

Expanding Innovation & Demand: Electric Vehicles and Waste-to-Energy in the Sacramento Region

Regional Industry Clusters of Opportunity II

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Acronym Glossary

AB: Assembly Bill

ARFVT: Alternative Renewable Fuels and Vehicle Technology

ARFVTP: Alternative Renewable Fuels and Vehicle Technology Program

BTAG: Biomass Technical Advisory Group

EV: Electric Vehicles

EVSE: Electric Vehicle Supply Equipment

GJV: Greenwise Joint Venture

PEV: Plug In Electric Vehicle

PHEV: Plug In Hybrid Electric Vehicles

RICO II: Regional Industry Cluster of Opportunity II

RNG: Renewable Natural Gas

SARTA: Sacramento Regional Technology Alliance

SCCC: Sacramento Clean Cities Coalition

SACOG: Sacramento Area Council of Governments

SAETC: Sacramento Area Electrical Training Center

SATS: South Area Transfer Station

SETA: Sacramento Employment and Training Agency

SMAQMD: Sacramento Metropolitan Air Quality Management District

SMUD: Sacramento Municipal Utilities District

VV: Valley Vision

UCD: University of California, Davis

ZEV: Zero Emission Vehicles

Executive Summary

Through AB 118, regions across the state were tasked with developing cluster strategies to develop and deploy innovative technologies that transform the state's fuel and vehicle types to help attain the California's climate goals. The California Energy Commission (The Commission) funded projects to develop the Alternative Renewable Fuel and Vehicle Technology Program (ARFVTP) cluster. Sacramento's Regional Cluster of Opportunity (RICO) II grant project was a partnership among public agencies, nonprofit organizations and businesses. Business leaders and local economic, workforce, and community partners worked together to identify priorities in workforce and economic strategies to grow industries around plug-in electric vehicles (PEVs) and renewable natural gas (RNG) produced through anaerobic digestion of organic sources of waste in the region (also known as Waste to Energy technology).

The RICO II team analyzed existing data and engaged employers and stakeholders in a collaborative priority setting process to establish an Investment Strategy. This strategy identified needs and opportunities within the cluster. From this, the team developed implementation strategies to develop the cluster.

The EV investment strategy has four main components:

- Increasing demand for PEVs to stimulate business and job growth,
- Building consumer awareness through education and increasing visibility of PEVs,
- Facilitating PEV purchase and infrastructure installation process to eliminate unnecessary roadblocks, and
- Creating training and certificate programs for occupations associated with the PEV economy.

A multifaceted approach of increasing awareness and education and supporting infrastructure and certificate programs helps drive demand and supports increasing demand with needed infrastructure investment and job skills.

The Waste to Energy Investment Strategy has similar components:

- Growing demand and long term commitments for waste-to-energy projects and business growth,
- Advocating for supportive local and state-level policies,
- Increasing visibility and support for projects through educational materials/events/forum,
- Encouraging regional fleet operators and other potential consumer groups to shift to using RNG vehicles, and
- Establishing the workforce needed to support the cluster.

PEVs and RNG technologies are part of an emerging cluster in the Sacramento region. Air quality in the Sacramento region ranks among the nation's ten most polluted for ground level ozone. Additionally, the passage of carbon reduction policies such as Assembly Bill AB 118 and

AB 32 paved the way for low emission vehicle growth and RNG utilization statewide. The Sacramento region needs coordinated action to enable cluster growth and ensure that infrastructure and policy systems adjust to the emerging technologies of PEV and RNG use.

The RICO II team's focus on driving demand by outreaching, educating and increasing visibility has been a pathway into cluster growth for this nascent cluster. By driving demand while also supporting infrastructure changes, job training and curriculum, the RICO II team has observed a spike in cluster activity and awareness. Over 1,400 Zero Emission Vehicles (ZEVs) and Plug In Hybrid Electric Vehicles (PHEV) were sold in the six county Sacramento region from January to July 2014, compared with about 1,200 total owned ZEVs and PHEVs in November 2013. Anaerobic digestion facilities grew from zero in 2012 to over 125 tons of capacity per day throughout three facilities region wide and RNG now fuels over 100 vehicles daily, compared to zero 18 months ago.

The RICO II project provides coordinated action to support technology adoption, build and maintain needed infrastructure and advocate for policies that allow PEV and RNG cluster growth. The team will continue implementation efforts through 2016 and beyond.

Regional Overview & Case for Action

The six-county Sacramento Region (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties) is the area covered by the Sacramento Area Council of Governments and houses an economy with over 70,000 businesses and 2.3 million residents. The region has collaborated effectively on a number of economic development activities, including the recent Next Economy strategy that has been adopted by more than two-dozen jurisdictions and every major economic development organization.

Action to stimulate job growth is still sorely needed, despite more positive economic results in recent months. Preliminary data show that the number of jobs on payrolls in the Region increased by 1.7 percent during the 12 months ending November 2013, equating to a 14,400-job gain. This rate of growth is higher than at the same point in the previous year and places Sacramento above the statewide average for the first time since a brief period in the summer of 2012ⁱ.

As the capital region and the crossroads of the state's major interstate corridors we recognize that it is imperative that Sacramento fosters innovation in the transportation cluster. Likewise, our air quality ranks among the nation's ten most polluted for ground-level ozoneⁱⁱ. Fortunately we have a track record of success in advancing green technologies. The Sacramento region ranked 3rd in the U.S. for the percentage of clean economy jobs comprising its regional economyⁱⁱⁱ, but we have been outpaced by other California regions when it comes to growth in the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) cluster^{iv}. Nonetheless, innovative ARFVT partnerships are enabling the region to forge tighter connections with local companies and to plan for growth in the future.

Focus on Electric Vehicles & Waste-to-Energy Technology

The ARFVTP industry cluster is relatively small in the Sacramento region, with core employment just under 350 people, but the number of jobs more than doubled between 2001 and 2011^v. Based on the Advanced Transportation Diagnostic Package for the Sacramento Region the segment of the industry with the greatest amount of jobs and fastest rate of growth is Alternative Fuels, with about half of the employment focused on ethanol and the remainder split between biodiesel and waste-to-energy. Alternative Motor Vehicles and Equipment and Alternative Transportation and Energy Storage remain important components of the cluster, but have not seen significant changes in employment numbers over the past decade.

The region has just a small core to build on, but the growth opportunity areas that were selected by the Regional Industry Cluster of Opportunity (RICO) II grant partners represent segments of the industry that have promising indicators of future growth and the momentum of other regional projects behind them. Using these factors the RICO II grant partners decided to focus on supporting two segments within our ARFVTP cluster, including plug-in electric vehicles (PEV) and waste-to-energy technologies.

