Aspen Community Electric Vehicle Readiness Plan

A collaboration of the City of Aspen
Canary Initiative, Utility and Parking Departments

1/17/17

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THE CITY OF ASPEN

A collaboration between the City of Aspen Canary Initiative, Utility and Parking Departments.

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Outcome Statement for Aspen

Aspen will be a thriving community where electric vehicles (EVs) are one of a variety of options in a healthy and sustainable transportation system. Aspen will welcome residents, visitors, businesses, and organizations to substitute zero emissions vehicles for gas-powered cars, while not encouraging increased vehicular use.

To support a prepared transition toward zero emissions vehicles, information will be widely available about EV advantages and challenges, models, affordability, rebate or grant opportunities, and associated infrastructure. The corresponding permitting and regulatory processes will be efficient and transparent, and charging infrastructure and parking will be highly visible and accessible. Local electric utilities will be prepared to meet the demand of EVs, and the professional fields that serve EVs and drivers (automotive technicians, valet services, emergency first responders) are trained and knowledgeable of EV-specific needs.

View of Aspen from Smuggler Mountain. Photo by Sheila Babbie.

A Guide to Using this Plan

This plan is intended mainly as an internal planning document to inform and support City Council and City of Aspen staff in promoting electric vehicle (EV) readiness. It also serves as a tool for staff to use in order to support individuals, businesses, and organizations in education and decision-making. Accordingly, the document is designed with utilitarian functionality in mind, rather than publication aesthetics. The following sections are included:

- The **Executive Summary** provides decision-makers and the public with a list of key actions that advance the community's readiness to adopt clean, zero-emissions vehicle technology.

- The **Introduction** orients the reader to the goal of this plan and why the City of Aspen recommends EVs, in the context of its overarching transportation goals. This section also contains definitions pertinent to EVs and their associated infrastructure, special considerations for mountainous environments, and descriptions of the existing efforts to support EV expansion in Aspen.

- The **Guiding Principles for Aspen** section is the philosophical foundation of the report, they key ideas that capture how Aspen hopes to achieve EV readiness**.** The **Strategies to Promote EV Readiness in Aspen** and **Timeline** represent the work plan and action steps that the City of Aspen Electric Vehicle Readiness Team plans to undertake in the next three years.

- City staff and the public can access information tailored to different electric vehicle user types in the **Supporting Different Sectors** part of the plan. In particular, the blue boxes can be extracted for targeted outreach or to answer citizen inquiries.

Do you have questions about electric vehicles in Aspen? Direct your queries here:

Parking in Aspen: Mitch Osur, Director of Parking, 970-429-1766, Mitch.Osur@cityofaspen.com

Aspen Municipal Electric Utility: Margaret Medellin, Utilities Portfolio Manager, 970-429-1992, Margaret.Medellin@cityofaspen.com

Available EV Models, Colorado and Federal Incentives: http://www.refuelcolorado.com/

General Inquiries: Laura Armstrong, Climate and Sustainability Programs Associate, 970-920-5104, Laura.Armstrong@cityofaspen.com
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Executive Summary

Vision for the Future: The Aspen Community Electric Vehicle Readiness Plan envisions a future with drastically reduced greenhouse gas emissions (GHG) and improved local air quality, and where if a vehicle is necessary, it is powered by clean, renewably sourced electricity rather than fossil fuels. Community members and visitors are knowledgeable and comfortable with this technology and utility providers and businesses are prepared for its presence and expansion.

Purpose of the Plan: This community-wide plan is a tool to educate and inform the public, City Council members, and City of Aspen staff about electric vehicles (EVs) and their associated infrastructure. It is also a strategic document to guide preparation for a future with an increased number of EVs. This document is a product of the City of Aspen Electric Vehicle Readiness Team, which was convened as a result of a City Council Best Year Yet goal in 2014.

Why EVs? While we hope that Aspen community members and visitors will choose to walk, bike, take public transit, and carpool before using a personal vehicle. When driving a car is required, EVs are the best option to support Aspen's environmental sustainability. Especially when charged on a low-carbon electric grid, such as the 100% renewably sourced Aspen Electric, driving an EV (instead of a gas-powered vehicle) reduces GHG emissions and local air pollution. EVs have lower fuel costs, as electricity is less expensive than gasoline, and lower maintenance costs due to fewer moving parts and no internal combustion engine.

Aspen's Existing EV Efforts: Aspen has already begun its efforts to encourage EVs through the following actions:

- ***Parking Policies*:** EV drivers are eligible for a permit to park for free in Aspen's residential areas. Visit or call the Aspen Parking Department for further information: 455 Rio Grande Building, (970) 920-5267.
- ***Charging Stations*:** In total, there are three locations with public charging stations and seven hotels with charging stations in Aspen. Of these, the City of Aspen maintains public charging stations, including a DC Fast Charger, in the Rio Grande Parking Garage. City staff has also assisted various hotels in acquiring charging stations for their patrons.
- ***Fleet Integration*:** The City of Aspen added two Nissan Leafs to its fleet in 2016 and also contracts with the all-electric Downtowner shuttle service.

Expand EV Preparedness in Aspen: Building on the actions already taken to advance EV readiness, the City of Aspen Electric Vehicle Readiness Team created the following list of **guiding principles to advance EV preparedness**. From these principles, the team derived the strategies and actions that come later in the Plan. For reference, these specific strategies are further explained on the following page.

→ **Increase the availability of charging infrastructure** and work with regional partners to create **robust electric corridors** throughout the state. *Supported by Strategies 1,2,4 and 9.*

→ **Expand common understanding and visibility of EVs** through **educational opportunities**, as well as **increased numbers of EVs** in the Aspen community. *Supported by Strategies 2-5, 9.*

→ Enhance **internal City of Aspen EV readiness**, including fleet incorporation, charging station installations, and grid impact analysis. *Supported by Strategy 4.*

→ **Support multi-unit housing complexes and their tenants** to welcome electric vehicles. *Supported by Strategy 9.*

→ Incentivize **shared use of electric vehicles** over single-occupancy vehicles. *Supported by Strategies 4, 6.*

→ Encourage **increased incorporation and continued commitment to renewable sources into electricity grids**. *Supported by Strategies 7,8.*

This plan highlights nine overarching strategies to support the principles on the previous page, many of which will work toward the success of multiple goals.

Charging a City of Aspen EV. Photo by Laura Armstrong.

***Strategy 1: EVSE Installation and Expansion**:* Increase public charging infrastructure and support private sector installations.

***Strategy 2: EV Group Purchase Program**:* Expand the presence of EVs in Aspen by acting as a regional partner in a limited-time program that will offer highly reduced costs for EV purchases.

***Strategy 3: Ride and Drive Events**:* Host educational test drive events.

***Strategy 4: City of Aspen Internal Electric Vehicle Readiness**:* Offer educational resources about EVs to staff and encourage them to use fleet EVs for regular work needs. Evaluate the City of Aspen fleet for further EV integration and facilities for charging station installation.

***Strategy 5: Collaborate with Other Local Governments**:* Develop network for sharing best practices and collaboration on an electrified Highway 82 corridor. Create a regional voice for EVs.

***Strategy 6: EV Parking Policies**:* Determine parking policies for Aspen.

***Strategy 7: Support Automatic Metering Infrastructure (AMI), Encourage Off-Peak Charging**:* Support AMI, as it will enable local utilities to offer dynamic rates to incentivize charging during off-peak hours. This could save consumers money, and prevent increases in peak electrical demand.

***Strategy 8: Assess Need for and Conduct Grid Impact Analysis**:* Understand and prepare for the impact of EVs on the Aspen municipal electricity grid.

Strategy 9: EV Ownership in Multi-Family Housing: Identify challenges, support solutions, and educate management and tenants.

Sector-Specific Resources: In addition to serving as a planning document for a prepared transition toward zero emissions vehicles, this plan provides education and information to support specific types of EV users. These specific sectors are: 1. *Potential or Future Drivers of Electric Vehicles,* 2. *Aspen Community Members,* 3. *Electric Vehicle Drivers Traveling Regionally,* and 4. *Fleets.* The sections encompass incentives, charging, parking, trip planning, and other interests for particular user groups.

Conclusion: The City of Aspen created and published this EV Readiness Plan to ensure that the Aspen Community's transition into the next three years of electric vehicles is thoughtfully designed. Staff intends to move ahead with the implementation of the strategies included in this plan, while remaining flexible and attentive to community needs and market developments.

Introduction

Goal of the Plan

The goal of this plan is to **help Aspen reduce its greenhouse gas (GHG) emissions** and **improve air quality** by **preparing the community to welcome and encourage electric vehicle (EV) use, in lieu of driving gas-powered vehicles.** Fueling vehicles on the Aspen Electric grid **leverages 100% renewable electricity**, an environmentally responsible fuel source. EV readiness is an important step of moving forward in the field of environmental sustainability.

The City of Aspen anticipates that the development and expansion of EV use will impact a wide variety of drivers who present distinct needs. Accordingly, this plan identifies a vision for what EV use will look like for different people and groups, as well as the expected infrastructural and educational needs of each.

WHY SUPPORT ELECTRIC VEHICLE READINESS IN ASPEN?

Reduce greenhouse gas (GHG) emissions: Aspen is committed to reducing community GHG emissions below 2004 levels, 30% by 2020, and 80% by 2050. In 2014, vehicle transportation made up 19% of the overall GHG emissions in Aspen. With this being a significant portion of the community's GHG emissions, the City of Aspen is focused on reducing vehicle trips and vehicle emissions to lessen the carbon impact of this emissions sector.

Improve air quality: Tailpipe emissions generate ground level ozone precursors and also contributes to poor air quality, which can cause respiratory health problems. Because of its location in a high altitude mountain valley, the Aspen community is prone to inversions that can temporarily trap these pollutants. To combat this, the City of Aspen encourages the use of zero emissions vehicles to reduce vehicle exhaust pollution.

Leadership: The City of Aspen strives to be a leader and promote environmental stewardship throughout the Roaring Fork Valley and around the globe. We recognize Aspen's dependence on a stable climate and natural resources for a thriving economy, healthy ecosystems and exceptional quality of life. Accordingly, it is critical to both support early adopters and also provide the sustainability services that residents and visitors value. Reducing our community's GHG emissions helps to mitigate the effects of climate change that threaten the health of our economy and environment. We hope to follow the state of Colorado's example as a leader in electric vehicle preparedness, thereby creating a more sustainable, resilient future Aspen, as well as providing a model for other small cities to do the same.

Origins of the Plan

The content of the plan, its guiding principles, and proposed actions, are the result of the planning process of the City of Aspen Electric Vehicle Readiness Team, which is comprised of the Parking Department, Utility Department, and Canary Initiative. This group came together under the request of a 2014 City Council Top Ten Best Year Yet goal, following a recommendation from a research report, published by Clean Cities, on low-carbon transportation solutions for the Aspen Community. After analyzing several fuel sources, including renewable natural gas and hydrogen fuel cell vehicles, Clean Cities found that plug-in electric vehicles, "represented the most actionable and meaningful technology for the city to reach its carbon reduction goals." To view the Executive Summary of the Clean Cities Aspen report, see Appendix 9: Clean Cities Executive Summary. Following the advice of Clean Cities, City of Aspen staff formed the EV Readiness Team and began work on the creation of this plan. During this time, the team also worked on related projects including the installation of EV charging infrastructure and the addition of new parking policies.

Definitions

Vehicle Types[i]

Vehicle Type	Abbreviation	Description	Example
Battery Electric Vehicle	"EV" in this plan. Also called "BEV."	Run fully on electricity, no gasoline engine. Highway operable.	Nissan Leaf[ii] 
Plug-In Hybrid Electric Vehicle	PHEV	Can operate on electricity alone. Once the electric driving range is depleted, gasoline engine extends driving range. Highway operable.	Chevy Volt[iii] 
Hybrid		Gasoline engine. The battery is not charged by being plugged in, but by regenerative braking while driving. Highway operable.	Toyota Prius[iv] 
Neighborhood Electric Vehicle	NEV	Run fully on electricity, no gasoline engine. For short range drives in urban areas. Not for use on roads or highways with limits over 35 mph.	Aspen Downtowner[v] 

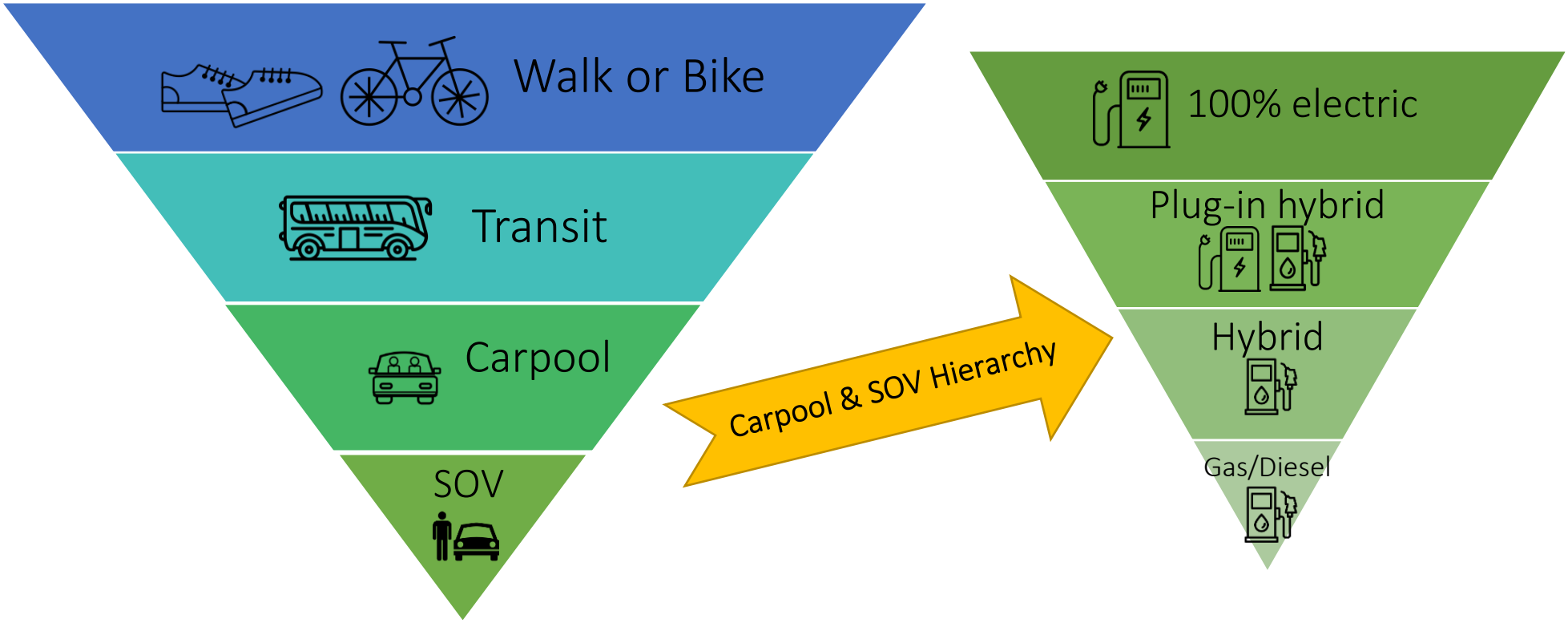
Charging Station Infrastructure

Electric Vehicle Supply Equipment (EVSE), also known as EV chargers, is available at three different power levels. Rates and costs vary by charging station and car model.

