greenhouse gas emissions and global warming, which are responsible for melting glaciers and ice caps. With already warmer air and seas, evaporation levels are increasing, resulting in heavier than normal rains, flooding, hurricanes, and sea level rise. 5) Bay Area and Marin County communities are particularly vulnerable to sea level rise. As weather events become stronger and more catastrophic, Marin County residents can expect the combination of storms and rising sea levels to threaten homes, harbors, and roads. 6) As EVs become more popular, the slowing demand for petroleum will reduce the number of oil tankers bringing petroleum to the Bay Area refineries, resulting in fewer oil spills and other disasters caused by ocean-going ships in the Pacific Ocean and San Francisco Bay. 7) Greater reliance on electrified transportation will decrease the need to damage fragile marine environments for oil exploration and extraction. 8) The demand for EV electricity will not over-burden the grid as most drivers will charge their cars during the evening when there is excess capacity of electricity throughout the state and rates are more economical. 9) Installation of roof top solar systems on homes, commercial buildings, and over parking lots will localize the supply of electricity to power EVs and other infrastructure, allowing residents and businesses to become more independent from distant power generation sources. In the event of major shutdowns of the power supply, individuals, local governments, and businesses will still be able to supply power to infrastructure.

Goal	Means to Achieve Target
<p>Countywide Consistency with Regional, State & Federal Policies & Actions aimed at Reducing Impacts from Global Warming</p> <p>This is a partial list of agencies, departments and organizations which support EVs through vehicle purchases, charging infrastructure planning, legislation, policy statements, creation of financial incentives and grants, land use planning, and/or advocacy.</p> <p><i>Compiled from numerous sources</i></p>	<p>Alameda County Association of Bay Area Governments Association of Monterey Bay Area Governments Bay Area Air Quality Management District CalCars CalStart California Air Resources Board California Department of Transportation California Energy Commission California Environmental Protection Agency California Natural Resources Agency California Plug-In Electric Vehicle Collaborative California Public Utilities Commission California Transportation & Air Initiative City of Fairfax City of Palo Alto City of Portland, Oregon City of Oakland City of San Anselmo City of San Rafael – Climate Action Plan City of Santa Rosa City of Sacramento City & County of San Francisco City of San Jose County of Marin – Marin Countywide Plan 2007 Department of Motor Vehicles East Bay Electric Auto Association Electrification Coalition Golden Gate Electric Vehicle Association Marin Energy Authority Marin Municipal Water District Metropolitan Transportation Commission North Bay Electric Auto Association Oregon Department of Transportation Pacific Coast Collaborative Pacific Gas & Electric Company Plug In America Puget Sound Energy Rocky Mountain Institute Sacramento Municipal Utility District San Diego Power & Light Company San Diego Association of Governments Santa Clara County Sonoma County Southern California Area Governments Southern California Edison Stanford University – Precourt Energy Efficiency Center State of California State of Oregon State of Washington Sustainable San Rafael, Fairfax, Marin Transportation Authority of Marin US Environmental Protection Agency US Internal Revenue Service Tax Code University of California, Davis – Institute of Transportation Studies US Department of Energy Washington Department of Transportation West Coast Corridor Coalition</p>



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A D D E N D U M

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Electric Vehicles:

*Implementing a Comprehensive EV Strategy for
Healthy Communities & Economic Vitality through
Zero-Emission Transportation in Marin*

RTP/SCS Project Proposal submitted to:

- Transportation Authority of Marin

Prepared by:

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Contents

Introduction: Responding to Recent Inquiries about EVs	3
Smart Driving: Will EVs Ease Congestion in Marin?	4
EV Batteries: Not All Used Up, Even After <i>100,000</i> Miles	5
Working Together: Aligning <i>All</i> RTP/SCS Strategies	7
Mapping the Future of Zero-Emission Transportation	9
Re-Cap: Implementing a Comprehensive EV Strategy	11
Acknowledgements	13



Introduction: Responding to Recent Inquiries about EVs

Following the submittal of our Proposal for implementing a Comprehensive Electric Vehicle Strategy, we received much encouragement and support from decision-makers, drivers, bicyclists, and visitors to Marin.

The authors participated in the public workshop organized by the Transportation Authority of Marin on March 26, 2011. We presented the Proposal at a meeting hosted by the Golden Gate Electric Vehicle Association and have testified at the Marin County Board of Supervisors and the TAM Board of Commissioners.

During the course of this outreach, people have recommended dozens of locations around the County where they feel charging stations should be installed. We have fielded a myriad of questions about specific vehicles, prices, and delivery dates. Numerous members of the public have requested copies of our Proposal and Addendum. We can see that EV enthusiasm is high.