Based on numbers from the California Clean Vehicle Rebate Program, more than 1,200 PEVs are owned locally. The Take Charge EV Readiness initiative by SACOG anticipates that number will grow to approximately 75,000 cars by 2025. More than 300 charging stations exist along the region's transportation corridors, with more being planned to support demand. The region has seen 4% month-over-month growth in PEV sales for the year ending in November 2013^{vi}. This data indicates that the share of PEVs on the region's roadways will grow steadily over time, and related jobs should grow accordingly.

In addition to addressing PEV business and workforce opportunities, the region focuses on waste-to-energy technologies and projects. This focus area leverages a new partnership with Atlas Disposal and Clean World to support the expanded use of Renewable Natural Gas (RNG). California's Bioenergy Action Plan calls for 75% waste diversion from landfills; anaerobic digesters provide a solution that converts this waste into methane biogas for transportation fuel. Clean World's organic waste recycling center is based on technology developed at UC Davis to convert food waste, agricultural residue and other organic waste into fuel, renewable energy and soil enhancements. The company identifies the Sacramento region as the focal point for early expansion.

The Atlas Disposal fueling station and Clean World Anaerobic Digester are currently in operation at the South Area Transfer Station (SATS) in Sacramento using technology developed by Clean World. This facility has been expanded to handle 100 tons of waste per day, which will make it one of the nation's largest projects of its kind. The expanded facility will replace one million gallons of diesel per year with RNG. Also being developed at the SATS is the nation's first digestion-based RNG Fueling Station. The facility will use gas produced by the digestion system to fuel the company's clean-fuel fleet, as well as vehicles from area jurisdictions and agencies. According to Clean World, six anaerobic digesters exist in the state today (three within the

Sacramento region) and waste diversion targets will demand a total of 150 – 200 facilities statewide by 2020.

A total of six waste-to-energy technology companies are based in the region. The University of California Davis serves as a research and development engine that amplifies the visibility of this small set of companies. Multiple clean technology leaders in the region share the view that the Sacramento region could be the home base for demonstrating the viability of technologies at commercial scale. Today there are eleven biogas energy projects already in operation, including projects at landfills, wastewater treatment plants and dairy lagoons.

Industry Cluster Outreach & Planning

The Sacramento Region RICO II grant partners include representatives from the private and public sectors with knowledge of economic and workforce development. These organizations have spearheaded the grant proposal and implementation. They include:

- Sacramento Employment and Training Agency (SETA)
- American River College (ARC)
- Atlas Disposal
- CleanWorld
- Greenwise Joint Venture (GJV)
- Sacramento Area Electrical Training Center (SAETC)
- Sacramento Clean Cities Coalition (SCCC)
- Sacramento Regional Technology Alliance (SARTA)
- TakeCharge (managed by the Sacramento Area Council of Governments or SACOG)
- Valley Vision (VV)

These partners used data from the Advanced Transportation Diagnostic Package for the Sacramento Region prepared by *Collaborative Economics* in September 2013 to gain a deeper understanding of key areas of business activity and job growth potential. These partners also relied on their on-the-ground awareness of existing projects and activities to identify the two segments within the industry cluster that are the focus of the RICO II strategy—PEVs and Waste-to-Energy.

Once those focus areas were selected, the next phase involved industry cluster outreach. This was handled somewhat differently for the two segments because varying levels of regional engagement already existed. Valley Vision staff took the lead on engaging sector employers and industry experts.

Electric Vehicle Stakeholder Engagement

The Sacramento region has been focused on supporting the expansion of PEVs for the past few years due to a significant project being led by the Sacramento Area Council of Governments (SACOG) known as TakeCharge. TakeCharge has primarily been focused on analyzing the transportation infrastructure needs to support the growth in PEV in the region, but has engaged

a broad coalition of industry advisors in partnership with Valley Vision and Greenwise Joint Venture (140 regional stakeholders listed in Appendix A). The TakeCharge infrastructure strategy was in development during 2013 and was approved by the SACOG Board of Directors in December. Rather than duplicate efforts, Valley Vision relied upon the monthly TakeCharge meetings to share updates on the RICO II research and planning, and to gather input on opportunity areas.

Furthermore, the TakeCharge initiative relied upon Valley Vision to design and implement an October 2013 event specifically focused on engaging fleet managers and other potential PEV buyers within the region. That half-day workshop attracted 80 participants, offered an “EV 101” style overview to provide basic information, featured expert speakers that could respond to the audience’s practical questions and ended with PEV test drive opportunities. Valley Vision gathered critical on-the-ground information about the PEV sector while designing this event, collaborating with the experts, and facilitating the audience question and answer sessions.

Following this event, Valley Vision staff pursued more in depth input on the PEV sector by conducting a series of one-on-one interviews with the region’s leading industry experts with a focus on the following questions:

1. *What is the current state of electric vehicle innovation in the Sacramento region?*
2. *What are the emerging trends in the electric vehicle arena locally, at the state level and beyond (looking out 3-5 years)*
3. *What factors influence growth opportunities for local PEV and related service companies? What are the biggest barriers?*
4. *What are the current and emerging workforce needs to support the industry?*
 - a. *What training and skills are necessary for the described positions?*
 - b. *Do you think the region is producing people with these training and skill requirements? If not, do you have recommendations for how the region could improve its capacity to address these workforce needs?*
5. *What can the region do to maximize the success of local companies and projects?*

This outreach included:

Name	Organization
Keith Malone	California Fuel Cell Partnership
Lisa Chiladakis	California Air
Erik Mason	Clipper Creek
Jeannie Lam	Nissan
Ricky Larkey	North State Building Industry Association
Becky Haupt	Phil Haupt Electric
Guy Hall	SacEV
Bill Boyce	SMUD

Deepak Aswani	SMUD
Kristina Whitney	Solar Cowboyz
Dave Head	Sonoma County
Heath Carmey	Sullivan Auto Group

Because many of the conversations to date had focused on the importance of growing regional demand for PEVs, Valley Vision secured a meeting in January 2014 with researchers who could help identify preferred strategies for achieving this goal. Five experts from the University of California Davis’ Plug-In Hybrid Electric Vehicle Research Center offered their insights on how to best stimulate the market. This session included:

- Tobias Barr, Program Staff
- Jamie Davies, Researcher
- Kevin Nesbitt, Researcher
- Michael Nicholas, Researcher
- Gil Tal, Researcher
- Tom Turrentine, Director

All of these mechanisms for gathering information offered unique lenses on the challenges and opportunities for expanding PEV innovation and demand in the Sacramento region. The input that was gathered was remarkably consistent, so the action plan is reflective of the broadly supported action areas. Moving forward, the contacts that have been established will continue to be engaged in regional efforts, with TakeCharge serving as the long-term venue for implementation and collaboration.

PEV Industry Input

The following table summarizes the high level input that was gathered related to economic and workforce development opportunities and barriers. These key findings inform the goals and actions that have been identified within the region’s action plan.