Type	Rate of Charging[vi]	Typical Applications[vii]		Electrical Current[viii]	Capital Costs[ix] (does not include installation or electricity cost)
Level 1	**Slowest** ~5 miles range/hr. of charging	Multiple hours, overnight 	Home, workplace, hotels, airports	Alternating current (AC), 120-volt, 20-amp	$0-$250 (outlet) $500-$1,500 (station)
Level 2	**Medium** ~10-20 miles range/hr. of charging	Several hours, at work, overnight 	Home, workplace, public spaces (mall, garage, library, museum, rec center, park and ride,)	Alternating current (AC), 208 or 240-volt, 30-amp	$500- $2,000 (Residential station) $3,000-7,000 (Commercial/ Public station)
Level 3	**Fastest** ~50-70 miles range/**20 min.** of charging	Less than 1 hour 	Fast fueling: gas station, mall, public parking, bank, grocery story, rest stop	Direct current (DC), 208/480-volt, 80 to 200-amp	$20,000- $40,000 (Commercial/ Public station)

Transportation Hierarchy

It is important to understand this Electric Vehicle Readiness Plan in the context of Aspen's greater transportation vision. When choosing methods of personal mobility, the City of Aspen supports the following hierarchy displayed in the left hand pyramid below. We first encourage walking and biking, then transit (like the bus or Downtowner). If those options do not work for you, please carpool. If you are carpooling, or you need to drive in a single occupancy vehicle (SOV), do so in the most efficient vehicle possible, minimizing local greenhouse gas emissions and air pollution. As seen in the right hand inverted pyramid below, the use of 100% electric vehicles is encouraged first, followed by plug-in hybrids (when the electric capacity is utilized), conventional hybrids, and finally fully gas or diesel-powered cars.



*INCREASING RANGE: As the availability of different models and the range that electric vehicles can travel on a single charge increases, **100% electric vehicles** will be a fully functional alternative to gas-powered vehicles. While this technology is still developing, **plug-in hybrids** (with the highest electric range possible) are a good option for those who hope to drive electric with the range extension of a gasoline-powered engine.*

A Case for Electric Vehicles [XIV]

Performance

Faster acceleration. **Quiet** driving experience for driver, less noise pollution for community. **Torque** and **horsepower** not impacted by high altitude.

Emissions

No tailpipe emissions.

Vehicles charged on **Aspen Electric** have **no well-to-wheel emissions.***

***Wells-to wheels**, also known as **pipeline emissions**, "include all emissions related to fuel production, processing, distribution, and use." From: *US Department of Energy, Alternative Fuels Data Center.*

Market

Rapid expansion

2011: **Only 3** EV models available

2016: **Over 20** models available

Efficiency

EV efficiency is **~60%** **vs. ~20%** for internal combustion engines.

EVs convert ~ 80% of electricity from the grid into power at the wheels. They are also ~80% efficient at converting AC current to DC.

Maintenance

50% lower maintenance costs. Fewer moving parts. No oil or transmission fluids. **Battery replacement** is **rare**.

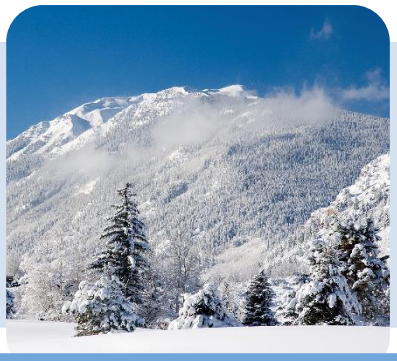
Energy Cost

Estimated average Colorado electricity cost : **$0.03/mile****

Electricity prices are more **stable than gas**.

** This calculation assumes that on average Coloradans pay $0.10/KWh for electricity and drive with an efficiency rate of 3 miles/KWh. Rates and costs will vary by electricity provider, driving style, and terrain. From: *Clean Energy Economy for the Region.*

Special Considerations for Driving EVs in the Mountains



COLD TEMPERATURES

An EV's driving range is reduced by freezing temperatures. Much of this reduction is from heating or cooling the inside of the car.

To extend range, precondition the interior (heat or cool it while plugged in to a charger), and use seat and steering wheel heaters only while driving. Some vehicles offer apps that can warm up the car remotely.

As EV battery ranges continue to increase (e.g. the 2017 Chevy Bolt will have a range of over 200 miles), range reductions will be even less likely to impact regular driving and commuting needs.

ALTITUDE

Unlike an internal combustion engine, an electric vehicle's engine is not powered by combustion (which requires oxygen).

Therefore, the power and torque of electric vehicles is not impacted by low oxygen levels in high altitude locations.

Driving uphill for an extended period of time, such as up a mountain pass or from Glenwood Springs to Aspen, uses more energy (whether electricity or gasoline) than driving on a flat road.

PERFORMANCE IN ICE AND SNOW

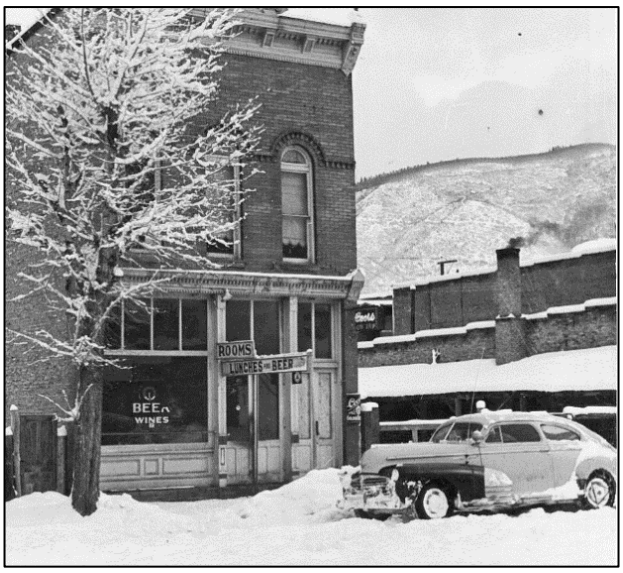
Electric vehicles typically perform well in snowy and icy conditions due to their low center of gravity and balanced weight distribution (the battery is located to the back and center of the vehicle).

Typical winter modifications, such as snow tires and reduced speed in slick conditions are also important to consider.

While the Tesla is the only manufacturer with all-wheel drive available in 2016, future market expansion is expected to increase AWD offerings.

CARS IN THE COLD:

All cars perform less efficiently in the extreme cold; an EV's battery life and resulting range is reduced and fuel efficiency decreases in gasoline-powered vehicles. However, because a fully charged EV battery typically results in a shorter range than a full tank of gas would, EV drivers should pay particular attention to their battery life in very cold conditions.



Top Photos by Sheila Babbie.
Bottom Right Photo is courtesy of Aspen Historical Society.

How Aspen Is Currently Supporting Electric Vehicles

Parking Policies: As of January 2017

- **EV Policy:** EV drivers can visit the Aspen Parking Department at 455 Rio Grande Building or call (970) 920-5267 to register for a permit to park for free in residential areas around Aspen. This policy has a sunset date for reevaluation by City Council in 2020.
- **Hybrid Policy:** Hybrid drivers are eligible for a permit to park for free in residential zones around Aspen through 2018.
- **Carpooling Policy**: Carpools of two or more driving-age adults may pick up a daily carpool permit for free parking in designated carpool spaces in Aspen's downtown core and residential spaces. Passes are available from 6-11am, M-F at the kiosk on the Airport frontage road. As of 2018, carpool permits will be administered at the Brush Creek Intercept Lot.

Charging Stations: As of January 2017

- **Public**: Three public locations near Aspen, **the Rio Grande Parking Garage, Pitkin County Public Works,** and **the Aspen Middle School.** Outside of Aspen, the **Brush Creek Intercept Lot** also has a station.
- **Hotels**: Seven hotels in Aspen have chargers available to patrons.
- **How to Find a Charger**: Visit Appendix 2: Map of Current EVSE Locations in Aspen and Appendix 3: Map of Charging Corridors around Aspen or use the following websites and corresponding apps for up-to-date charging station maps: PlugShare.com or Chargepoint.com.

Fleet Integration: As of January 2017

- During the fall of 2016, the City of Aspen added **two Nissan Leafs** into its fleet for departmental use.
- In the summer of 2016, the City of Aspen contracted with the **all-electric Downtowner shuttle** to provide free rides in the downtown core.

2017 TAX INCENTIVES:

Colorado: Aspen is fortunate to be in a state that offers one of the best electric vehicle tax incentives in the nation- a $5000 rebate.

Federal: EV purchasers are also eligible for up to $7500 in federal tax credits.

See Appendix 6: Tax Credits or visit www.refuelcolorado.com for more information about tax incentives.

A City of Aspen EV. Photo: Laura Armstrong.

City of Aspen Electric Vehicle Charging Stations. Dual cord Level 2 Charging Station (left) and DC Fast Charging Station (right), both located in the Rio Grande Parking Garage at 427 Rio Grande Place.

Photos by Jane Wilch.

Guiding Principles for Aspen

The following points are the guiding principles from which more specific strategies and actions for electric vehicle readiness (found on p.13-14) are derived. The italicized text following each item indicates the corresponding strategies that work to achieve said item.

1. Two of the largest barriers to electric vehicle expansion are range anxiety and lack of readily available charging infrastructure.[xi] Accordingly, the City of Aspen should **work with community partners to increase the availability of charging infrastructure in Aspen**, while also **working with regional and state partners** to build a strong and visible network of charging stations throughout Colorado. *Strategies 1,2,4 and 9.*

2. As of January, 2017, the presence of EVs in Aspen and the Roaring Fork Valley is limited, but growing. Amplified and widespread **education and understanding of how to acquire and operate EVs** is essential to the growth and success of a prepared transition toward low-emissions vehicles. This can be realized through a combined effort to **increase the quantity of EVs** operated in the Roaring Fork Valley, as well as **outreach and hands-on opportunities to test drive EVs**. *Strategies 2-5, 9.*

3. The City of Aspen should lead by example and continue to focus on its own **internal EV readiness**. This should include an analysis of its fleet and future charging station locations to power that fleet. As technology evolves, Aspen should continue to evaluate the appropriateness of electric heavy-duty equipment and buses in local and regional fleets. The City of Aspen Electric Utility will also be impacted, and one of the ways in which it can prepare for the future is to conduct an EV grid impact analysis. *Strategy 4.*

4. For equitable and widespread access to electric vehicle infrastructure throughout the community, focus on **supporting multi-unit housing complexes** with charging station (Levels 2 and/or 3) installation and accommodation of Level 1 charging. When designing solutions, **start with affordable housing**,[xii] and offer resources to support and educate both tenants and management. *Strategy 9.*

An EV-only parking spot at the Rio Grande Parking Garage. Photo by Jane Wilch.

5. Promote policies that **incentivize shared-use electric vehicles over single-occupancy electric vehicles.** For example, giving preferential charging or parking rates to carpool vehicles.[xiii] *Strategies 4, 6*.

6. To realize the greatest potential reduction in GHG emissions from the use of EVs, both locally and globally, **electricity grids with high carbon intensity must switch to cleaner, renewable energy sources**. In turn, incentives should be created to encourage charging during off-peak hours of electricity demand to create a sustainable charging pattern for local utilities. *Strategies 7, 8.*

Strategies to Promote Electric Vehicle Readiness in Aspen

The following table is a list of the top strategies for initiation in 2017, as recommended by the City of Aspen Electric Vehicle Readiness Team.

Strategy	Actions	Lead Parties	Budget	Timeline	Stakeholders	Notes
1. EVSE installation and expansion	**A. EVSE at transit locations**	EV Team, Capital Asset, RFTA	Staff time and cost of charging equipment and installation	2017-2019	RFTA, Transportation Department, Aspen Skiing Company, Airport	Intercept Lot install 12/2016. Team can act as a resource for EVSE install along transit corridors, improving equitable access and encouraging transit use over driving.
	B. Outreach to hotels	EV Team	Staff time and possible incentive program	2017	Hotels, ACRA	Focus on sharing EV parking and charging between businesses and providing options for the public.
	C. Incentives for private sector install	Building Department, CLEER, CORE, EV Team, Holy Cross Energy, Aspen Electric	Staff time and possible incentives	2017-2019	Electricians, contractors	Streamline permitting process. Education around rebates, models, installation. Suggested rules. When to charge. Communicate permitting process. Installation information.
2. EV Group Purchase Program	**Act as regional partner and resource**	CLEER, EV Team, CORE, other jurisdictions	Staff time, $750 advertising	Program: 4/2017-6/2017 Planning: 12/2016-8/2017	Local dealerships, employers, media, communication channels.	Significantly reduce EV prices for a limited time. Expand presence of EVs in the RFV. EV trainings for Aspen community members before and after program. Possible co-sale of other efficiency products.
3. Ride and Drive Events	**Host test drives**	EV Team, CORE, CLEER	Staff time, $4000 advertising	Ride and Drive 3/2017, 9/2017	Ford, Chevy, Audi in Glenwood, Nissan in Grand Junction, Tesla in Aspen.	Partner with National Drive Electric Week and hold additional ride and drive events. Cross promote with Group Purchase Program.
4. City of Aspen (CoA) Internal EV Readiness	**A. CoA Staff Outreach**	EV Team	Staff time and prizes/food	2016-2017	All CoA staff	Lunch and learns, City Source announcements, test driving Nissan Leaf.
	B. Evaluate CoA Fleet for EV integration	City Council, Canary, Streets, Transportation	$27,000/EV (fleet replacement budget) $500 for education	2017/2018	Department Heads, vehicle purchasing decision makers, Car to Go.	Analysis of City of Aspen fleet to evaluate vehicles that could be replaced by EVs, and resulting saving in $ and GHG. Determine who is responsible for grant applications.
	C. Evaluate CoA facilities for EVSE capacity	Utility, Canary	Staff time	2017-2019	Capital Asset, Utility, Canary	Planning for future EV incorporation into fleet.
	D. Maintain EVSE and EVs	EV Team, Streets	$2,000/year for EVSE maintenance	2016-on	All EVSE users, all Canary Leaf users	Evaluate ongoing cost of chargers and set aside maintenance budget.