We have prepared this Addendum to address several areas of interest that arose during these discussions, including:

- Will electric vehicles ease traffic congestion in Marin?
- How will electric vehicle batteries be disposed?
- How will electric vehicles support other transportation strategies?
- Where will drivers need EV charging stations in Marin?

We believe Marin County is ready to move ahead with installing charging stations and planning the transition to a zero-emission land use on our roads and highways. We welcome this opportunity to answer as many questions about EVs as we can. Each of the areas listed above is covered in the following pages.

In closing, we thank you for the opportunity to submit this RTP/SCS Project Proposal and Addendum. We request your sponsorship of and support for this Proposal before the Metropolitan Transportation Commission and look forward to working with TAM in the near future to create a zero-emission transportation land use throughout Marin County.

Jan Alff Wiegel, Dale W. Miller, and William Carney



Smart Driving: Will EVs Ease Congestion in Marin?

Electric vehicles may change traffic patterns and driver behavior

When evaluating different Sustainable Communities Strategies, it is important to recognize that no single strategy will accomplish 100% of the desired RTP/SCS targets and goals. This is just as true for electric vehicles and charging infrastructure as it is for all of the other strategies under consideration. There is no strategy that offers solutions to all problems.

Initially, adoption of electric vehicles might seem to simply create a one-to-one replacement of gasoline-powered vehicles with electric vehicles and that EVs will not beneficially impact traffic congestion. Actually, this might not be the case.

Today's gasoline cars do not encourage efficient use or trip planning. Gas stations are assumed to be everywhere and even \$4.00 per gallon gas has had little effect on Marin County traffic patterns. The EV, however, could be a game changer. On board navigation systems, real-time energy usage data, and charging station network mapping may guide EV drivers to group errands and reduce vehicle miles traveled. By actively involving the driver in thinking about conserving energy, the EV may provide a direct motivation for the individual who participates in causing traffic congestion to cause less of it by planning shorter routes and spending less time driving.

Additionally, EV drivers qualify to use carpool lanes through 2014, regardless of the number of the people in the vehicle. The declared legislative intent in establishing carpool lanes is to relieve traffic congestion, conserve fuel, and reduce vehicular emissions. With an increasing proportion of EVs on the road during commute times, more drivers will be able use carpool lanes, thereby reducing congestion in single-person occupancy lanes – at least until the end of 2014.

Until more EVs are on the road, it is hard to say what impact, if any, they will have on local traffic congestion. But, for those EV drivers who do get caught up in congested traffic, their vehicles will contribute *no* air pollution or greenhouse gas emissions, unlike the other cars on the road with them. Their transportation expenses will still be lower, overall fossil fuel consumption will decrease, and the negative health and environmental impacts associated with gasoline will be mitigated.



EV Batteries: Not All Used Up, Even After 100,000 Miles

Answering the "product end-of-life" question, driving towards a greener grid

Before the decade is out, electric vehicles will be common place on local and state highways. Most drivers will not need a new battery very soon as manufacturers are warranting their batteries for up to 100,000 miles or eight years of use. But what will happen to the EV batteries once they reach their end of life as a car battery?

The California Center for Sustainable Energy (CCSE), which is studying re-purposing spent EV batteries, predicts most batteries will see a second life as electric storage devices for households, businesses, and utilities. According to CCSE, EV batteries will retain 70% to 80% of their original capacity after being removed from a vehicle. The batteries will still be fully capable of being used for stationary energy storage and other applications, especially during periods of peak grid demand and natural disasters.

In researching how utilities might employ used electric vehicle batteries to create a more sustainable grid, CCSE has been working with University of California, Davis, AeroVironment, San Diego Gas & Electric Company, and others to identify how an utility can remotely charge and discharge used electric vehicle batteries in response to simulated real grid conditions. Duke Energy is also testing second life use of EV batteries. The company believes that by increasing the overall lifetime value and performance of EV batteries through second life applications, initial battery costs will be reduced.

Plug In America (PIA), a respected national electric vehicle advocacy group, says that "car battery recycling is already a success story." More than 98% of conventional car batteries already get recycled, and the same (or better) should be true of EV batteries. According to PIA, from an environmental perspective, it makes sense to re-use battery materials. Though the lithium-ion batteries used in EVs contain none of the caustic chemicals found in the lead-acid batteries used in gasoline-powered cars, dumping them in landfills would be economically wasteful and could potentially pollute area groundwater.