<p>Economic Development Opportunities/Assets:</p> <ul style="list-style-type: none"> • Aggressive climate related policies, energy consumption and air quality targets could drive the market for PEVs, especially on the fleet side, workplace charging and sustainability plans • SMUD’s commitment to electric vehicles is high and there are several (EVSE) demonstration projects in the region; time of use rates for electricity are competitive and encourage off peak charging • The Take Charge Coordinating Council has developed a strategic plan for regional PEV adoption and convenes a monthly meeting with key stakeholders • Strong research capability and a focus on PEVs exists at UC Davis and the California Fuel Cell Partnership • Sac EV is active in education and providing opportunities to test drive PEVs and advocating for workplace charging • Battery storage opportunities beyond just vehicles 	<p>Workforce Development Opportunities/Assets:</p> <ul style="list-style-type: none"> • Growth is likely to occur in the following areas: <ul style="list-style-type: none"> ○ PEV and EVSE salespeople ○ Electricians and electrical contractors ○ Vehicle maintenance technicians ○ Networking and IT • Incumbent worker training is needed in the following areas: <ul style="list-style-type: none"> ○ Jurisdictional permitting and inspection staff ○ First responders and tow operators ○ General safety practices across occupations with exposure to PEVs and EVSE • American River College applied for funding to create Advanced Transportation and Renewable Energy Center of Excellence
<p>Economic Development Barriers:</p> <ul style="list-style-type: none"> • Upfront costs for EVs and charging equipment can be prohibitive and it is difficult to keep vehicles in inventory • The public is unfamiliar with PEVs and charging technologies, how vehicles operate (i.e., range anxiety), benefits of ownership • Permitting and inspection process for EVSE installation is inconsistent across jurisdictions and there is a lack of understanding on the staff side about what is involved • The process of selling and PEV is more time consuming than conventional vehicles and few sales staff are knowledgeable about the cars and associated charging needs. There is also a low profit margin with PEVs. • Growth is largely driven by incentives and rebates, which is not a sustainable model 	<p>Workforce Development Barriers/Risks:</p> <ul style="list-style-type: none"> • Significant outreach and education needs to occur to stimulate demand for PEVs in the region before jobs emerge • The actual demand for workers is unclear and difficult to measure, which creates challenges investing in training for sales and maintenance staff • Since growth is largely dependent on incentives, demand may shrink once these funds are expended if that market has not developed fully • Growth in the region is slower than other areas in the state where utility rates and population density are driving PEV adoption • Some available funding for training is sometimes too restrictive (reimbursement only vs. paying costs upfront, not supporting on the job training).

Waste-to-Energy Stakeholder Engagement

Industry engagement looked different for the waste-to-energy sector because the RICO II partners were unaware of any existing collaborative efforts focused on this topic area. Valley

Vision decided to host a roundtable with industry experts to initiate the planning process. Valley Vision relied upon the lists of regional waste-to-energy companies and waste-to-energy projects identified by Collaborative Economics to create a group of invitees. Representatives from every business and landfill waste-to-energy project in the region were contacted by email and phone calls as part of this effort.

The November 2013 waste-to-energy industry roundtable connected the RICO II grant partners with the following industry experts:

Name	Organization
Andrea L. Stephenson	Atlas Disposal
Paul Philleo	County of Sacramento (landfill)
Dr. Ramin Yazdani	County of Yolo (landfill)
Tim Daleiden	Recology Environmental Solutions
Michael G. Hart	Sierra Energy
Rashael Parker	Sierra Energy
Michele Wong	Synergex International Corporation

Valley Vision facilitated the discussion and focused on the following questions with the group:

1. *What is the current state of waste-to-energy innovation in the Sacramento region?*
2. *What are the emerging trends in the waste-to-energy arena locally, at the state level and beyond (looking out 3-5 years)*
3. *What factors influence growth opportunities for local waste-to-energy companies? What are the biggest barriers?*
4. *In light of the future projections, what are the workforce needs to support the industry?*
 - a. *What training and skills are necessary for the described positions?*
 - b. *Do you think the region is producing people with these training and skill requirements? If not, do you have recommendations for how the region could improve its capacity to address these workforce needs?*
5. *What can the region do to maximize the success of local companies and projects?*

Additionally, Valley Vision completed one-on-one interviews with two company representatives who did not attend the meeting, but offered valuable industry insights that have helped guide the work in this action plan. First, Shawn Garvey with CleanWorld was interviewed during the preparation of the RICO II proposal and assisted with business growth and workforce expansion projections. Dennis Schuetzle with Renewable Energy Institute International, a local company implementing Department of Energy biofuels-focused funding, was interviewed in October in lieu of being able to attend the roundtable meeting.

Following this input gathering subsequent meetings were held with individual attendees and additional experts who could help refine the region’s waste-to-energy plan. The entire November 2013 meeting of the Green Capital Alliance—a partnership that convenes the

region’s clean technology economic and workforce development partners on a quarterly basis—was dedicated to the waste-to-energy recommendations. This helped connect Valley Vision to Val Tiangco, the biomass expert at the Sacramento Municipal Utility District (SMUD) who has advised the utility on its growing waste-to-energy portfolio. Dr. Tiangco had convened several meetings of a Biomass Technical Advisory Group (BTAG) in the past, and it is possible the expansion of this committee could play the role of a sustained industry advisory group in the future.

Waste-to-Energy Industry Input

Similar to the findings for the PEV sector, the following table summarizes the high level input that was gathered related to economic and workforce development opportunities and barriers for waste-to-energy. These key findings inform the goals and actions that have been identified within the region’s action plan.

Economic Development Opportunities/Assets:	Workforce Development Opportunities/Assets:
<ul style="list-style-type: none"> • Demonstrate waste-to-energy technologies at commercial scale and garner national/international attention • Multiple regional companies pursuing multiple technologies, using various kinds of waste—create synergies and “clustering” of technologies • SMUD’s commitment to biofuels is high • Ability to forge connections between waste producers and users: <ul style="list-style-type: none"> ○ Folsom Prison? State buildings? ○ Clarksburg poplars and lignin byproduct • Focus on affecting jurisdiction’s franchise agreements for waste hauling/disposal • Local companies have each expressed long term commitment to Sacramento region— from here and want to stay • UCD recognized leader in anaerobic digestion, willingness to invest in CleanWorld is proof of commitment • Adjust CalRecycle’s focus from composting organic waste to using digesters • Create more flexibility in local policies about waste “types” • Drive demand by requiring fleets for haulers to have lower GHG emission levels (be users of fuel made at landfills) • Opportunity to better utilize existing waste infrastructure 	<ul style="list-style-type: none"> • Companies each project a rapid growth curve in next 2-3 years • Broad spectrum of employment needs that demand further investigation, but include the following types of positions: <ul style="list-style-type: none"> ○ Waste haulers ○ Welders ○ Pipefitters ○ Wiring control systems ○ Software development (plant operations) ○ Infrastructure development, fabrication ○ Facilities operations & maintenance ○ Maintenance of trucks and equipment, machines ○ Mechanical Engineers ○ Oil/gas industry consultants ○ Sales/marketing people to support conversion to RNG vehicles (business to business sales) ○ Technicians who do repairs to heavy duty engines