Strategy	Actions	Lead Parties	Budget	Timeline	Stakeholders	Notes
5.Collaborate with other local governments	**Sharing information and collaborating on policy decisions**	EV Team, CORE, CLEER, all other jurisdictions	Staff time	2017/2018	EV drivers throughout the Roaring Fork Valley	Work with CORE to communicate with Green Teams. Bring other jurisdictions together into a network. Information sharing. Support electrified Highway 82 Corridor and downtowns. Create a regional voice for EVs.
6. EV Parking Policies	**Determine parking policies for Aspen**	Parking Department, Canary Initiative	Staff time	2016-2017	Transportation Department	EV policy, Hybrid policy, enforcement for gas-powered vehicles (ICEs) that park in EV-only spaces.
7. Support Automatic Metering Infrastructure (AMI), encourage off-peak charging	**Communi-cate how AMI supports EVs and helps utilities manage peak loads.**	Utility, EV Team	AMI for Aspen Electric is estimated at $1,200,000 for 2018-2020.[xiv]	2017-2019	CORE, Holy Cross Energy	AMI would enable the utility to measure real-time energy use of their service area. It would also enable demand pricing, which has the potential to lead to consumer savings while limiting increased peak electrical demand. Engage Holy Cross Energy in this discussion.
8. Assess need for and conduct grid impact analysis	**What will the impact of EVs be on Aspen Electric grid and what are the tipping points?**	Utility, EV Team	Staff time in 2017 for prelim assessment of EV growth – determine study timing and budget.	2017-2019	CORE, MEAN, RMI, Holy Cross Energy	Need to take into consideration grid structure, generation mix, clustering, impact on specific transformers, and pricing.
9. EV ownership in multi-family housing	**Understand challenges, support solutions, and educate management and tenants.**	EV Team, CORE	Staff time, $2000 outreach and education	2017-2019	CORE, HOA Boards, APCHA	Understand what challenges exist for residents of multi-family homes to purchase and charge EVs. Offer support and policy examples. Host educational events.

Electric Vehicle Viewing Event at 2016 Aspen Community Picnic.

WeCycle's bike balancing fleet consists of two EVs. Photos by Laura Armstrong.

Outreach Strategies

This table contains goals, strategies, and actions that are specifically tailored to outreach and education. In many cases, these items will support and dovetail with the strategies in the previous section.

Goal 1: Strengthen Aspen and the Roaring Fork Valley's understanding of electric vehicles, vehicle charging, and available resources in efforts to break down barriers to purchasing an electric vehicle.

Strategy	Outreach Actions	Lead Parties	Budget	Timeline	Notes
Update EV website with new information	**Offer up-to-date website with EV information**	EV Team	Staff time	2017-ongoing	-Periodically reach out to EV team to gather any new information for website -Check that EVSE mapping sites and apps are up-to-date with new chargers
Prepare materials for EV outreach	**Organize necessary information**	EV Team	Staff time	2017	-Organize materials that explain operation of vehicle, benefits, current EVs on the market, and types of charger
Host Ride and Drive events	**Announce event date/ location**	EV Team	Staff time	2017	-PSA/Press release, Newsletters (Z Green, CORE, High Five, Inside Aspen), Social Media, City Source
	Create and distribute event poster	EV Team	Staff time, newspaper ad costs	2017	-Design poster and distribute it to: City communications staff, bulletin board locations in Aspen, newspaper
	Plan outreach for event	EV Team	Staff time	2017	-Table with information -Take photos at event -Giveaway
Outreach to COA staff	**Announce that Nissan Leaf is available for departments to drive**	EV Team	Staff time	2017	-Post Leaf vehicle information on City Source -Email department heads with this information -Lunch and learn events -Set up appointments with City staff to go through Leaf vehicle orientation
	Inform employees of EV website	EV Team	Staff time	2017	-Include information in email signatures -Create EV page with web link on City Source -Employee and Inside Aspen newsletters
Make EV information, resources, and experiences more widely available	**General handout on EV program**	EV Team	Staff time	2017	-Small rack card
	Distribute information to partners	EV Team	Staff time	2017	-Tesla Showroom, Mall information kiosk, ACRA, City of Aspen offices -Saturday Market and other events

Goal 2: Build relationships with local businesses and local governments to inform them of EV program efforts, and to support them in installing electric vehicle infrastructure.

Strategy	Outreach Actions	Lead Parties	Budget	Timeline	Notes
Share information with other local governments	**Develop list of key contacts for each municipality/ Green Teams**	EV Team	Staff time	2017	-Organize information to share -Set up meetings with key contacts to review the EV plan and goals moving forward -As updates occur, notify key contacts -Consider collaborations— infrastructure installation, group buy, ride and drive events
	Develop valley-wide EV messaging	EV Team	Staff time	2017	-Municipalities: Snowmass Village, Basalt, Carbondale, Glenwood Springs -Counties: Pitkin, Eagle, Garfield
Add wayfinding as new EV chargers are installed	**Work with Streets Dept. and CDOT for sign approval and orders**	EV Team	Staff time	2017	-Strive for consistency of messaging and imagery.
Outreach to employers	**Develop key contacts for employers**	EV Team	Staff time	2017	-Aspen Skiing Company, Aspen Valley Hospital, School District, ACRA, Pitkin County
	Offer resources to employers interested in installing EV infrastructure	EV Team	Staff time	2017-ongoing	-Prepare EV materials for employers
Reach out to large parking centers	**Develop key contacts for large parking centers**	EV Team	Staff time	2017	-Reach out to Aspen Skiing Company, Aspen Valley Hospital, School District, City Market, Clark's Market, ABC
	Offer resources to contacts interested in installing EV infrastructure	EV Team	Staff time	2017-ongoing	-Prepare EV materials for key contacts

Goal 3: Support current electric vehicle drivers (Aspen residents and valley commuters) by serving as a resource and communication link to opportunities available to them in Aspen and the Roaring Fork Valley.

Strategy	Outreach Actions	Lead Parties	Budget	Timeline	Notes
Partner with dealerships	**Develop key contacts for dealerships**	EV Team	Staff time	2017	-Contact Chevy, Ford, Audi, Nissan, Tesla, and other dealerships that offer EVs -Encourage technicians who can work on EVs
	Offer support to dealerships	EV Team	Staff time	2017-ongoing	-Set up in-person meetings to discuss: ride and drive events, how to simplify purchasing process
Spread model availability information	**Increase access to EV model information**	EV Team	Staff time	2017-ongoing	-Model information available on website -Information available at events

Timeline for Internal Projects

The following timeline displays the top priority strategies (found on p. 13-14) that the City of Aspen Electric Vehicle Readiness Team will focus on in the near future. The span of each colored block demonstrates the duration in which staff will be involved in that project. For example, staff will be actively planning and then executing the Group Purchase Program from January to August of 2017, though the program itself is only offered for only three months of that timespan. Specific implementation plans for each of these actions can be found in Appendix 1: Implementation Plans.

2017												2018		2019	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1st half	2nd half	1st half	2nd half
1. EVSE Installation and Expansion															
2. Ride and Drive							2. Ride and Drive								
3. Group Purchase Program															
4. City of Aspen Internal EV Readiness															
5. Share Information with other Local Governments															
6. EV Parking Policies															
7. Support Automatic Metering Infrastructure (AMI) and encourage off-peak charging															
8. Assess need for and conduct grid impact analysis															
					9. Understand and streamline EV ownership in multi-unit housing											

Support for Different Sectors of Electric Vehicle Use

The following section is designed to educate and inform specific types of electric vehicle users. The blue boxes have the capacity to stand alone, and therefore can be extracted by staff to use in targeted outreach efforts or to respond to specific inquiries.

1. Potential and Future Electric Vehicle Drivers

Only recently have plug-in EVs with significant range become widely available in Colorado. The selection of vehicles, price points, and amenities are rapidly expanding. Owning or leasing an EV is easier and more attractive than ever. With increased interest comes questions about how electric vehicles work and what infrastructure exists to support them. The following section addresses drivers who are or may be interested in electric vehicles in the future.

What Potential or Future Drivers of Electric Vehicles Need to Know:

Why you should purchase an EV: EVs offer a wide variety of benefits to drivers and the local environment, including **excellent performance, fuel and maintenance cost savings, and zero tailpipe emissions**. For more information, see *A Case for Electric Vehicles* on p.9. In 2016, there were **22 EV models available** in the United States. Comparisons of these models can be seen in Appendix 5: Electric Vehicle Comparisons .

Incentives are available: **Federal and State of Colorado tax credits** are available for EVs. Drivers who purchase an EV in 2017 are eligible for up to **$7500** of Federal tax credit (depending on battery size), to be refunded up to Federal tax liability. The Colorado tax credit is for **$5000** and is fully refundable, regardless of how much state tax is owed. The Colorado tax credit is also available for leased vehicles (see Appendix 6: Tax Credits). As the credits are subject to change, contact Refuel Colorado (part of the Colorado Energy Office) for the most up-to-date information: (303) 866-2100 or visit http://www.refuelcolorado.com/.

Aspen is ready for EVs: In Aspen, EV drivers are eligible for a permit to **park for free in residential areas**. To obtain this permit, visit the Aspen Parking Department or call (970) 920-5267. The City of Aspen also offers **free charging** (parking rates apply) at a DC Fast Charger and two Level 2 Chargers in the Rio Grande Parking Garage. Public charging is also available at the Pitkin County Public Works, Aspen Middle School, Snowmass Village Town Park Station, and a variety of other locations on the Highway 82and I-70 (Appendix 3: Map of Charging Corridors around Aspen) corridors. Visit PlugShare.com or Chargepoint.com for up to date EVSE maps. The City of Aspen is engaged in ongoing work to continue expanding public electric vehicle charging infrastructure.

EVs in Mountain Environments: Unlike gasoline powered vehicles that depend on combustion for horsepower and torque, **EV engines are not impacted by the low levels of oxygen** in high altitude environments. Accordingly, an EV will have the same power and hauling capacity in Aspen as in Los Angeles or at the top of Independence Pass. **Cold temperatures reduce battery life** (and decrease fuel efficiency in gas powered vehicles as well), which should be taken into account when driving EVs in the mountains. Because of their low center of gravity, **EVs offer stability and handle well in ice and snow conditions**. As the EV market expands, the selection of all-wheel drive vehicles is expected to increase. Learn more in the *Special Considerations for Driving EVs in Aspen* on p. 10.

2. Aspen Community Members

Aspen community members are full and part time residents who would drive and charge a vehicle inside of City Limits and in the greater area surrounding Aspen. They are likely to come into town to work, meet, play, shop, or eat. Included also in this category is a section dedicated to managers and tenants of multi-unit housing, and an explanation of Neighborhood Electric Vehicles.

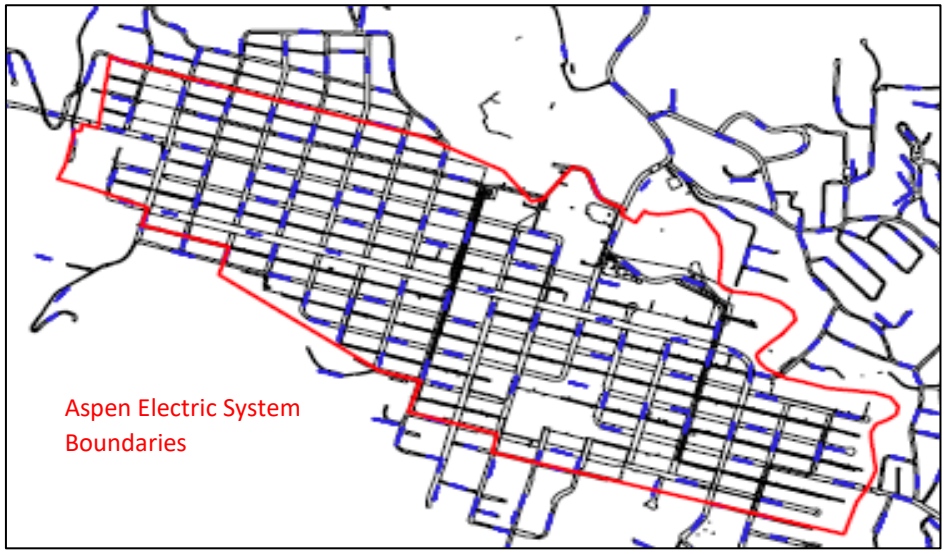
What Aspen Community Members Need to Know:

Where to Charge: For convenience and reduced congestion in town, charging EVs at home is highly recommended for Aspen residents. If charging in town is necessary, see Appendix 2: Map of Current EVSE Locations in Aspen, PlugShare.com, or Chargepoint.com for a list of public stations. Charging with Aspen Electric (service area map below) ensures the use of 100% renewable electricity, whereas charging on a less "clean" grid results in increased GHG emissions at the source of electrical production.

When to Charge: EVs can either be helpful to the local utility by charging during times when there is otherwise low demand. Alternatively, EVs can cause challenges by charging during peak times when the demand for electricity is high throughout the community. Help our local utilities and keep costs low by charging off peak, between 9pm and 9am. For more information about what types of charging stations can be installed at home, see Charging Station Infrastructure on p. 7.

Parking: The City of Aspen strongly encourages Aspen residents to walk, bike, or bus into town. Where vehicle use is required, carpooling is highly encouraged and use of a zero-emissions electric vehicle is preferred. In Aspen, EV drivers are eligible for a permit to park for free in residential areas. To receive this permit, visit the Aspen Parking Department or call (970) 920-5267. The City of Aspen also offers free charging (parking rates apply) at a DC Fast Charger and Level 2 Chargers in the Rio Grande Parking Garage (970-920-5430). Public charging is available at a variety of other locations on the Highway 82 and I-70 (Appendix 3: Map of Charging Corridors around Aspen) corridors.

Employers: A report published by the National Renewable Energy Laboratory found that workplace charging "yields the lowest level of emissions for the majority of electricity grid profiles."[xv] Additionally, people who can charge at work are 6 times more likely to own an EV.[xvi] The US Department of Energy has created a number of resources for employers, from tools to engage employees to charging station management policies to tax incentives and grant opportunities for EVSE purchase. These resources and more are found here: https://energy.gov/eere/vehicles/workplace-charging-challenge-install-and-manage-pev-charging.