And, as EV demand grows, so, too, will demand for recycling the nickel, cobalt, and manganese metals that power the batteries, something the federal government has already recognized in awarding stimulus funding.

For example, in 2009, the Department of Energy awarded \$9.5 million to California-based Toxco, Inc., to boost the company's recycling capacity for lithium-ion batteries, the kind used to power most electric vehicles entering the market. Toxco is using the grant to expand its recycling facility in Lancaster, Ohio, to process vehicle-grade batteries. Toxco's recycling facility in British Columbia already recycles lithium-ion batteries from devices like laptop computers, industrial plants, and Tesla Motors' electric *Roadster*.

Moreover, while still in use in cars, these batteries may well help create a cleaner electrical grid. 'Vehicle to Grid' systems now being actively developed hold the promise of utilizing the batteries in EVs to store electricity that can be sold back into the grid during periods of peak demand, thus balancing out the system and reducing the need for peak-generation power plants.

The current US electrical grid has sufficient capacity to provide power to about 70% of all the cars in the country if they were EVs. As EVs become more widely used, they will help motivate the production of energy from cleaner, renewable sources.

On or off the road, EV batteries will serve us in numerous ways. They are not destined for the landfill.



Working Together: Aligning All RTP Strategies

In order to create sustainable communities with healthy and diverse housing, clean air, and multiple transportation choices, Marin County will need to use every methodology available. Mass transit cannot do it all. Bicyclists and pedestrians cannot do it all. In-fill development cannot do it all. Shuttles and trolleys cannot do it all. And, neither can electric vehicles and charging stations.

While some may perceive that funds allocated to electric vehicles and charging infrastructure will subtract from funding of existing and/or new projects, the truth is that electric vehicles and charging stations will *support and enhance* other methodologies, not take away from them. We believe that the different methodologies *can and should* work in concert, forming a balanced portfolio of solutions, to achieve desired SB 375 goals. For example:

- Electric vehicles can be used to get commuters to transit hubs, where charging stations will encourage use of public transit.
- Charging stations can be equipped to recharge electric bicycles and scooters, supporting a wide range of transportation options.
- By eliminating tailpipe emissions and improving air quality, EVs will make walking and bicycling along roadways more enjoyable, encouraging people to drive less.
- Bicyclists and hikers can charge their vehicles at key trailheads and recreational locations.
- Charging stations located at in-fill affordable housing sites can support concentrated development, while also providing affordable energy for transportation.
- EVs drivers will patronize downtowns and other pedestrian-friendly districts where their vehicles can be recharged while they enjoy shopping, dining, business, civic, entertainment, and other activities.
- Charging stations will further boost downtown centers by reducing noise, improving the air residents breathe, and servicing vehicles arriving from other regions.
- By providing a strategic network of charging stations throughout the County, economic vitality will increase by reducing the cost of transportation, reducing vehicle maintenance expenditures, and lowering the overall cost of living.
- Implementing a Comprehensive Electric Vehicle Strategy will expand transportation choices to residents, fleet operators, small businesses, and employers.
- As soon as an EV hits the road, tailpipe greenhouse gas emissions for that vehicle, which would otherwise be gas-powered, will be immediately reduced to zero.

Electric vehicles and charging stations will support and enhance other RTP/SCS methodologies, not take away from them. Implementing a Comprehensive Electric Vehicle Strategy will be an integral part of a multi-dimensional climate change strategy to reduce transportation-generated greenhouse gas emissions and create livable communities.



Mapping the Future of Zero-Emission Transportation in Marin

Engaging Bay Area residents in identifying charging station sites

At two public presentations during the past two weeks, the authors asked attendees where they would need charging stations if they drove an electric vehicle or rode an electric bicycle or scooter. A large map of Marin County was displayed at each event and attendees placed colored stickers on locations they recommended for charging stations. Residents from Marin, Sonoma, San Francisco, and the East Bay participated. Commuters, bicyclists, boaters, public transit riders, and future EV owners contributed to the mapping exercise. Many income levels and ethnic backgrounds were represented.

The mapping exercise demonstrates the type of public engagement/scoping process that could be conducted during development of a charging infrastructure plan. It was immediately apparent that the map inspired peoples' thinking about their travel patterns, destinations, and where they were likely to park for different periods of time. Attendees recognized needing charging stations at places of employment, education, and recreation. Many noted that installing charging stations at transit hubs, where they boarded busses and ferries, would be necessary. Several placed stickers at their residences, thereby connecting the loop of travel from home and to other destinations, although this proposal does not seek funding for home charging stations.