<p>Economic Development Barriers:</p> <ul style="list-style-type: none"> • Need political will to pursue aggressive waste agenda and raise tipping fees • Hauling waste not regulated for emissions like landfills • Public fearful of complicated waste-to-energy technologies, used to putting garbage in the ground • Significant policy adjustments needed • Sense of high risk when making long-term waste agreements (companies desire 20 years of certainty) when other fuel prices are volatile and policy arena is unpredictable. Agreements need to leave enough flexibility for new technologies 	<p>Workforce Development Barriers/Risks:</p> <ul style="list-style-type: none"> • Window of opportunity for regional companies to emerge as leaders in the field is short (next 18-24 months), or others will take the lead • Companies not fully disclosing projects “on the books” before they are formalized commitments—making workforce planning harder to predict
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Stakeholder Engagement and Development of Cluster Strategy Plans

The RICO II team created cluster strategy plans that outlined overarching goals, action steps, metrics/timeline, and implementation activities based on the input that was gathered from industry experts and research. In order to ensure that the strategy plans were in line with the needs of the industry, Valley Vision organized a second round of meetings with industry leaders. The goals were to gain additional input into the cluster strategy plans, inform industry leaders of the action plan, and create opportunities for buy in and further collaboration with the RICO team and industry leaders.

PEV Cluster Plan Stakeholder Engagement

Valley Vision staff presented the PEV cluster strategy to SACOG’s TakeCharge group in April 2014 with more than 20 industry advisors or stakeholders in attendance. Valley Vision gave a high level overview of the strategy plan and facilitated a 10-15 minute discussion about what is needed to drive industry growth.

Ideas that were discussed as a result of sharing the PEV cluster plan at the TakeCharge meeting include:

- Investments in infrastructure need to happen simultaneously with actions to generate demand. Increased market penetration will impact infrastructure availability and ultimately EV pricing, which will drive further demand. Fleet conversion is one way to create market penetration and therefore lower prices of vehicles. It is important to be able to make the business case to business owners show them why it is economically beneficial to convert to an electric fleet.
- Salespeople need to have the correct information and motivation to sell PEVs – this should include toolkits and incentives for salespeople

Overall, these meetings informed industry leaders in both PEV and Waste to Energy industries of the RICO II team strategies, gathered additional input and informed RICO II team strategy. New opportunities and barriers were identified in these meetings that allowed the RICO II team to develop new strategies and to update and fine tune the existing cluster strategy plans.

Waste to Energy Cluster Plan Stakeholder Engagement

Valley Vision staff presented an outline of the RICO project and the Waste to Energy RICO cluster strategy plan at SMUD’s quarterly Biomass Technical Advisory Group (BTAG) meeting in April 2014. This meeting was hosted by Dr. Tiangco and attended by other industry experts, including California Energy Commission staff, SMUD staff, a UC Davis researcher and RICO team members from Sacramento Clean Cities Coalition, Greenwise Joint Venture and Valley Vision. Valley Vision was invited to co-host this quarterly meeting in the future, creating an ongoing avenue to connect RICO work with industry experts and other regional biofuel activities.

Valley Vision also convened a meeting with industry leaders in Waste to Energy to present the strategy plan and get feedback. Valley Vision outreached all industry leaders that were previously invited to the initial discussion and added new connections that have been made since that time (Appendix B).

Key opportunities and barriers that were identified through these meetings included:

Opportunities	Barriers
<ul style="list-style-type: none"> • The technologies have been very well received by the public, when the public is made aware of them • CleanWorld already is getting media attention, they want to use that attention to promote and raise awareness about industry growth in general • Elmhurst pilot of food waste collection could lead to compelling data to expand these efforts • Areas of potential growth that were identified include a major demonstration project in the region, and expanded food collection systems 	<ul style="list-style-type: none"> • Lack of public awareness is a major barrier to growth in this region • There are barriers within the CalRecycle permitting process and regulation enforcement that hinder anaerobic digester facility development • The region is missing opportunities to utilize waste locally by allowing it to be hauled out of the region • Gaining access to high level individuals who can make financial and strategic decisions can be difficult for governmental or nonprofit agencies.

Sustainability Plan

The RICO II team is establishing project sustainability by addressing systems and infrastructure needs, creating ongoing venues for stakeholder engagement and collaboration, creating add on training curriculum to existing educational programs and certifications, and continuing implementation of key activities to further develop the cluster. The RICO II team approach has aligned actions, created collaborations and institutionalized cluster development activities. RICO II is facilitating actions and systems that support the cluster, creating a growing, economically vital and sustainable cluster.

- Systems and Infrastructure implementations: The RICO II team is supporting efforts to create the needed infrastructure in the region to support EVs and Waste to Energy technology.
 - RICO II partner, SACOG, assessed the region's PEV infrastructure readiness with their report, TakeCharge II: Infrastructure Roadmap. SACOG continues to monitor and respond to PEV charger needs.
 - The RICO II team has also created web-based PEV resources that will continue to be maintained beyond the RICO grant period. This website includes an application that can crowdsource desired locations for PEV chargers. A user can drop a pin in the map to indicate where a charger should be. If there is enough support for, as shown through crowd support of the pin placement, SACOG can authorize the installment of a charger at that location. This allows for a market demand driven approach to infrastructure systems, which meets users' demands without oversaturating the market with unneeded infrastructure.
- Ongoing venues for stakeholder engagement and collaboration:
 - Engagement with the clean energy cluster, including a focus on PEV and Waste to Energy, will continue through the Green Capital Alliance, a group convened by Valley Vision and created to support organizations to inform and guide actions advancing the cluster, including RICO II Extension implementation on Waste to Energy and PEV adoption and infrastructure
 - Through the RICO team collaboration, Valley Vision co-chairs SMUD's BTAG, this will continue through at least 2015 and the TakeCharge group, collaboration among SACOG, Valley Vision and others, will continue to convene PEV stakeholders indefinitely.
- Add-on training and curriculum
 - RNG tank certification and facility maintenance curriculum: Add-on curriculum and certifications put the systems in place to train workforce for PEV and RNG fueling and maintenance jobs.
 - Car dealer training: RICO team members developed a dealer training module that can be scaled to the rest of the region. This training will facilitate PEV adoption, growing our region cluster.
- Continuing implementation in key activities

- Corporate fleet conversion: Fleet conversion supports the cluster as a whole by scaling up the amount of PEVs or RNG vehicles in the region, saturating the market, supporting infrastructure growth and normalizing technology adoption.
- Food recycling and emerging technology policies: by supporting policies that support biodigester facilities, RNG fueling stations, PEV technology adoption and food recycling, the RICO team sustainably supports the cluster and enables future growth.
- We will support career pathways for the ARFVT cluster by installing PEV charging stations and supportive curriculum at selected high schools and American River College to provide hands on experience for students in the green jobs/Engineering career pathway programs. By exposing students to PEV charging installation and maintenance we are supporting the sustainability of the cluster.