Aspen Electric System Boundaries are in red and cover most of Aspen's downtown core. This is roughly east to west from 8th street to the Roaring Fork River as it crosses the east side of town, and north to south from W Smuggler St. to E Durant St.

The system also includes Burlingame and the Aspen Recreation Center (not pictured in this map). Map is courtesy of Aspen Electric.

What Aspen Community Members Who Are Residents and Managers of Multi-Unit Housing Need to Know:

Many of Aspen's residents live in multi-unit housing (condominiums, apartments, mobile home parks, or townhomes). For example, within the Aspen Emissions Inventory Boundary, there are over 2100 units either rented or owned by the Aspen Pitkin County Housing Authority, the vast majority of which are in multi-unit dwellings.[xvii] Accordingly, the creation of effective charging policies for multi-unit dwellings is essential for the success of EVs. Forward-thinking management can anticipate the needs of their residents and prepare for the future.

The Law: Individuals are legally permitted to pursue EVSE installation, so long as they pay for the associated costs.[xviii] Read more here: http://www.afdc.energy.gov/laws/10856.

Location: It is a best practice for managers to install stations that can be used by multiple tenants.[xix] In instances where there are assigned parking spaces for residents, dedicated chargers for particular individuals (whether Level 1 or 2) can also be installed. Use of extension cords is not recommended for safety purposes and because they reduce energy efficiency.

Cost: Energy costs can be bundled with parking or negotiated individually. Certain charging stations are also equipped with technology that can meter and bill for energy use and be used by multiple and/or specific users. [xx]

Evaluate Readiness and Get Started: Evaluate when management of a multi-unit dwelling should begin creating EV policies, access information and examples of EV policies, and make use of tools to calculate impact the US Department of Energy's Alternative Fuels Data Center website: http://www.afdc.energy.gov/fuels/electricity_charging_multi.html See Appendix 7: Multi-Unit Dwelling Resources for specific resource guides for both residents and managers/owners of multi-unit homes.

Burlingame, one of the many multi-unit housing complexes in the Aspen Community. Photo by Chris Menges.

ASPEN COMMUNITY MEMBERS- NEIGHBORHOOD ELECTRIC VEHICLES

There are around **100 Neighborhood Electric Vehicles (NEVs) in the Aspen area** in the summer, with increasing numbers used in winter as well. NEVs are all-electric vehicles, but distinct from the EVs discussed throughout this plan, as they are intended for **low speed uses** (not highway). In Colorado, NEVs can operate on roads with a maximum speed limit of 45 mph.[xix]

Use: NEVs can replace carbon-emitting vehicles for **personal use**, **delivery services**, **in-town fleets**, and **public transit**. NEV use could be widely expanded in Aspen to include transporting workers or car share programs.

Charging: A NEV battery is charged on a **standard 110-volt outlet**. While most NEV drivers charge at their homes, there are also 20 NEV-compatible plugs in the bottom floor of the Rio Grande Parking Garage, available upon request of a parking attendant.

Parking: As of January 2017, **NEVs can park in any legal parking space in Aspen for free.** This may be subject to change.

NEVs are a great alternative to gas powered cars for necessary in-town trips; however, they are not a fully-functioning substitute for a highway-ready, long-range vehicle. So while NEVs are complimentary to the goals of GHG reduction and improved local air quality, they are not included in the primary focus of this plan, which is substituting gas-powered vehicles for EVs.

COMMERCIAL NEV USE:

- Aspen Historical Society: history coach
- Viceroy Hotel, Snowmass: trolley busses
- Aspen Alps: bellman, housekeeping and grounds
- Explorer Bookstore: flatbed for deliveries.
- City of Aspen fleets: Parks and Environmental Health
- Mason Morse Real Estate: showings
- St. Regis: guest transportation
- Hyatt: guest transportation
- Wendy Whitman Real Estate: showings

An NEV carrying a snowboard on S. Hunter St (left), the City of Aspen electric truck (middle), and a privately owned NEV on E. Durant St. (right). Photos by Laura Armstrong.

3. Electric Vehicle Drivers Traveling Regionally

Drivers in this category spend time in Aspen for work, vacation, or while traveling throughout the surrounding region. This includes commuters who live along the Highway 82 or I-70 corridors, as well as visitors traveling by vehicle from further afield.

What EV Drivers Traveling Regionally Need to Know:

Where to charge if you commute to or from Aspen: Commuters are encouraged to park their vehicles at one of the numerous Park and Rides on the Highway 82 corridor and reach or leave Aspen by bus. The Brush Creek Intercept Lot is now equipped with a Level 2 charging station, as is the Carbondale Park and Ride. Additional public charging is available at the Glenwood Springs public parking garage, Carbondale Town Hall and High School, Whole Foods Market in El Jebel, the Rocky Mountain Institute and Town Hall in Basalt, and the Snowmass Rodeo Lot (see Appendix 3: Map of Charging Corridors around Aspen, PlugShare.com or Chargepoint.com).

Parking: If you need to drive into Aspen, you can park and charge at the Rio Grande Parking Garage or speak with your employer about accommodating workplace charging (see Appendix 10: Resources). Charging on the Aspen Electric grid ensures the use of 100% renewable electricity, whereas charging on a less "clean" grid results in increased GHG emissions at the source of electrical production. Additionally, EV drivers can go to the City of Aspen Parking Department to obtain a special parking permit to park for free in residential areas.

When to Charge: The best time to charge is between 9pm and 9am, the off-peak hours for electricity consumption. Shifting electrical vehicle charging away from the hours when the most electricity is being used on the entire system (especially between 1-8pm) will prevent them from increasing that peak.

Hotel accommodations: A variety of hotels in Aspen offer Level 2 EV charging to their guests. This includes the Gant, the Little Nell, the Residences at the Little Nell, Hotel Jerome, and the Limelight Hotel (all are J1772 and Tesla compatible). Where EV chargers are not available, guests should ask about the availability of a parking space with a 110-volt outlet, at which they can plug in their vehicle's Level 1 charging cord. EV owners should inquire about charging while making hotel reservations.

Charging on the I-70 Corridor: There is an ever-growing network of charging stations on Colorado's I-70 corridor. Before making a trip, visitors driving EVs are encouraged to plan their route with available charging stations in mind. Several EV trip planning websites exist for this purpose: EVJourney.com and EVTripPlanner.com. For up-to-date maps of charging station locations, visit: PlugShare.com or Chargepoint.com. These links also locate charging stations from Glenwood to Aspen, to support drivers on Highway 82.

4. Fleets

This section can be used as a reference tool by all fleets, public or private. Examples include hotel shuttles, taxis, delivery vehicles, real estate agent fleets, grounds equipment, commuter vehicles, and more.

What Fleet Operators Need to Know:

Advantages of Electric Vehicle Fleets:

- Converting fleets to electric can reduce GHG emissions, while saving significantly on fueling and annual operating costs. For example, the annual operating costs of a 2016 Toyota Highlander Hybrid are $498 more than a 2016 Nissan Leaf (fuel, tires, maintenance, license, registration, and insurance). The Highlander will also emit 8,743 more pounds of CO_2 annually (if the Leaf is charged on Aspen's 100% renewable electricity).
- As technology evolves, the Aspen community should consider electric heavy-duty equipment and buses in local and regional fleets, which would have large impacts on local emissions and pollution.

Keys to Electric Vehicle Fleet Acceptance:

- Introducing pilot electric vehicles that employees can demo and use regularly, in their regular course of work, can improve comfort levels with future EV deployment.
- Direct education and outreach and strong support from leadership are critical to acceptance of EVs.
- It is critical to match EVs to the jobs they will be performing and to install EVSE to support driving ranges. After a fleet analysis of which vehicles could be converted to EVs, a transition plan can be implemented.

Resources:

- Refuel Colorado offers alternative fuel fleet coaching and resources to seek out the right vehicle for the job and identify monetary savings. Learn more at: RefuelColorado.com.
- Fleet operators can use vehicle cost calculators from the EPA's Alternative Fuels Data Center to compare savings across vehicle model, year, mileage, and use: http://www.afdc.energy.gov/tools.
- To view a sample set of specifications for purchasing an electric vehicle, see Appendix 8: Sample Specification Sheet for an Electric Vehicle.
- The US Department of Energy estimates that Level 2 workplace charging stations cost between $400-$6,500/unit, with average installation costs of around $4000. For more information about costs, grant funding, RFP guidelines, ADA compliance, and signage, visit: https://energy.gov/eere/vehicles/workplace-charging-challenge-install-and-manage-pev-charging.

Cost estimates for different Level 2 charging station use types.

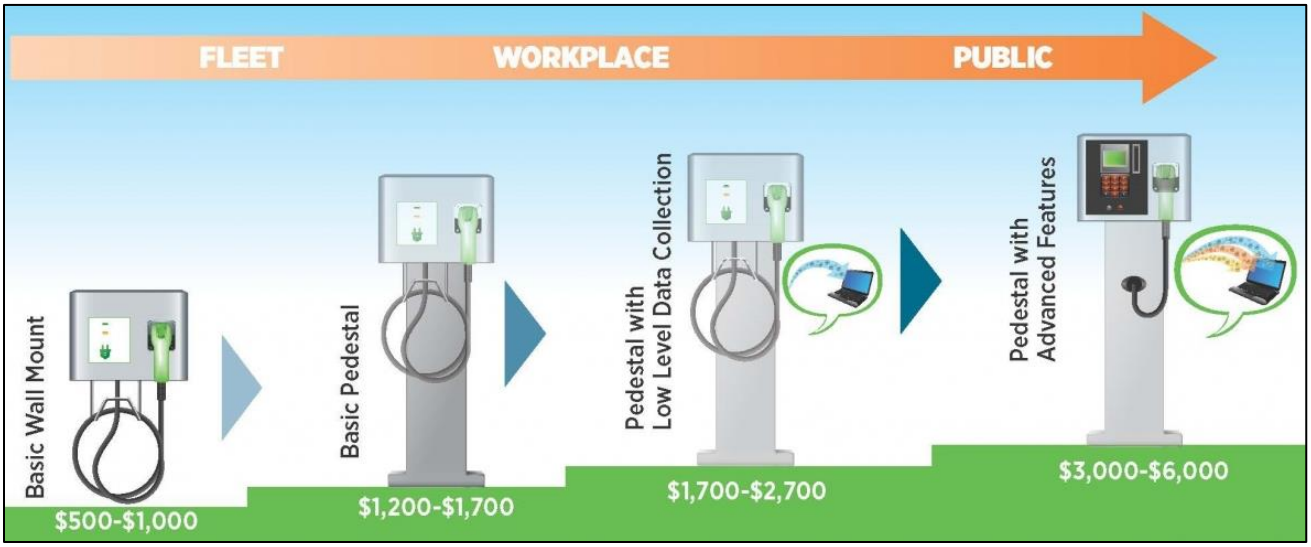


Image by Kristina Rivenbark. From: "Workplace Charging Equipment Costs." US Department of Energy. <https://energy.gov/eere/vehicles/workplace-charging-equipment-costs>.

Conclusion

The City of Aspen created and published this EV Readiness Plan to ensure that Aspen's transition into the next five years of electric vehicles is well thought out and deliberately planned. It is also our hope that this plan and the information contained within it will be useful to a wide variety of community members, from early adopters, to those who are simply curious about EVs.

Staff intends to move forward with implementing the strategies included in this plan, and adapt programming both to the needs of the community and to changes in the rapidly expanding field of electric vehicles.

Charging at the Middle School, overlooking Highlands. Photo by Laura Armstrong

Appendices

Appendix 1: Implementation Plans

The following tables break down each of the nine Strategies to Promote EV Readiness in Aspen (p. 13-14) into the list of tasks that will be required, as well as the timeline, partners, responsible parties, and budget. These implementation plans are planning documents for the members of the Electric Vehicle Readiness Team responsible for each item.

Strategy 1	**Electric Vehicle Supply Equipment (EVSE) Installation and Expansion:** Determine goals and vision for EVSE growth in Aspen. Encourage and support charging station installation.	
Tasks	Create phased plan for new installs.	Begin 1/17
	Identify types of chargers needed and specs: level 1, 2, or 3, price, amps, connectivity to an app, etc.	Begin 1/17
	Identify grants, apply for grants	Begin 1/17
	Review current chargers installed at hotels in Aspen	Begin 1/17
	Identify approach to on-street charging	Begin 1/17
	Create budget	Begin 1/17
	Partner with hotels to encourage shared EV parking programs	06/2017
	Streamline permitting process. Communicate permitting process. Install info.	Begin 8/17
Completion date	Plan in detail by 5/17. Streamline permitting process by 6/18.	
Partners	Work with the EV team, RFTA, City Council, CORE, CLEER, businesses, Utilities	
Responsible Parties	Mitch Osur and EV Team	
Budget	City will pay for public installations. Businesses pay for private. Public/commercial Level 2 chargers cost: $3,000- $7,000. Level 3 chargers cost: $20,000-$40,000. Previous City of Aspen installations have varied from $7,000-$30,000.	
Considerations?	The effect on non EV drivers, the cost of electricity, peak vs off-peak charging, partnering with Community Development to understand parking requirements for new development, EV parking incentives.	

Strategy 2	**Group Purchase Program:** Significantly reduce electric vehicle prices for a limited time. Expand EVs presence in the Roaring Fork Valley. A 2017 group purchase is being spearheaded by Garfield Clean Energy, in partnership with jurisdictions throughout the Roaring Fork Valley.	
Tasks	Participate in Regional Planning Team: offer feedback on RFP and program strategy.	11/2016-08/2017
	Evaluate feasibility of offering a co-buy opportunity for other efficiency items.	01/2017
	Plan outreach and advertising to Aspen community: earned advertising, communication with employers.	02/2017-08/2017
	Educational/informational sessions for public before and after group buy, such as “A day in the life of an EV driver.”	02/2017-08/2017
	Ongoing communication and tracking of those Aspen residents who buy EVs.	04/2017- on
Completion date	Group buy complete by end of June, 2017. Outreach complete by August, 2017.	
Partners	Garfield Clean Energy, CLEER, CORE, Eagle County, Walking Mountains, Glenwood Springs, Eagle/Vail, Pitkin County.	
Responsible Parties	Laura Armstrong is the City of Aspen representative for the group purchase Regional Planning Team. Project led by Garfield Clean Energy and CLEER.	
Budget	Paid advertising: $750 Canary	
Considerations?	Coordinate and cross promote with ride and drive events.	