The exercise prompted discussion about how a network of charging stations would work on a regional basis. Attendees wanted to know if EV charging infrastructure would be accessible throughout the Bay Area and the state. Several realized they regularly traveled outside the County on a daily basis and thus would need charging stations beyond Marin, particularly in Sonoma County. Others mentioned seeing charging stations in San Francisco and Sonoma, wondering if any were located in Marin.

The locations mentioned by members of the public provide a glimpse into the public's perceived general need for charging stations. Because the suggested locations (shown below) are not address- or site-specific, they do not constitute an actual infrastructure plan that could be implemented. They are included here merely as a reflection of the public's desire to have access to EV charging in these general locations: *

Downtown Novato
Lucas Valley
Northgate Shopping Center
Kaiser Hospital
Marin County Civic Center
Dominican University of California
San Rafael Transit Hub
San Rafael Corporate Center

College of Marin
Bon Aire Shopping Center
Larkspur Ferry Terminal
The Village at Corte Madera Shopping Center
Corte Madera Town Center
Tiburon Ferry
Angel Island Ferry, Tiburon
Tam Junction, Mill Valley

Manzanita Park & Ride, Mill Valley
Downtown Sausalito
Future SMART Stations
Along bike paths
Point Reyes Station
Bollinas
Marshall
Drakes Beach
Bear Valley Visitor Center
Woodacre
Alpine Lake Trail Heads
Stinson Beach Parking Lot

Sausalito Ferry
Vista Point, Sausalito
Muir Woods
Rodeo Beach Parking Lot
Petaluma **
Santa Rosa **
Bodega Bay **
Sears Point/Infineon Raceway **
Golden Gate Bridge Parking Lot,
San Francisco **
The Embarcadero, San Francisco **

(*) NOTE: Until the County and its jurisdictions implement a Comprehensive EV Strategy and develop specific charging station site criteria, it is unknown whether or not these sites are feasible or logical. The charging infrastructure plan would develop site evaluation at a much greater level of detail than suggested by the mapping exercise. It is beyond the scope of this Addendum to evaluate the sites suggested by members of the public; no endorsement on the part of the authors should be inferred.)

(**) NOTE: Locations in San Francisco and Sonoma counties are included to reflect the public's recognition that charging infrastructure needs to be established throughout the region, even though our proposal and this Addendum apply exclusively to Marin County.



Re-Cap: Implementing a Comprehensive EV Strategy

Leading by example to reach zero-emission transportation

PROPOSED PROJECT: Implement a comprehensive strategy for the transition to electric vehicles in Marin that includes municipal fleet purchases, and the installation of charging stations at public parking facilities, public employee lots, and key transit and housing sites.

PROPOSED AGENCY SPONSOR: Transportation Agency of Marin

FUNDING REQUESTED: \$10 million over 10 years

SUPPORT centralized countywide implementation of EV programs:

- Comprehensive Electric Vehicle Infrastructure Plan.
- Dynamic implementation process conducted by TAM.
- Expand EV Working Group, including key stakeholders.
- Coordinate with all local jurisdictions.
- Engage residents, non-profits, and businesses.
- Work to provide renewable energy sources for EVs.
- Proactively develop and distribute funding.
- Include EVs in local Climate Change Action Plans.

FUND & INSTALL strategically-located publicly accessible charging stations countywide:

- Public parking lots and garages.
- Transit hubs, bicycle and pedestrian paths.
- Affordable housing developments.
- Curbside parking in downtown centers.
- Employee parking facilities.
- Recreational areas.
- Health care facilities.
- Entertainment venues.

ENABLE & ENCOURAGE private sector EV investments:

- Proactive outreach to residents and businesses about EVs.
- Residential roof-top solar systems.

- Charging stations at major employers and destinations.
- Streamlined permitting and building inspection for charging stations.
- “EV-ready” development standards.
- Include home charging stations in future PACE programs.

PURCHASE electric cars, vans, and light trucks for municipal fleets; convert existing assets:

- Align with fleet replacement schedules and budgets.
- Convert existing fleet assets to electric power when possible.
- EV fleets for utilities, agencies, franchisees.

PROMOTE rapid widespread adoption of electric vehicles by Marin residents and businesses:

- Sustained, coherent outreach through all media and platforms.
- Press releases and events for all public installations and actions.
- Promote “Green” and “EV-friendly” Marin destinations.

MARIN GHG REDUCTION RESULTS

- 20% EV adoption by 2020 = 46,000 EVs on the road = 12% reduction of Marin GHGs.
- 100% EV adoption by 2035 = 60% reduction of Marin GHGs.



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