We will continue to engage with employers in a few different ways:

- Employers recognize the value in working with supportive organizations and are interested in ongoing relationships. For example, the General Manager of Atlas Refuel is a Board member of RICO partner, Sacramento Clean Cities Coalition.
- The Green Capital Alliance will continue to convene employers and Valley Vision will continue to engage them in one-on-one interviews and ongoing consultation to support the clean energy cluster.

Many RICO activities support larger goals of the partnering organizations and will continue to be supported beyond the life of the RICO funding.

- Green Capital Alliance will continue to be supported by Valley Vision to support the clean energy sector.
- Fleet conversion is a strategy employed by RICO II partner, Sacramento Clean Cities Coalition. They will continue their efforts through Green Fleet Week and other events, outreach and educational events and resources.
- SACOG will continue to support infrastructure updates and web resources to facilitate PEV technology adoption and support.

RICO II has provided a launching point for ARFVT cluster development. Through aligning actions, creating partnerships and collaboration, providing a forum for employer outreach and feedback, supporting infrastructure, creating training and career pathways, and supporting programs and policies to support a nascent cluster, RICO has enabled cluster growth. Moving forward, this launching point can support a healthy ARFVT economy and workforce.

PEV Cluster Strategy

Goals/Objectives	Action Steps (Targeted Outcome)	Metrics/Measures and Timeline	Implementation Commitments/Resources	
			Actual	Potential
Increase demand for PEVs to stimulate business and job growth	Take steps at the local level to encourage public and private sector fleets to purchase PEVs (Double the number of PEVs purchased in 2014 over 2013 (1,505))	Vehicle needs assessment, Summer 2014 # EVs in fleets, ongoing	Survey fleet managers to assess 2014 vehicle purchase plans. DGS will give estimate for state fleets GJV: Work with larger businesses in Sac region, encouraging electric	
			SCCC: Green Fleet Award event, October 15	Use business associations to form business relationships, encourage business and corporate fleets
		30 elected officials attended (3/27/14)	SACOG: Hosted March 27 th summit for elected officials to understand the business case of. Tesla was there for a ride and drive. Coordinate with other agencies that convene local officials around clean energy	
	Build consumer awareness about PEVs, comfort with purchase decision, and understanding of available incentives (Double number of PEVs purchased in 2014 over 2013 (1,505))	Live website w resources Winter 2014 # participants April – June 2014 June 12 th , # participants May – December 2014 Over 100 drives, over	VV/SACOG: implementing a web-based PEV outreach strategy, leveraging TakeCharge platforms. Battery range app launched to calculate EV range and charger location crowd sourcing app developed SCCC: Electric Vehicles Panel and Ride & Drive SCCC: Full day workshop on Zero Emissions vehicles SARTA: 4 Ride and Drive events in locations with target demographics	SCCC: Executive vehicle loaner program in partnership with SacEV

Goals/Objectives	Action Steps (Targeted Outcome)	Metrics/Measures and Timeline	Implementation Commitments/Resources	
			Actual	Potential
		1,000 individuals exposed to EVs	and existing high traffic	
		# participants	GJV/SCCC/SacEV: participating in National Plug In Week, Sept. 15-21	
		Winter 2014	SARTA: User testimonial videos created	
		Increase EV use by #	El Dorado County: Offers their own incentive for EVs (this could be a pilot to see how incentive work if you track the numbers)	
		Public input into process	SACOG: Crowd source collection of desired locations of charging infrastructure (website)	
Facilitate PEV purchase and installation process to eliminate unnecessary roadblocks	Develop consistent and cost efficient permitting processes for charging infrastructure installations across the region	Final report in review, Summer 2014 Create a replicable model	SACOG: EV readiness component of TakeCharge. Creating a report on how to standardize permitting. Elk Grove, Folsom, Sacramento have adopted a model form—need to get other jurisdictions to adopt this too.	
	Support PEV salespeople with information resources that speed up the purchase decision process	31 trainees in first 2 events	GJV: 3 Train the Salespeople on-site dealer events, including EV informative presentation, hands on time with EV, ride and drive with EV, and leave behind materials. Are producing a professional quality video of training.	
		Ongoing collaboration	VV/UCD: Giving up-to-date info to Plug Share	
		# installations	SMUD: Has cap-and-trade dollars to install chargers. Chargers are	

Goals/Objectives	Action Steps (Targeted Outcome)	Metrics/Measures and Timeline	Implementation Commitments/Resources	
			Actual	Potential
			planned for headquarters, Citrus Heights, the airport and other locations	
		# installations	SMUD: 450K grant for charging stations with Nugget grocery stores	
Create training and certificate programs associated with PEV economy	<p>Address near term needs for training and education programs to support the industry</p> <ul style="list-style-type: none"> • PEV and EVSE salespeople • Electricians and electrical contractors • Vehicle maintenance technicians • Networking and IT 	<p>31 salespeople trained, # EVs sales increase Summer – Fall 2014</p> <p>Assessment of dealership needs complete and action plan in place (report complete date)</p>	<p>GJV/SARTA: help the dealers train their staff around EVs according to needs identified by assessments</p> <p>UCD: Grant (Eric Cahill and Jamie Davies) report address how to address dealership needs and how to train salespeople</p>	
	<p>Retrain existing workforce for new skills needed to support PEV expansion</p> <ul style="list-style-type: none"> • Electricians • Building inspectors 	30 electricians trained 1/14- 11/14	SAETC: training electricians to install charging stations	
	Put curriculum and training for new skills needed to support PEV economy into place for students	<p>Development of curriculum (2014)</p> <p>Development of certification</p>	GJV and ARC: has curriculum and the sales force is the weak link ARC: expanding certification on alternative fuels and green technology to include EV and hybrid vehicles	
	Develop mechanisms to stay “in tune” with changing job training needs as the industry matures within the	Network ties strengthened, ongoing	Quarterly TakeCharge meetings with industry leaders	

Goals/Objectives	Action Steps (Targeted Outcome)	Metrics/Measures and Timeline	Implementation Commitments/Resources	
			Actual	Potential
	region			
Launch a PEV charging demonstration project	Gain visibility for the importance of charging infrastructure and the region taking leadership	# chargers installed	SMUD: Installing charging infrastructure across service territory	
			GJV: Promote idea of City of Sac becoming a model City for PEVs: includes Electric Ave with visible charging stations and combined with media campaign	Provide hands on opportunities for people getting charging installation/inspection trainings at demo sites
				Partner with UCD to create public and workplace charging protocols, and track data associated with site's utilization
				Public charging 101, work with SacEV to demonstrate safe and proper use of public Level 2 and DC Fast Charging

Waste-to-Energy Cluster Strategy

Strategies for this cluster are framed within a 3 year timeframe, with the year one as phase one, year two as phase two and year three as phase three. Because Waste-to-Energy efforts in this region are emerging, primary activities include information gathering, education, awareness raising in phase one. Phase one outcomes are oriented towards exploration of the potential for RNG on both the supply and demand side and include number of educational events, identification of opportunities and challenges for RNG and setting a roadmap for successful RNG expansion in phases two and three.