Strategy 3	**Ride and Drive Events**: Host electric vehicle ride and drive events in Aspen. Engage local dealerships.	
Tasks	Establish dates: one event before a group purchase program is offered. Potentially a second event in the summer of 2017.	Begin 01/2017
	Identify partners	01/2017
	Create commitment form for dealerships	01/2017
	Secure location	01/2017
	Contact dealerships, confirm commitments: Mountain Chevy, Glenwood Springs Ford, Audi Glenwood Springs, Grand Junction in Nissan, Tesla	1/2017
	Create promotional/informational materials. Flyer, paper ads, press release, social media posts, state and federal incentives handouts, prize drawings	02/2017
	Advertise through local nonprofits, businesses, City lists, paid advertising. Announcements at Green Team meetings.	02/2017
	Day-of coordination, food, email collection	03/2017
	Post event surveys, follow up, measures of success	03/2017
Completion date	03/2017, potential second event in summer 2017	
Partners	Local dealerships, CORE, CLEER	
Responsible Parties	Canary Initiative: Laura Armstrong, all EV Team	
Budget	Paid advertising: $4000	
Considerations?	Research liability considerations for the City of Aspen	

Strategy 4	**City of Aspen (CoA) Internal EV Readiness:** Engage City of Aspen staff in education and hands-on trials of electric vehicles. Analyze the City of Aspen's fleet for future EV integration and buildings for future charging station installations. Establish procedures for applying for grants.	
Tasks	Staff Outreach and Education: All-city email, City Source postings, encourage driving Leaf, Lunch and Learn, promote group buy.	11/2016-12/2017
	Evaluate CoA fleet for EV integration: • Work with leadership to understand EVs and incorporate them into vehicle replacement schedule. • Research exemplary fleet replacement policies from other cities and organizations. • Determine number of vehicles that could be replaced by EVs and resulting saving in $ and GHG. • Comparison of conventional vehicles to EVs: total cost of operation (acquisition + life fuel +life maintenance- salvage) • Work with departments to incorporate fleet EVs into GOMs	January of each year for fall fleet purchases
	Create plan to integrate EVs over time, including applying for grants	Begin 3/2017
	Evaluate CoA facilities for EVSE and electric capacity	Begin 3/2017- on
	Develop relationships with granting agencies	Begin 5/2017
	Work with utilities on charging station locations, potential use of solar, impacts to peak demand	Begin 6/2017
Completion date	Plans and analysis complete by 6/2017. Most work ongoing 2017-2019	
Partners	City of Aspen – Streets Department, Car to Go, Capital Asset Department, Engineering Department, and Community Development Department, Utilities (including HCE)	
Responsible Parties	Canary staff – Ashley Perl and Laura Armstrong	
Budget	$27,000/electric vehicle (covered in fleet replacement budget), $500 for outreach, $2000/year for EVSE maintenance	

Strategy 5	**Collaborate with other local governments:** electric vehicle expansion will require "electrified corridors" that enable drivers to charge travel beyond normal commuting range.	
Tasks	Organize information to share with other municipalities.	Begin 1/2017
	Contact governments to establish who the point person is for each municipality. Work with CORE to see about Green Teams being involved.	Begin 3/2017
	If feasible, set up meetings with point person to go over the plan and goals moving forward.	3-4/2017
	Valley-wide EV meeting, in-person, before group buy gets underway.	4/2017
	As updates happen, notify the point person at each municipality.	2017- on
	Consider potential collaborations—partner on infrastructure installation, group buy, ride and drive events?	ongoing
Completion date	This will be an ongoing action as we want to build and retain relationships with other municipalities in the valley for EV information sharing and collaborations.	
Partners	CORE, CLEER, Pitkin, Garfield, Eagle counties, Towns of Snowmass, Basalt, Carbondale, Glenwood Springs, Leadville	
Responsible Parties	EV team, all other jurisdictions	
Budget	Printing materials in house, staff time.	

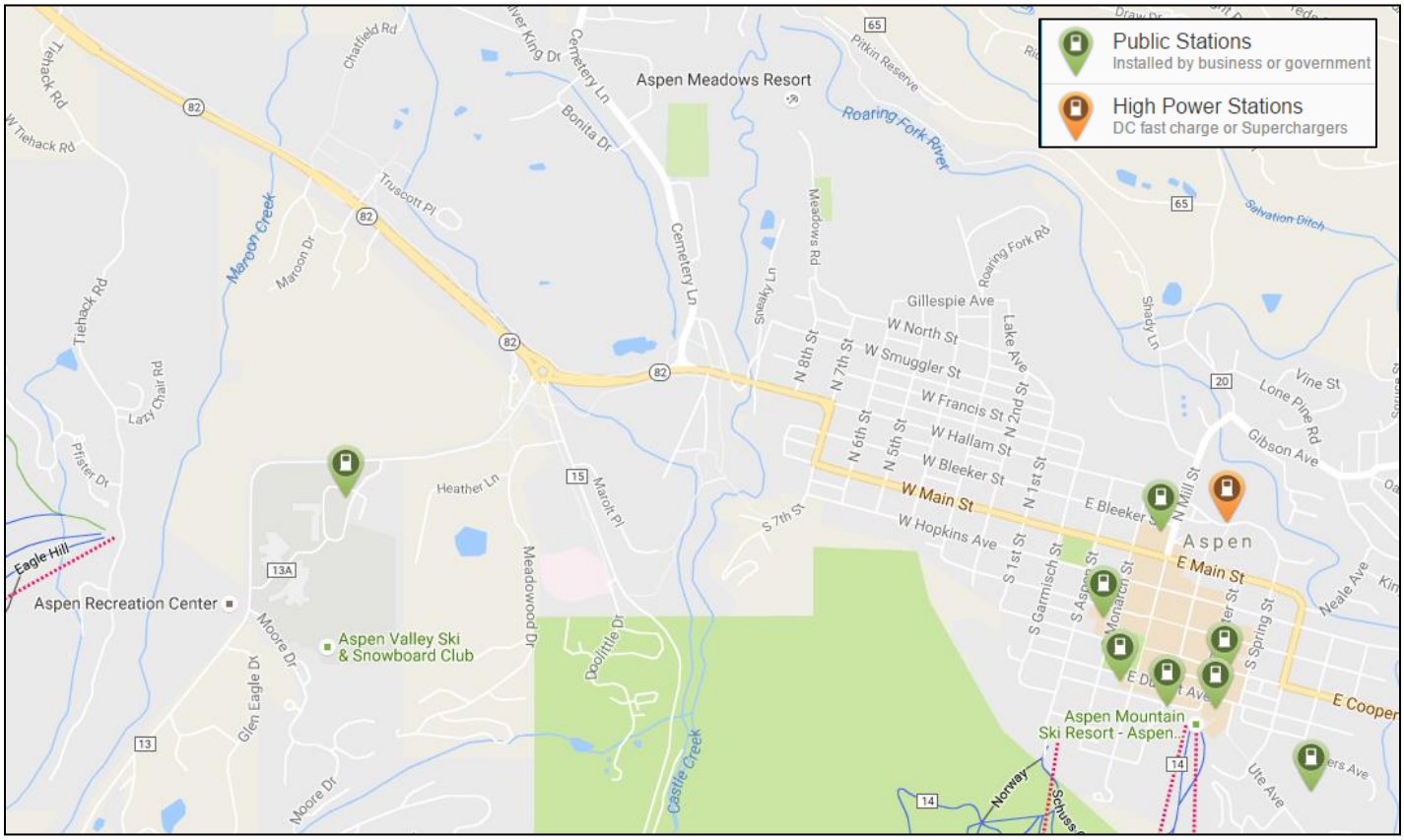
Strategy 6	**EV Parking Policies:** Ensure that City of Aspen parking policies and prices are fair, transparent, and in alignment with city vision that driving single occupancy vehicles is discouraged, but early adopters of clean fuels should be rewarded.	
Tasks	Seek Council feedback on parking: residential and garage only? On-street?	1/17/2017
	Create a formal plan and policies for parking in the core, the residential areas and parking garage for hybrid and all types of electric vehicles.	3/2017
	Determine pricing policies	3/2017
	Create a marketing plan	3/2017
	Establish date of policy implementation and sunset date for expiration/reconsideration	3/2017
	Coordinate potential new loads on grid with utility (grid analysis of planned EV parking)	3/2017
	Determine enforcement for gas-powered vehicles parking in EV-only spaces and offer training and resources to enforcement staff	3/2017
Completion date	Decisions completed by 03/2017, implemented in the community by 06/2017	
Partners	Mitch Osur, Lynn Rumbaugh, Ashley Perl, City Management, City Council	
Responsible Parties	Mitch Osur and Ashley Perl will put the plan together and look for support from stakeholders	
Budget	Staff time	
Considerations?	How many electric vehicles will we have in town by 2018, review NEVs, ask Council if goal is to drive EV parking to residential and parking garage only or to include on-street parking.	

Strategy 7	**Support Automatic Metering Infrastructure (AMI) and encourage off-peak charging:** Evaluate how off-peak, demand pricing, and AMI could work in concert with each other.	
Tasks	Support Utility Department in pursuing AMI	2017-2018
	Research industry standards for incorporating EV charging onto grid	2018
	Analyze peak power use in the system and identify best times for EV charging	2018
	Research benefits of AMI for reducing peak, develop recommendation for use	2018
	Discuss AMI and the interest in dynamic pricing for EVs with Holy Cross Energy	Mid 2017
Completion date	Dependent upon if and when AMI is adopted	
Partners	Canary, Utilities, MEAN	
Responsible Parties	Margaret Medellin, Ashley Perl, Dave Hornbacher	
Budget	Staff time, AMI for Aspen Electric is estimated at $1,200,000 for 2018-2020.[xxii]	
Considerations?	May wish to partner with MEAN and/or other power experts to develop a strategy for AMI use. Reach out to RMI, Xcel, other knowledgeable resources.	

Strategy 8	**Assess need for and conduct grid impact analysis:** What will impact of electric vehicles be on electricity grids? An analysis will take clustering and impact on specific transformers into consideration.	
Tasks	Monitor the success of EV expansion in the Roaring Fork Valley through events like the Ride and Drives and Group Purchase Program (Strategies 2 and 3, respectively) to determine when a grid impact analysis should occur.	1/2017-8/2017
	Research industry standards for grid analysis and preparedness	Begin 8/2017
	Determine impact to grids of EV charging	Begin 8/2017
	Identify areas with limited capacity	Begin 8/2017
Completion date	Determine if and when grid study will be necessary by Fall 2017.	
Partners	Canary, Utilities	
Responsible Parties	Margaret Medellin, Ashley Perl, Dave Hornbacher	
Budget	Staff time in 2017, grid impact study budget TBD.	

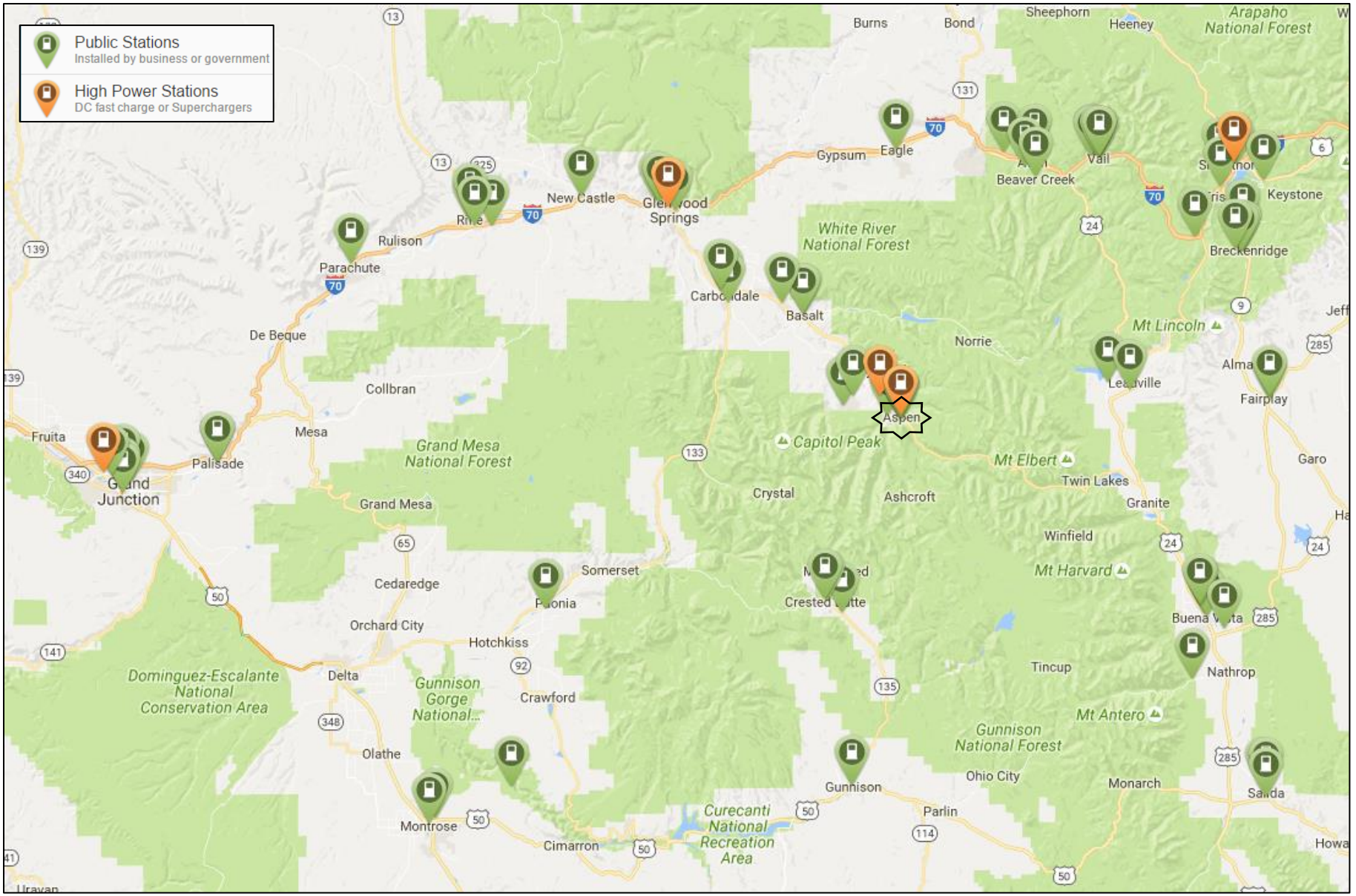
Strategy 9	**Understand and streamline EV ownership in multi-family housing:** support multi-family housing complexes in electric vehicle policy creation, reducing barriers for residents to purchase electric vehicles, supporting management in preparedness.	
Tasks	Identify a representative group of multi-family complexes and collect current rules related to EV charging and parking. In particular, work with APCHA.	Begin 6/2017
	Research national best practices for charging at multi-family housing	Begin 6/2017
	Create model policy language	Begin 6/2017
	Work with multi-family complexes to adopt policy language	Begin 6/2017
	Educate homeowners and renters about new or existing rules or policies, off-peak charging	Begin 6/2017
	Have messaging available during test drive and group-buy event for multi-family residents	04/2017
Completion date	7/2018	
Partners	APCHA, HOA boards	
Responsible Parties	EV Team – Margaret Medellin, Jane Wilch and Laura Armstrong	
Budget	Staff time, $2000 outreach and education	
Considerations	This will be a long-term, slow process to first understand what exists and then work with individual HOA's to implement changes.	