Goals/Objectives	Action Steps (Targeted Outcomes)	Metrics/Measures (Timeline)	Implementation Commitments/Resources	
			Actual	Potential
Grow demand and long term commitments for waste-to-energy project and business growth	Advocate for supportive local and state-level policies that foster opportunities and eliminate barriers to growth	Increased awareness of W2E opportunity areas by CRRC and CRA	Atlas: Advocated to Bioenergy Association for food waste policy And worked with California Refuse and Recycling Council and California Restaurant Association to understand opportunity areas and gap between northern and southern CA	Atlas/SCCC/VV: Pursue ordinance and regulations of Mather vehicles using NG as mandatory as opposed to voluntary
		Mobilize broad regional action on one or more pieces of state-level legislation that affects industry	All: Tracking policies and staying aware of grant opportunities that are relevant to digestion VV: Address and mobilize support around policy and enforcement barriers to technology expansion(RICO II and IIE)	
			SCCC: Advocated Air District for City of Sac to use RNG for their new heavy machinery fleet vehicles	
		Passage of AB1826	GJV: Advocated for “Zero Waste strategy” goals (i.e. organics as mandatory recycling material), accomplished by passage of AB 1826	
	Make local policies better support the industry, including:	Phase 1: Select one fleet agreement to focus on as a beta test approval/use of new	American Clean Skies: Speaking at panel, has drop-in language to certify fleets	VV/GJV/SCCC: Local level advocacy to support new fleet regulations

Goals/Objectives	Action Steps (Targeted Outcomes)	Metrics/Measures (Timeline)	Implementation Commitments/Resources	
			Actual	Potential
Grow demand and long term commitments for waste-to-energy project and business growth	<ul style="list-style-type: none"> City/county agreements for waste hauling should incentivize RNG fleets Jurisdictions should focus on diverting more waste for energy production	requirements		
		Updated information	SMAQMD: Bid specification language in development	
	Increase the visibility and support for projects through educational materials/events/forums	Documentary complete SCCC: 2 -4/14	SCCC: Creation of a farm-fork-fuel documentary with Car Czar SCCC: Creation of documentary about UC Davis anaerobic digester	VV: Host a regional forum that showcases economic development potential of industry
		All forums completed SCCC: 10/14	SCCC: Waste-to-energy forum hosted at Green California Summit. 3 RNG panels, part of main plenary session, part of award ceremony for vendors	Look for opportunities to encourage food recycling in large restaurants and school cafeteria.
			SCCC: Participation and sponsor of 2014 Farm to Fork events	
		Over 20 meetings w businesses or agencies Workshops completed SCCC: 10/14	SCCC: Identify and work with heavy fleets from the food industry SCCC: Fleet education workshops	
	Encourage regional fleet operators and other potential consumer groups to shift to using RNG vehicles	Events completed SCCC: 2/14 – 5/14	SCCC: Three “lunch and learn” workshops with fleet operators. Additional workshop at Meadowview Corp. Yard	
		Atlas: 4/14 - ongoing	Atlas: Working with Chris Juarez from Wicked Witch to convert food truck as an example for region. Use this as an opportunity to network with CA Restaurant Association	VV/GJV/SCCC: Local level advocacy to support new fleet regulations. VV gets policy support on ordinance restricting carbon claimable on CAP
		Addition of RNG fueling vehicles	Atlas: Added 4 trucks to their fleet as a result of an EPA grant City of Sac have added new RNG street sweepers and other heavy	

Goals/Objectives	Action Steps (Targeted Outcomes)	Metrics/Measures (Timeline)	Implementation Commitments/Resources	
			Actual	Potential
Grow demand and long term commitments for waste-to-energy project and business growth			machinery to fleet that fuel at Atlas	
	Build relationships with large public/private waste producers and pursue pilot food waste diversion agreements (Full capacity utilization of CleanWorld's biodigester by end of year)	3 collection points in downtown area (year 1 goal)	GJV/SARTA: Implementation of Waste Diversion Pilot in downtown Sacramento in 2014 GJV: Identified local businesses for recycling bins SCCC/Atlas: Pursue restaurant implementation of food collection/diversion	
		Summer 2014 Spring 2014	SMUD: Conducting a related study and Elmhurst Food Collection Pilot. Integrate this work with SMUD's efforts.	
		Presence of programs in schools	SCCC/Atlas: Took actions to implement food collection in schools, i.e. (through BREATHE CA) Enrolled 7 elementary schools in the after school food source separate education program, O24u, presentation on food source separation to the BREATHE Youth Advisory Board,	
	Raise awareness of economic development potential of the industry in the region <ul style="list-style-type: none">Draw more national and international attention to local companies and expansion opportunities (Phase 1: Broader regional awareness of assets and opportunities)	SMAQMD: 2014	SMAQMD: Continue investigating potential project partnerships (connecting waste producers and users)	VV: Create roadmap for actions that support Sac region as world demo for RNG and waste diversion (RICO III)
		VV: 6 - 12/14		VV: Create partnership with business associations and individual jurisdictions' Chambers of Commerce to have them make business case for waste separation and NG vehicles
		VV: 5 -9/14		VV: Study best practices from LA/LA Basin food recycling and RNG use.

Goals/Objectives	Action Steps (Targeted Outcomes)	Metrics/Measures (Timeline)	Implementation Commitments/Resources	
			Actual	Potential
				Assess feasibility of creating a demonstration site to showcase multiple technologies working in tandem (RICO IIE)
Establish the workforce needed to support future growth in the industry	Create training to prepare workers to service/operate renewable natural gas fueling infrastructure and vehicles	12/14 (curriculum dev)	Atlas Disposal and ARC: Work together to incorporate RNG training into the existing American River College biodiesel curriculum, including enhanced tank certification and station maintenance	
	Build collaborative systems to be responsive to future workforce needs		VV: Co-chair BTAG meetings/communicate with working groups to house RICO activities post 2014	

Early Wins

The RICO team's focus on implementation has brought about some successful strategies, early outcomes and lessons learned so far.

Some of the most successful approaches with our Investment Strategy to increase PEV adoption and develop the cluster have been:

- Increased demand for PEVs to stimulate business and job growth:
 - Bottom up approaches such as Ride n' Drives and demonstrations combined with top down approaches of permit streamlining and increasing infrastructure has been an effective way to grow demand for PEVs
 - Developed peer to peer testimonials for social media and consumer education with user testimonial videos. This amplifies the passion of PEV drivers to an audience of potential buyers.
 - Worked within framework of cap and trade with Sacramento Housing and Redevelopment Agency to increase PEV use in low income neighborhoods, such as through PEV Car Share, and identified future funding opportunities to increase benefits of and access to PEVs.
 - Worked with partners in RICO II regions in Silicon Valley and the Central Valley to share information on lessons learned, best practices and new approaches to build market demand for this cluster
- Built consumer awareness through education and increasing visibility of PEVs:
 - Increased web presence and developed a crowd sourcing web application. This website and app will allow users to give direct input into the location of new chargers, a direct market approach to placing infrastructure.
 - Developed and participated in workshops, panels, events and demonstrations to highlight commercial applications for PEVs, and economic and environmental benefits of PEVs. This reached direct consumers and businesses that manage fleets with direct education and experience with PEVs.
- Facilitated PEV purchase and infrastructure installation process to eliminate unnecessary roadblocks:
 - Developed and piloted a Dealer/Sales Force Training Curriculum and Presentation in collaboration car dealer expert. This addressed a key barrier to more widespread PEV adoption according to a recent UCD study^{vii}.
 - SACOG developed a report on permit streamlining and prepared templates for PEV infrastructure to help jurisdictions, building on model forms from the cities of Elk Grove, Folsom and Sacramento. Infrastructure support is growing and challenges are being met.

- Created training and certificate programs for occupations associated with the PEV economy:
 - Completed two Journeylevel Electric Vehicle Infrastructure Training Program courses, training 28 Journeylevel electricians
 - Marketed Electric Vehicle Infrastructure Training Program training classes to the Sacramento Valley Association of Building Officials and the entire membership of IBEW local 340 in 18 counties from Sacramento to Shasta

Early outcomes in the Sacramento region in PEV adoption include:

- More Zero Emission Vehicles (ZEVs) were sold than Plug In Hybrid Electric Vehicles (PHEV) this year: as of July 2014, 823 ZEV rebates were given and 585 PHEV were given. This demonstrates an increased commitment from consumers to purchase zero and low emissions EVs.
- More widespread acceptance of technology, including more public awareness and knowledge. Local officials are more aware and accepting of PEV technology and events, forums and Ride and Drives have been well attended.

Some of the most successful approaches with the Investment Strategy to increase Waste to Energy adoption and develop the cluster have been:

- Growing demand and long term commitments for waste-to-energy projects and business growth,
 - SCCC partner, Breathe CA, introduced modules into schools on food recycling, contributing to long term culture change around food recycling
 - Working with partners in RICO II regions in Silicon Valley and the Central Valley to share information on lessons learned
 - Close business and community partnerships have provided an opportunity to align emerging technology business needs with community supported action
- Increased visibility and support for projects through educational materials/events/forum:
 - Produced five documentaries programs from Battle Hill Media featuring anaerobic digestion, vehicles fueled by renewable gas, hydrogen fuel cells and electric power
 - SCCC has hosted zero-waste events featuring Farm to Fork to Fuel concept and demonstrating its application through food recycling and Atlas ReFuel technologies
 - Defined opportunities for underserved neighborhoods through working with Sacramento Housing and Redevelopment Agency to integrate food recycling in low income neighborhoods and identify future funding opportunities to increase benefits and access

- Encouraged regional fleet operators and other potential consumer groups to shift to using RNG vehicles:
 - Education and outreach to fleets and businesses around RNG conversion and food waste recycling has increased food waste recycling and RNG vehicle fueling significantly in the last 18 months
 - Local fleet conversions demonstrate examples economic viability and benefit to clean fleet vehicles, providing evidence to bolster more business outreach
- Established the workforce needed to support the cluster:
 - Developed Renewable Natural Gas training to integrate into existing American River College biodiesel curriculum and developing curriculum around tank certification

Early outcomes in advancement of the **Waste to Energy** technologies cluster include:

- Anaerobic digestion capacity in the region has increased to 125 tons of capacity per day available at three locations throughout the region (South Area Transfer Station, UC Davis, American River Packaging Incorporated)
- Three of six anaerobic digesters in the state are located in the Sacramento region
- UC Davis anaerobic digester currently operates at capacity, SATS operates at 40 tons per day (still under capacity)
- More than 100 vehicles fueling with RNG at the station, compared with 0 last year
- SMUD is conducting major feedstock research project to explore residential food recycling with its green waste program
- More public awareness and demand to recycle food waste

Lessons Learned

Throughout the Cluster Diagnosis, Collaborative Priority Setting, Cluster Investment Strategy and Sustainable Implementation phases, our team has encountered barriers, adjusted our strategies, and learned lessons in the process. These lessons include:

- Continued engagement with employers and experts is critical, especially in an emerging technology field.
- There is a strong need to educate both dealers and consumers on these new more complex technologies, about the types of vehicles, the charging infrastructure – locations and requirements, costs, what the purchase/lease incentives are and program eligibility. New competencies and strategies are needed to market and sell PEVs, especially to drive shifts in consumer behavior. If dealers are not prepared and aware, they cannot market PEVs effectively to consumers. Many car dealers currently lack sufficient knowledge about PEVs and steer customers toward gas-powered vehicles.
- It is important to focus on commercial fleets as well as individual consumers, and develop strategies to work with fleet managers, businesses and organizations. In

communicating to businesses, it is critical to describe how adopting these technologies can be economically viable and beneficial for the company.

- Rigorous efforts to grow demand for PEVs and RNG use are critical; it is important to take this step before large scale workforce training is developed and implemented.
- It is important to get buy in from elected officials, educate them and get them engaged as you go along (at the local and state levels).
- Be flexible in redirecting resources, taking risks and being able to make mistakes without dire outcomes. PEVs and Waste to Energy technologies are emerging clusters with a learning curve, so it is important for partners to have the flexibility to adapt to market, consumer and technology adoption realities.
- Organizations in the Sacramento region have made a commitment to collaborate and keep working together, even with leadership changes, ensuring continuity of efforts.

The early wins and outcomes, coupled with lessons learned, provide a solid basis for continuing work to implement the Investment Strategy, shift as conditions change, and sustainably implement action to create jobs and opportunities in the ARVTP cluster.