Appendix 2: Map of Current EVSE Locations in Aspen[xxiii]



Location	Chargers	Availability
Rio Grande Parking Plaza	Two Level 2 plugs, *J1772* 1 Level 3 DCFC- One CHAdeMO plug and one SAE Combo plug, additional CHAdeMO adaptor.	Public, 24/7, free to charge, parking rates apply
Pitkin County Public Works	Four Level 2 plugs, *J1772* 1 Level 3 DCFC- One CHAdeMO plug and one SAE Combo plug	Public, 24/7, free
Middle School	Two Level 2 plugs, *J1772*	Public, 24/7, free
Hotel Jerome	Two Level 2 plugs, *Tesla* Two Level 2 plugs, *J1772*	Patrons
Limelight Hotel	One Level 2 plug, *Tesla* One Level 2 plug, *J1772*	Patrons
Mountain Chalet	All basement parking spots have Level 1 wall outlets on the ceiling above	Patrons
Residences at the Little Nell	One Level 2 plug, *Tesla* One Level 2 plug, *J1772*	Patrons
The Little Nell	One Level 2 plug, *Tesla* One Level 2 plug, *J1772*	Patrons
Aspen Square	Dryer Outlet	Patrons
The Gant	Two Level 2 plugs, *Tesla* One Level 2 plug, *J1772*	Patrons

Appendix 3: Map of Charging Corridors around Aspen[xxiv]



Public Electric Vehicle Charging Stations on the I-70 and Highway 82 Corridors: Denver to Aspen

Information was compiled in November, 2016 and is subject to change. For most the **most current information** and to **view a map**, please visit PlugShare.com or http://www.afdc.energy.gov/locator/stations/

1. **Silverthorne** Supercharger: 8 Tesla SuperChargers.
   Address: 309 Rainbow Dr., Silverthorne, CO 80498
   Phone: (877) 798-3752
   Hours: 24/7
   Description: I-70 exit 205. Located behind the Under Armor store at the Outlets at Silverthorne, north of I-70 and just north of Highway 6 in Silverthorne.
2. **Frisco**, Whole Foods: 2 Level 2 AC EV Plugs (J1772)
   Address: 261 Lusher Court Frisco, CO 80443
   Phone: (970) 668-9400
   Cost: ChargePoint fees apply.
   Description: I-70 exit 203. Two stations in Whole Foods parking lot. Need a ChargePoint Member Card or credit card to unlock.
3. **Copper Mountain Ski Resort**, Beeler Parking Lot: Level 2 AC EV Plug (J1772)
   Address: 930 Copper Rd. Copper Mountain, CO 80443
   Description: Free charging and free parking for EVs
4. **Vail**, Vail Transportation Center: 2 EV Plugs (J1772)
   Address: 368 S Frontage Rd E, Vail, CO, 81657
   Phone: (970) 479-2100
   Hours: Garage business hours
   Description: Exit 176. Three stations. P1 level (bottom level of the structure) at "T" there is one charging station. P1 level as it gets close to P2, "SS" in the parking garage. P3 level middle of the structure.
5. **Vail**, Lionshead Parking Structure: EV Plug (J1772)
   Address: 395 S Frontage Rd W, Vail, CO, 81657
   Hours: Garage business hours
   Description: I-70 exit 176. The charging station is located on level P1 of the parking structure at the southeast end.
6. **Avon**, Walking Mountains Science Center: 2 EV Plugs (J1772)
   a. Address: 318 Walking Mountains Lane, Avon, CO 81620
   b. Hours: 24/7
   c. Description: Two parking spots in public parking lot with free charging
7. **Edwards**, Edwards Station: 4 EV Plugs (J1772)
   a. Address: 434 Edwards Access Rd Edwards, CO 81632
   b. Phone: (970) 926-5380
   c. Hours: 24/7
   d. Description: $2/hour, open 24 hours. I-70 exit 163.
8. **Eagle**, Eagle County Building: 2 EV Plugs (J1772)
   a. Address: 500 Broadway, Eagle CO 81631
   b. Phone: (970) 328-8600
   c. Hours: 24/7

   d. Description: This convenient location in downtown Eagle provides easy access to downtown amenities such as restaurants, shops, and government services.
9. **Eagle**, Costco: EV Plug (J1772), Tesla HPWC (Model S)
   a. Address: 170 Cooley Mesa Rd, Eagle, Colorado, 81637
   b. Phone: (970) 328-7601
   c. Hours: Mon. - Fri.: 10 a.m. - 8:30 p.m.; Sat.: 9:30 a.m. - 6 p.m.; Sun.: 10 a.m. - 6 p.m.
   d. Description: Tesla Wall Connector and J1772 charging station is located in the Costco parking lot next to the tire center.
10. **Glenwood Springs**, Public Parking Garage: 2 EV Plugs (J1772)
   a. Address: 380 9th St Glenwood Springs, CO 81601
   b. Hours: 24/7
   c. Description: The parking garage is located on the southwest corner of 9th and Cooper right off of Grand Ave. Across the street from Sunlight Mtn. Ski and Bike Shop.
11. **Glenwood Springs** Supercharger: 6 Tesla SuperChargers
   a. Address: 125 Wulfsohn Road, Glenwood Springs, Colorado 81601
   b. Phone: (877) 798-3752
   c. Hours: 24/7/365
   d. Description: I-70 Exit 116. The Superchargers are located in the parking lot of the Residence Inn.
12. **Glenwood Springs**, Mountain Chevrolet: EV Plug (J1772)
   a. Address: 51359 Hwy 6, Glenwood Springs, CO 81601
   b. Phone: (877) 900-4566
   c. Description: Level 2. Partly solar powered. Open to the public. Free coffee for Volt Owners. Free coffee and a sales pitch for non-Volt owners.
13. **Glenwood Springs**, Ford: EV Plug (J1772)
   a. Address: 55 County Highway 181, Glenwood Springs, CO 81601
   b. Phone: (888) 476-3624
   c. Description: I-70 exit 114. One Level 2 near service bay doors. For Ford customers. Other users call ahead.
14. **Carbondale**, RFTA Carbondale BRT Station/Park-n-Ride: 2 EV Plugs (J1772)
   a. Address: 234 State Highway 133 Carbondale, CO 81623
   b. Phone: (970) 384-4968
   c. Hours: 24/7
   d. Description: Public Level 2, Dual, commercial charging station. FREE for transit riders.
15. **Carbondale**, Colorado Mountain College - Lappala Center: 2 EV Plugs (J1772)
   a. Address: 690 Colorado Ave, Carbondale, CO 81623
   b. Phone: (970) 963-2172
   c. Hours: 24/7
   d. Description: Two level 2 plugs. Free. Signed for two-hour limit. Near downtown shops, restaurants.
16. **Carbondale,** Carbondale Town Hall: 2 EV Plugs (J1772)
   a. Address: 511 Colorado Ave, Carbondale, CO, 81623
   b. Phone: (970) 963-9140
   c. Hours: 24/7
   d. Description: The charging station is located on 4th St, just north of the intersection with Colorado Ave, near the flag pole. 70 A outlet, 2-hour charging limit.
17. **Carbondale**, Third Street Center: 4 EV Plugs (J1772)
   a. Address: 520 S 3rd St, Carbondale, CO 81623

   b. Phone: (970) 963-3221
   c. Hours: 24/7
18. **Carbondale,** Roaring Fork High School: 2 EV Plugs (J1772)
   a. Address: 2270 CO-133, Carbondale, CO 81623
   b. Phone: (970) 384-5757
   c. Hours: 24/7
   d. Description: Two Level 2 charging stations in the main parking lot. Look for the yellow charging stations.
19. **Willits**, Whole Foods Market: EV Plug (J1772)
   a. Address: 340 Reed Street Basalt, CO 81621
20. **Basalt,** Town of Basalt: 2 EV Plugs (J1772)
   a. Address: Midland Spur between Two Rivers Rd and Midland
   b. Description: Two level 2, 30A each.
21. **Basalt**, Rocky Mountain Institute: 6 EV Plug (J1772)
   a. Address: 22832 Two rivers Road, Basalt, CO 81621
   b. Hours: 24/7
22. **Snowmass,** Snowmass Village Town Park Station: 2 EV Plugs (J1772)
   a. Address: 2835 Brush Creek Road Snowmass Village, CO 81615
   b. Phone: (970) 923-3777
   c. Description: Two Level 2 plugs. 30A each. Located near a shed on the west end of the parking lot. The parking lot is known by many names: Town Park Station, Rec Center lot, Rodeo Lot.
23. **Aspen,** Pitkin County Public Works: 4 EV Plugs, (DCFC and J1772)
   a. Address: 76 Service Center Rd, Aspen CO 81611, United States
   b. Hours: 24/7
   c. Description: Follow Public EV Charging sign. The stations are past the sign on the left. Also a Fast Charger with 50 kw output & Dual plugs SAE and CHAdeMO.
24. **Aspen,** Rio Grande Parking Plaza: 3 EV Plugs (DCFC and J1772),
   a. Address: 427 Rio Grande Pl Aspen, CO 81611
   b. Phone: (970) 920-5430
   c. Cost: $1.50/hr. paid parking, and free charging 3AM-6PM daily. Free parking and free charging 6PM-3AM daily.
   d. Hours: 24/7
   e. Description: One DC Fast Charger. CHAdeMO, SAE, and Tesla Adaptor. Two Level 2 70-A chargers. From Main Street, turn north on Mill Street and travel one block. Turn east on Rio Grande Place, on the south side of the street.

Please note that EV charging is available at a number of hotels and other private locations. Please check PlugShare.com or Chargepoint.com for more information

Appendix 4: Future EVSE Siting

Based on the criteria[xxv] outlined below, the City of Aspen Electric Vehicle Readiness Team generated a list of priority locations for future electric vehicle charging stations. The locations were then evaluated with staff from the City of Aspen utility department and the sites with the highest feasibility remained high on the list. Locations with electricity provided by 100% renewably sourced Aspen Electric rose to the top because of the zero-carbon emissions associated with that power. On-street charging locations in the downtown core were not evaluated, as they would be chosen based upon electrical capacity and parking demand. Before installation is pursued, site viability and project costs will have to be more formally investigated. In the table below, **AE is Aspen Electric** and **HCE is Holy Cross Energy**.

- Willing owner/operator or host
- Americans with Disabilities Act (ADA) accessibility compliance potential
- Close proximity to suitable electrical point of connection
- Minimal trenching required through paved areas
- Site Safety
- Highly visible
- Within 1/2 mile of at least 10 basic services (as per LEED 2009)[xxvi]
- Within 1/2 mile of connection points to other modes of transportation
- Suitable for block of multiple chargers
- Low risk of public backlash from converting significant numbers of high demand conventional parking spaces
- Well-lit without the addition of dedicated lighting
- Would support workplace and/or fleet charging in addition to public charging
- Suitable for use by residents of a multi-family housing development
- Control/ownership of site unlikely to change in next 10 years

Ranking:	Site:	Comments:
highest score	New City Hall (AE)	This site would support more EVs in the City fleet. Installation costs could be built into the original plans of the building. Ranks high for all levels of charging.
	Armory (AE)	Level 2 or Level 3 charging (after New City Hall is constructed)
	Yellow Brick (AE)	Levels 1 and 2 for charging during the workday.
	Red Brick (AE)	Levels 1 and 2 for charging during the workday.
	Burlingame (AE)	Level 1 and 2 charging for residents and visitors.
	Paepcke Park (AE)	Level 2 for on-street parking (especially in concert with road work or construction)
	ARC (AE)	Levels 2 and 3 for daytime use.
	Community Bank (AE)	Levels 1, 2, and 3 (especially in concert with road work or construction)
	Truscott Parking Lot (HCE)	Advisable for Level 2 charging, followed by Level 1 for nearby residents.
	Airport (HCE)	Level 1 and 2 use for longer term parking, Level 3 for electrified taxis, hotel vehicles, or other mobility on demand services.
	Hospital (HCE)	Level 1 and 2 charging (Level 1 outlets currently available)
	ABC- Near Roxy's (HCE)	Level 1 and 2 to support nearby residents. A Level 3 station near the gas station could prove beneficial, especially if rental car agencies offer EV options.
	Intercept Lot (HCE)	Levels 1, 2, and 3. A level 3 station would ease range anxiety, though it might be a disincentive to dropping a car and taking a bus into Aspen or Snowmass. One dual-cord Level 2 station is due to be installed 1/2017.
	High School (HCE)	Levels 1 and 2 for charging during the school day. A dual charge level 2 currently exists in the Middle School parking lot.
	Buttermilk P&R (HCE)	Levels 1 and 2 for charging during the workday, close access to bus routes.
	Highlands (HCE)	Levels 1 and 2 for charging during the workday or for skier parking, close access to bus routes.
moderate score	Music Tent (HCE)	Levels 2 and 3 for guests, Level 1 charging for longer term visitors.
	Power House (HCE)	Levels 1 and 2 for charging during the workday, errands in town.

Electric Vehicle Comparisons

June 15, 2016

Chart by CLEER: Clean Energy Economy for the Region / (970) 704-9200 / www.CleanEnergyEconomy.net / P.O. Box 428, Carbondale, Colorado 81623

Sources: U.S. EPA, Plug In America

Manufacturer				Specifications				Price and tax credits				Range		Charge time, hours			Performance						Comparison to similar gasoline model				
Name	Model	Photo	Built	Type	Seating	EV Type	Battery size (kWh)	Price (before credits)	State tax credit	Federal tax credit	Price after credits	Electric range (EPA est)	Total range elec + gas	Level 1 (120v)	Level 2 (240v)	Level 3 (400+v)	MPGe / (MPG gas in hybrid mode)	Top speed (mph)	Horse power	Torque (lb-ft)	Acceleration (0-60 mph)	Weight	Crash Rating	Comp. gasoline vehicle	Comp. vehicle base price	Comp. vehicle est. MPG gasoline	Est. real-world MPGe for EV	Est. years to pay back purchase price *
Tesla Motors	Model S		USA	4-dr sedan	5	BEV	60	$66,000	$6,000	$7,500	**$52,500**	208 mi	208	42	6.5	1	95 MPGe	130	259	387	5.9	4,647	5 star	Model A6	$45,000	28	95	7.9
Tesla Motors	Model S Performance		USA	4-dr sedan	5	BEV	90	$89,500	$6,000	$7,500	**$76,000**	265 mi	265	60	8.9	~1 hr	89 MPGe	130	259	485	4.2	4,766	5 star	Model S6	$75,000	22	89	0.8
Tesla Motors	Model X		USA	4-dr SUV	7	BEV	75	$83,000	$6,000	$7,500	**$69,500**	237	237	60	8.9	~1 hr	89 MPGe	155	362	443	6.0	5,271	5 star	Model Q7	$54,800	22	89	11.5
Nissan	Leaf		USA	4-dr hatch	4	BEV	24	$29,010	$5,162	$7,500	**$16,348**	84 mi	84 mi	13	3.9	0.5	114 MPGe	89	110	210	9.7	3,385	4 star	Sentra	$11,999	38	99	7.2
Nissan	Leaf		USA	4-dr hatch	5	BEV	30	$34,200	$6,000	$7,500	**$20,700**	107 mi	107 mi	16	4.9	0.75	114 MPGe	89	110	210	9.7	3,385	4 star	Sentra	$11,999	38	99	14.3
Hyundai	Sonata		Japan	4-dr sedan	5	PHEV	10	$35,400	$3,007	$5,335	**$27,059**	27 mi	600 mi	7	3.3	NA	60 MPGe (40mpg)	130	202	291	9.0	3,497	5 star	Sonata	$21,750	30	60	8.5
Ford	Focus Electric		USA	5-dr hatch	5	BEV	23	$35,200	$6,000	$7,500	**$21,700**	76 mi	76	20	4	NA	110 MPGe	84	140	181	9.5	3,691	5 star	Focus	$18,000	32	105	4.5
Mitsubishi	i-MiEV		Japan	4-dr hatch	4	BEV	16	$22,995	$2,479	$7,500	**$13,016**	65 mi	65	22.5	7	30min 80%	112 MPGe	80	66	133	9.0	3,329	4 star	Mirage	$12,995	40	112	0.0
Ford	C-Max Energi		USA	4-dr hatch	5	PHEV	7.6	$32,950	$2,200	$4,007	**$26,743**	21 mi	21 + 620	7	2.5	NA	88 MPGe (38 mpg)	90	195	129	8.5	3,900	4 star	CMAX Hybrid EV	$27,000	40	55	instant
Ford	Fusion Energi SE		USA	4-dr sedan	5	PHEV	7.6	$38,700	$2,637	$4,007	**$32,056**	21 mi	21 + 620	7	2.5	NA	88 MPGe (38 mpg)	85	195	117	8.0	3,913	5 star	Fusion (4 cyl)	$23,000	26	55	11.9
Chevrolet	Volt		USA	4-dr hatch	4	PHEV	18.4	$33,170	$4,723	$7,500	**$20,947**	53 mi	53 + 367	10	4	NA	98 MPGe (40 mpg)	100	149	273	9.0	3,781	5 star	Cruze	$18,000	27	66	3.6
Chevrolet	Bolt		USA	4-dr hatch	5	BEV	60	$37,500	$6,000	$7,500	**$24,000**	200 mi	200 mi	42	8.5	~1 hr	100 MPGe	100	200	266	6.9	3,580	not yet rated	Cruze	$18,000	27	66	7.3
Chrysler	Pacifica		USA	Minivan	7	PHEV	16	$37,995	$4,879	$7,500	**$25,616**	30 mi	30 + 456	11	2.6	NA	80 MPGe (24 mpg)	100	287	262	8.5	4,330	5 star	Town and Country	$27,995	24	40	instant
Toyota	Prius-Plug in		Japan	4-dr hatch	5	PHEV	4.4	$32,500	$1,320	$2,500	**$28,680**	11 mi	11 + 540	3	1.5	NA	95 MPGe (50 mpg)	108	98	153	10.9	3,165	4 star	Prius	$25,000	50	60	29.4
BMW	i3 (REX available)		Germany	4-dr hatch	5	BEV (REX option)	33	$44,595	$6,000	$7,500	**$31,095**	114 mi	114 (200 REX)	15	4.5	40 min 80%	138 MPGe (111 mpg)	93	170	184	7.2	2,961	not yet rated	BMW 2 or 3 series	$32,000	21	124	instant
Cadillac	ELR		USA	4-dr hatch	4	PHEV	17	$65,000	$6,000	$7,500	**$51,500**	40 mi	35 + 300	15	5	NA	85MPGe (35 mpg)	106	181	295	6.4	4,065	not yet rated	Lexus RC350	$47,875	22	85	2.9
Porsche	Panamera S E-hybrid		Germany	4-dr hatch	4	PHEV	8.8	$96,100	$6,000	$4,585	**$85,515**	21 mi	21 +480	3.9	2.5	NA	50 MPGe (25 mpg)	167	416	435	5.2	4,600	not yet rated	Porsche Panamera S	$82,800	22	50	2.8
Porsche	Cayenne		Germany	4-dr hatch	5	PHEV	10.8	$77,395	$6,000	$5,335	**$66,060**	14 mi	25 + 590	5	3	NA	47 MPGe (27 mpg)	151	416	428	5.6	5,200	not yet rated	Porsche Cayenne	$74,800	21	47	instant
BMW	i8		Germany	2-dr sports	2	PHEV	7.1	$136,500	$6,000	$3,793	**$126,707**	15 mi	15 + 315	7	2.5	NA	76 MPGe (32 mpg)	155	357	420	4.5	3,455	not yet rated	Audi R8	$115,900	16	76	3.9
Audi	A3 Sportback E-tron		Germany	4-dr hatch	5	PHEV	8.8	$37,900	$2,939	$4,500	**$30,461**	31 mi	31 + 549	7	2.25	NA	98 MPGe (42 mpg)	138	204	243	7.5	3,616	not yet rated	Audi A3	$34,095	27	98	instant
Mercedes	S550		Germany	4-door	5	PHEV	8.7	$95,650	$6,000	$4,500	**$85,150**	20 mi	20 + 430	7	2.25	NA	58 MPGe (26 mpg)	130	436	479	5.2	4,718	5-star	S550	$95,650	24	58	instant
Volvo	XT90		Sweden	4 door SUV	7	PHEV	9.2	$68,100	$6,000	$4,500	**$57,600**	25	25 +	7	2.25	NA	54 MPGe (25 mpg)	130	400	472	5.9	5,059	5-star	Audi Q7	$54,800	22	54	1.8

BEV= Battery Electric Vehicle

PHEV = Plug-in Hybrid Electric Vehicle

MPGe = Miles per Gallon Equivalent; 1 gallon = 33.7 kilowatt

* Payback is w/tax credits, 15,000 miles per year, gas @ $2.50

Appendix 6: Tax Credits

The subsequent figures were generated by Refuel Colorado and relate to light-duty passenger plug-in electric vehicles. Additional tax credits (in increasing amounts) exist for light, medium, and heavy duty trucks.[xxviii] Please consult a tax professional, the Internal Revenue Service and the Colorado Department of Revenue for more details.

For Purchasing an EV [xxix]

Federal tax credit:	**$7,500**	**The Federal tax credit is based on the battery capacity of the electric vehicle (EV). For an EV with a battery capacity of 16 kWh or greater, the maximum value of Federal tax credit is $7,500. The Federal tax credit can only be refunded up to your Federal tax liability. Therefore, if you only owe $5,000 in Federal taxes, even if your vehicle could qualify for a $7,500 Federal tax credit, you would only receive credit for $5,000.**
Colorado tax credit:	$5,000	Received at time of purchase, in essence functioning as a point of sale rebate.[xxx]
Total tax credits available:	$12,500	The Federal tax credit, plus the Colorado state tax credit.

For Leasing an EV[xxxi]

Federal tax credit:	**Depends**	**In many cases, the leasing company will collect the Federal tax credit and discount your vehicle lease accordingly. If this is the case, then you are not entitled to an additional Federal tax credit.**
Colorado tax credit:	$5,000	Convert the battery capacity to a percentage (e.g. 24 kWh = 24%). Then multiply that percentage by the "actual cost" of the vehicle. Your Colorado state tax credit is the lesser of that result and $6,000.
Total tax credits available:	$5,000+	The Federal tax credit (which is $0 in this example), plus the Colorado state tax credit.

For Purchasing and Installing EVSE[xxxii]

Colorado grants (no federal grants available as of 01/2017)	**Up to 80% of station cost, up to certain maximums .**	**As part of the Charge Ahead Colorado grants, the Colorado Energy Office will pay 80% of EVSE cost, up to the following maximums:** ▪ **Level 2, Single Port Station: $3,260** ▪ **Level 2, Dual Port Station: $6,260** ▪ **Level 3, Single Connection Standard Station: $13,000** ▪ **Level 3, Multiple Connection Standard Station: $16,000**

Additional Information

For more information on tax credits, incentives, grants, fueling station locators and FAQ's for Alternative Fuel Vehicles (AFVs) in Colorado, please go to: RefuelColorado.com.

For more information about the Charge Ahead Colorado EVSE grants, visit: http://cleanairfleets.org/programs/charge-ahead-colorado.

Appendix 7: Multi-Unit Dwelling Resources

The following guides were created by the California Plug-In Electric Vehicle Collaborative, and while they contain some California-specific material, much of the information and the suggestions are best practices in all states.

Resources for Multi-Unit Managers[xxxiii]

Plug-in Electric Vehicle Charging Guide for Property Owners, Managers and Homeowner Associations of Multi-unit Dwellings

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

Plug-in electric vehicles powered by electricity have arrived! More than 15 models are currently in show-rooms and more are on the way. As a multi-unit dwelling owner, manager or member of a homeowners association board, you may have received resident requests for charging stations or seen a charging cord plugged into an outlet in your garage.

Property Benefits

- Charging stations will give the property a positive "green" image, which can be used for marketing.
- Charging stations can help make the property a leader in sustainable practices.
- As the plug-in electric vehicle (PEV) market grows, the number of requests for charging will undoubtedly grow.
- Charging stations can provide Leadership in Energy & Environmental Design (LEED) points for the property.

More than 85 percent of all PEV charging occurs at home because it is a convenient and cost-effective way to fuel a PEV. But, PEVs can present some unique challenges for multi-unit dwellings (MuDs).

Getting Started

Start by learning about the many considerations and charging options for MuDs:

- **Demand.** A resident survey is a good way to find out how many residents already have PEVs or plan to buy them. Find a link to a sample survey in the Additional Resources section.
- **Logistics.** Whether parking is assigned, deeded or first-come, first-served, each option has its own set of considerations.
- **Electrical capacity.** Do resident units have their own electric meters, are they accessible from the parking area and is there spare electrical capacity? Do common area meters, such as those for security lighting or laundry rooms, have spare electrical capacity? Are new service meters needed for the chargers?
- **Charging choices.** There are several different levels of charging and dozens of brands of equipment, ranging from simple wall boxes to communicating units with networking capability. The units and features you choose will depend on your specific property's requirements and will determine associated costs.
- **Cost recovery.** Properties seeking to recover costs for residential charging installation and operation can either assign chargers to individual drivers or use charging equipment with a payment system.
- **Incentives.** Local and regional incentives for charging station installations may be available. See the Additional Resources section to search for incentives.

Guidelines for Multi-unit Dwellings
Plug-in Electric Vehicle Charging Infrastructure Guidelines for Multi-unit Dwellings is a comprehensive guide for property owners, managers and HOAs. It provides details on all the topics discussed here. See Additional Resources.

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

Implementation

You've done a resident survey and found strong interest in these vehicles and become familiar with some of the options. How do you implement the plan? Figure 1 summarizes the steps you may take to install charging at your property.

Legal Obligations

California Senate Bill 880 sets out the rights and responsibilities of common-interest developments in providing charging for residents. Property managers cannot prohibit the installation of charging, but they can set requirements and conditions.

California Assembly Bill 1092 requires the California Building Standards Code to include mandatory standards for the installation of future electric vehicle charging infrastructure in multi-unit dwellings and nonresidential developments. See Additional Resources.