Appendix A: TakeCharge Stakeholder List

First name	Last name	Company
Eric	Cahill	Adaptiv Consulting
Lias	Chiladakis	Air Resources Board
William	Barrett	American Lung Association
Elaine	Andersen	Assistant to the City Manager of Folsom
Doug	Dransfield	Bank of America
Lori	Rianda	Bank of America
June	Livingston	Business Environmental Resource Center (BERC)
Mr. Lindsee	Tanimoto	CA Energy Commission
Cris	McCullough	California Community Colleges Chancellor's Office
Catherine	Dunwoody	California Fuel Cell Partnership
Joshua	Cunningham	CARB
Leslie	Baroody	CEC
Thanh	Lopez	CEC Emerging Fuels and Technologies Office
John	Shears	Center for Energy Efficiency and Renewable Techno
David	Almeida	Center for Sustainable Energy
casey	kempenaar	City of Citrus Heights
Angela	Frost	City of Elk Grove
Rick	Renfro	City of Elk Grove
Randy	Starbuck	City of Elk Grove
Steve	Burger	City of Folsom
David	Gassaway	City of Rancho Cordova
Paul	Diefenbach	City of Roseville
Yvette	Rincon	City of Sacramento
Cicely	Garnett	City of Sacramento
Christopher	Dougherty	City of Sacramento
Erik	De Kok	City of Sacramento
Gary	Simon	Clean Start
Jason	France	Clipper Creek
Dave	Packard	Clipper Creek
Erik	Mason	Clipper Creek, Inc
Matt	Sloustcher	CODA Automotive
Chris	Flores	Congresswoman Matsui
JD	Stack	Consultant
Bruce	Dravis	Downey Brand
Chris	Delfino	Downey Brand
Emily	Dransfield	Editorial Page Editor
Al	Eidson	Eidson and Partners
Robert	Meyer	Employment Training Panel
Brent	Rubey	EUC
		EV user group
Bernie	Kotlier	EVITP
Patrick	McGuire	GoBiz
Hoss	Bozorgzad	Gold Country Business Advisors
Jason	Buckingham	Golden Sierra Job Training Agency
Darlene	Galipo	Golden Sierra WIB
Guy	Hall	Greater Sacramento Electric Auto Association
Tim	Hastrup	Greater Sacramento Electric Auto Association

First name	Last name	Company
Julia	Burrows	Greenwise Joint Venture
Dave	Butler	LEED - Sacramento
Glendine	Porter	Los Rios Community College District
Dan	Throgmorton	Los Rios Community College District
Walter	Di Mantova	Los Rios Community College District
Bev	Rager	McClellan Park
Matt	Yancey	Metro Chamber
Douglas	Yordy	Mitsubishi Motors
Jeannie	Lam	Nissan North America
Rick	Larkey	North State Building Industry Association
Brandon	Ida	Office of Senator Barbara Boxer
Mark	Nava	Pacific Gas and Electric Company
Josh	Boone	PEV Collaborative
Genevieve	Dufau-McCarthy	PG&E
Clay	Schmidt	PG&E
Becky	Haupt	Phil Haupt Electric
Phil	Haupt	Phil Haupt Electric
Tom	Christofk	Placer County APCD
Tim	Wegner	Placer County Building Division
Dave	Snyder	Placer County Office of Economic Development
Katarina	Miletijev	Roseville Electric
Kris	Blair	Roseville Electric
Rob	Jensen	Roseville Electric
Martin	Bailey	roseville electric/city of roseville
Raef	Porter	SACOG
Sabrina	Bardbury	SACOG
Victoria	Cacciatore	SACOG
Jennifer	Hargrove	SACOG
Greg	Chew	SACOG
Regional Partner	Taylor	Sacramento Air District/Sacramento Clean Cities
Pat	Fong Kushida	Sacramento Asian Pacific Chamber of Commerce
Chantel	Hoad	Sacramento Asian-Pacific Chamber of Commerce
Jessica	Equihua	Sacramento City Council-Office of Rob Fong
Keith	Leech	Sacramento Clean Cities
Marianne	Biner	Sacramento County
John	Febbo	Sacramento County Airport System
Martha Clark	Lofgren	Sacramento Metro Chamber
Freya	Arick	Sacramento Metropolitan AQMD
Deepak	Aswani	Sacramento Municipal Utility District
Phil	Garcia	Sacramento State
Bob	Burris	SACTO
Barbara	Hayes	SACTO-Sacramento Area Commerce and Trade Organizat
Dennis	Morin	SAETC
Meg	Arnold	SARTA
Ingrid	Rosten	SARTA
Mario	Montes	SETA
Robin	Purdy	SETA
Kathy	Kossick	SETA
Terri	Carpenter	SETA-Head Start-Sacramento Works

First name	Last name	Company
Scott	Meinzen	SIEMENS Industry, Inc
Paul	Douglas	Siemens Industry, Inc.
Keith	Logan	Sierra College
Michael	Kane	Sierra College
Jeane	Berry	SMAQMD
Larry	Greene	SMAQMD
Jim	Alves	SMUD
Susan	Oto	SMUD
Susan	Wheeler	SMUD
Beth	Tincher	SMUD
Dwight	MacCurdy	SMUD
Daniel	Gehringer	SMUD
Amy	Young	SMUD
Bill	Boyce	SMUD
Bill	Slaton	SMUD
Greg	Hribar	SMUD
Diana	Parker	SMUD
Ruth	McElhinney	SMUD
Kristina	Whitney	Solar Cowboyz
Sam	Vanderhoof	Solar Cowboyz
Mike	Anderson	Solar Power, Inc.
Jason	Vitaich	South Natomas TMA
Mel	Assagai	Strategic Counsel, PLC
Heath	Carney	Sullivan Auto Group
Joseph	Angeles	Supervisor Roger Dickinson
Kelly	Brenk	Sutter Health Sacramento Sierra Region
Tobias	Barr	UC Davis
Richard	Battersby	UC Davis
Marjorie	Dickinson	UC Davis
Alan	Bennett	UC Davis
Michael	Nicholas	UC Davis PHEV Research Center
Leslie	Mancebo	UC Davis Transportation and Parking Services
Jennifer	Frei	University of Phoenix
Hubbert	Booze	US Government Bureau of Reclamation
Farah	McDill	USGBC/SCUSD
Jan	Schori	Valley Vision
Tom	Dowling	
Jim	Wilson	
Jim	Denning	
David	Sidhu	
Maureen	Johnson	

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ⁱⁱ "State of the Air" *American Lung Association*. 2013. Web. 27 May 2013.

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^{iv} Information from 2010 RICO Green Business cluster analysis prepared for SETA. Bubble diagram representing Green Employment by Segment. *Data source: Green Establishment Database. Analysis: Collaborative Economics*.

^v Information from the "Advanced Transportation Diagnostic Package: Sacramento Region" prepared by *Collaborative Economics*. September 2013.

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^{vii} Cahill, Eric, Jamie Davies-Shawhyde, Thomas S. Turrentine (2014) New Car Dealers and Retail Innovation in California's Plug-In Electric Vehicle Market. Institute of Transportation Studies, University of California, Davis, Working Paper UCD-ITS-WP-14-04