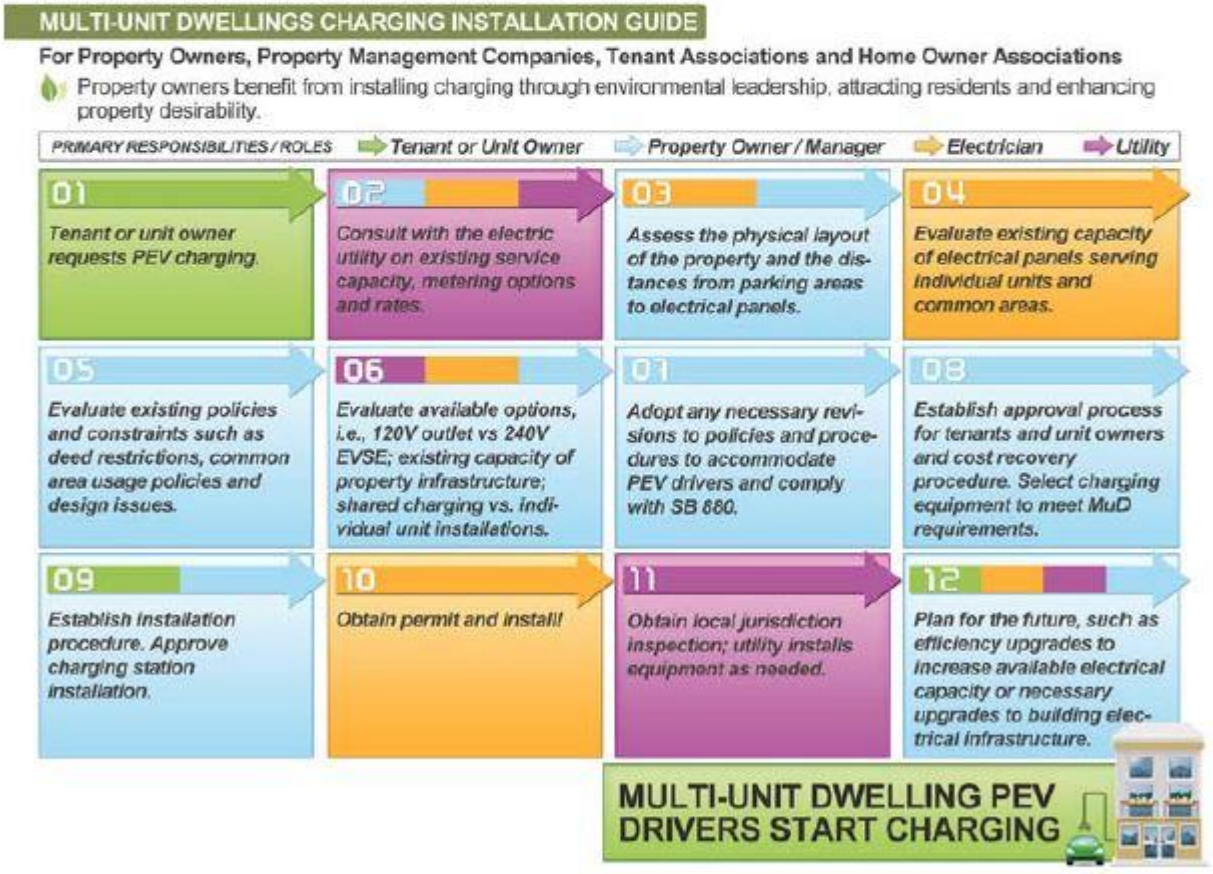


Figure 1. Typical PEV charging station installation process flow in MuDs.
Source: California Plug-In Electric Vehicle Collaborative. Original source materials developed by San Diego Gas & Electric and Sacramento Municipal Utility District for the Electric Power Research Institute.

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

Think Outside the Box

Installing charging in MuDs can be challenging. No two properties are alike and many have constraints on electrical capacity or parking spaces. Since not every property will be able to accommodate charging, here are some alternative solutions.

- **Shared charging.** Charging stations in mixed-use garages can be used by businesses during the day and residents at night.
- **Electrical capacity.** You could employ energy-efficiency measures to free up electrical capacity.
- **Low-level charging.** Regular 110-volt outlets may serve some residents' needs.
- **Workplace charging.** Residents may have the option to charge their cars at work.
- **Third-party vendors.** You could contract with a third party, which would make all or most of the capital investment, own the charging units and bill the driver directly via a subscription.

Millennium Tower in San Francisco installed PEV chargers for their tenants. See Appendix D in the *Plug-in Electric Vehicle Charging Infrastructure Guidelines for Multi-unit Dwellings* to read this and other case studies for MuD charger installations.

November 2013 www.pevcollaborative.org

Resources for Multi-Unit Residents[xxxiv]

Plug-in Electric Vehicle Charging Guide for Residents of Multi-unit Dwellings

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

So you've been eyeing the new models of plug-in electric vehicles and thinking about buying or leasing one. You like the idea of saving money on gasoline and doing your part for clean air. But, as a renter or condo owner, you wonder if you'll be able to charge your new car at home and what you'll need to do to convince your property manager to install a charging station.

Property Benefits

Here are some points you might use to persuade managers to install charging.

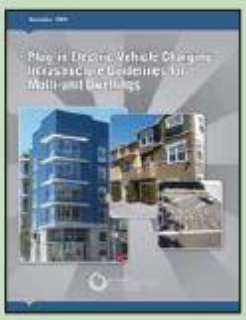
- Charging stations will give the property a positive "green" image, which can be used for marketing.
- Charging stations can help make the property a leader in sustainable practices.
- As the PEV market grows, the number of requests for charging will undoubtedly grow.
- Charging stations can provide Leadership in Energy & Environmental Design (LEED) points for the property.

Do Your Homework

Start by educating yourself and helping your property manager understand the options.

- **Demand.** A resident survey is a good way to find out how many residents already have PEVs or plan to buy them. Find a link to a sample survey in the Additional Resources section.
- **Decision-making process.** How do you obtain permission to install a charger? By law, condo property managers cannot prohibit the installation of charging, but they can set requirements and conditions.
- **Logistics.** Whether parking is assigned, deeded or first-come, first-served, each option has its own set of considerations.
- **Electrical capacity.** Do resident units have their own electric meters, are they accessible from the parking area and is there spare electrical capacity? Do common area meters, such as those for security lighting or laundry rooms, have spare electrical capacity? Are new service meters needed for the chargers?

Talk to your property owner, manager or homeowners' association (HOA) before you buy or lease a plug-in electric vehicle (PEV) to get them up to speed on installing a PEV charger. Talk to your neighbors, too.



Guidelines for Multi-unit Dwellings

Plug-in Electric Vehicle Charging Infrastructure Guidelines for Multi-unit Dwellings is a comprehensive guide for property owners, managers and HOAs. It provides details on all the topics discussed here. See Additional Resources.

- **Charging choices.** There are different levels of charging and dozens of brands of equipment. The units and features you choose will depend on your specific property's requirements and will determine associated costs.
- **Cost recovery.** Make clear that you are willing to cover or share the cost of the charger installation – as well as the ongoing cost of electricity.
- **Incentives.** Some local and regional incentives for charging station installations may be available to individuals or businesses. See the Additional Resources section to search for incentives.
- **Neighbors.** Find other PEV advocates among your neighbors to help you present your request and to demonstrate the level of support within the community. Address neighbors' concerns.

Overcome Concerns

Prepare responses to concerns that may be raised. Table 1 lists some examples.

Concern	Responses
No one will use it.	PEV sales are growing and so is the demand for home charging. We can survey tenants to see how many currently own or hope to buy PEVs. We can start small with one or two chargers and plan to expand as needed.
It's too expensive.	There are many options for chargers and charging locations that can minimize cost. Incentives or grants may also be available.
No one else is doing it, so why should we?	With the PEV market continuing to grow, property owners across the country are responding to residents' requests.
How will this affect our electricity costs?	Some utilities offer special residential rates for PEV charging. Residents could be encouraged to charge during off-peak hours if the chargers are connected to a community meter. We could charge PEV drivers a flat rate or for their electricity usage (especially if using wall outlets). Depending on the building architecture, the charging station may be connected directly to the resident's electric meter.
How will this impact the number of parking spaces available?	Designating parking spaces for PEV charging should not impact the number of parking spaces required by local authorities.

Table 1. Responses to concerns that may be raised about PEV charging.

Legal Obligations

California Senate Bill 880 sets out the rights and responsibilities of multi-unit property (legally known as common-interest developments) owners in providing charging for residents.

California Assembly Bill 1092 requires the California Building Standards Code to include mandatory standards for the installation of future electric vehicle charging infrastructure in multi-unit dwellings and nonresidential developments. See Additional Resources.

Think Outside the Box

Despite your property manager's best intentions, it may be too difficult or too expensive to install charging at your multi-unit residence at this time. Other options may be available, including:

- **Low-level charging.** A 110-volt outlet or low Level 2 charger may work, as well as high-power Level 2 charging, and be easier to fit into the building's electrical capacity.
- **Charging at work.** Workplace charging is growing rapidly, and may provide an option for drivers who cannot install charging at home. See Additional Resources.
- **Public or fast charging.** Public charging stations convenient to your path of travel can provide an alternative to home charging.
- **Car sharing.** Car sharing services are purchasing PEVs and may provide a viable option.
- **Third-party managers.** Your property manager could contract with a third party, which would install, own and operate the charging unit. You would pay a monthly fee for the charger which may also include access to other chargers in the provider's network.

A San Diego condominium tower installed wiring hubs on each floor of the parking garage to accommodate charging station installations at residents' individual parking places. See the case study in *Plug-in Electric Vehicle Charging Infrastructure Guidelines for Multi-unit Dwellings*. See Additional Resources.

Appendix 8: Sample Specification Sheet for an Electric Vehicle

TECHNICAL SPECIFICATIONS

New Year model 4 door 5 passenger Electric car

ITEM	DESCRIPTION	RESPONSE
General	Based on the specs written herein, the City expects to receive bids on a new year model, 4-door, 5-passenger electric car similar or equivalent to the Nissan Leaf SL.	
Engine	Electric	
Transmission	Automatic	
Battery	30KWH Lithium battery minimum	
On board charger	6.6KW with over charge protection	
Quick charge port	Yes, must have DC Quick charge capabilities	
Trickle charge	Yes, must supply all cords for charging systems	
Mileage Range	100-plus minimum nothing less accepted.	
Regenerative braking	Yes, and please list what types of braking are available	
4 wheel ABS braking	Yes	
Electric Power Steering	Yes	
Tilt adjustable steering wheel	Yes	
Intermittent wipers	Yes, Front and Rear	
Seating Capacity	5	
Heat and AC	Yes, in both front and rear of vehicle	
Fold down rear seats	Yes, to be able to use vehicle to haul minimal items	
Battery warranty	5-year minimum, please list out what your battery warranty is and what is covered and any costs associated with it, but do include that price into your base bid.	

Appendix 9: Clean Cities Executive Summary

The impetus to create this plan came from City Council directive, following a recommendation from a Clean Cities report on low-carbon transportation solutions for the Aspen Community, the Executive Summary of which is below. The following text is directly sourced from the "Low Carbon Fuel and Vehicle Technology Analysis," composed for the City of Aspen by Denver Metro Coalition Clean Cities. For the complete report contact Canary@CityofAspen.com.

EXECUTIVE SUMMARY

After analyzing renewable natural gas (RNG), hydrogen fuel cell vehicles (FCVs), and plug-in electric vehicles (PEVs) as possible alternative transportation fuels for the City, PEVs represent the most actionable and meaningful technology for the city to reach its carbon reduction goals. PEVs are the best opportunity to reduce emissions from on-road transportation in the near term by charging on an incredibly clean Aspen Electric grid, and the PEV market as a whole is expected to continue growing to overcome the barriers it currently faces.

The main obstacle preventing RNG as a recommendation is a lack of available biomethane. Pitkin County Landfill was assessed as a possible source, but because it currently vents methane and has no method for capturing the gas, it cannot be treated and used as a transportation fuel. Installing a methane capture system is timely and costly, but the landfill represents a significant emissions source for the region, and if the County decides to install a gas collection system, RNG should be strongly considered as an end-use for the captured landfill gas.

Fuel cell vehicles (FCVs) could arguably provide the greatest benefits to the community in the long term and hold the most potential for convenient, long-distance, and zero-emission transportation among all vehicle classes, but the barriers are too large and the applications too limited for the city to pursue in the near-term. Additionally, there is tremendous uncertainty in the future of the FCV market and whether it will prove to be a better zero-emission option than PEVs in the long term. Aspen should revisit FCV's sometime in 2020 or later as the market develops.

To accomplish the aggressive carbon reduction goals by 2020 and 2050, Aspen will need to exhibit leadership and pursue options that are immediately actionable, but also sustainable in the medium and long term. The recommendations from the Low-Carbon Fuel and Technology Analysis are a reflection of that premise:

Recommendation 1: PEVs provide the strongest short and long-term opportunity for Aspen to achieve their carbon reduction goals in the transportation sector. The city should aggressively pursue PEV adoption in the area by serving as a regional catalyst for adoption and deployment.

Recommendation 2: Action should be prioritized over the next 2-3 years to deploy PEV infrastructure and transition vehicles. Substantial infrastructure grants and vehicle incentives are currently in place that will dramatically minimize the capital cost of implementing cleaner fuels sooner rather than later.

The first recommendation is to leverage the clean grid and aggressively position Aspen as a PEV-friendly community to residents, tourists and regional commuters, and ski traffic. This can be accomplished by providing access to convenient charging, educating and incenting fleets to incorporate PEVs, making sure that PEVs are a visible component of city operations, and educating Aspen residents about the city's investment in electrification. Because the Aspen Electric grid leverages large quantities of renewable energy, there is a unique opportunity for all plug-in electric vehicles charging on the grid to produce zero lifecycle emissions. Replacing one vehicle with a PEV will be the emissions-equivalent of taking one vehicle off the road completely, offering the best opportunity to reduce carbon emissions from many of the fleet vocations, including the general public. For PEVs charging on the Holy Cross Electric (HCE) grid, efforts should be made to pair their wind and hydro offset programs with new PEV purchases, and the city should support HCE efforts to expedite their incorporation of renewable resources.

There are still significant barriers which will limit the wide-scale deployment of PEVs in Aspen; primarily the absence of affordable AWD, truck, and SUV models, but the market is expected to provide those in the next five years. Other prominent barriers are high vehicle cost and range anxiety in a cold, mountainous environment. Both barriers can be addressed in the short term by providing adequate and visible charging infrastructure, leveraging the grants and tax credits available for vehicle purchases, and allowing economies of scale to further develop through the automakers that will reduce capital costs. Also, the Holy Cross Electric (HCE) grid still has significant emissions associated with electricity generation, and many of the residents who may own a PEV live outside of downtown and will be using the HCE grid. The second recommendation is to leverage existing PEV incentive programs that are currently in place to help overcome barriers like capital cost of vehicles and access to charging infrastructure. The state has the strongest tax credit in the country (up to $6,000 for light-duty) for PEVs that individuals and organizations with a tax liability qualify for (this excludes governments like the City of Aspen), and when combined with the federal PEV tax credit of $7,500, there is a possible $13,500 in available credits.

However, both of these credit programs have a horizon, as the state tax credit begins shrinking in 2019 and disappears in 2022, and the federal credit disappears whenever an individual automaker sells 200,000 qualifying PEVs. Additionally, there are grant funds available through Charge Ahead Colorado that the City can apply for to assist with the deployment of charging stations, up to $16,000 for a Level 3 and $6,260 for a Level 2. That program is only around until funding dries up, which is dependent upon application demand and the registration of new PEVs ($20 of a $50 PEV registration fee goes to a PEV infrastructure grant program). The City should take advantage of and promote these incentives to the community while they are around, as it will minimize financial barriers to greater PEV adoption in the Aspen area and position the city as a regional and national leader. Specific actions the City can take to act on this recommendation are included below, but they include things like electric circulator buses in town, development of PEV infrastructure at strategic locations, incorporation of PEVs where sensible in the City fleet, and serving as an educator, encourager, and resource to the community about PEVs.

Specific vehicle vocations that appeal to the current PEV market include: circulator buses, the city fleet, the general public, the county fleet, Aspen Ski Co., and taxi fleets. Vehicle vocations in the area that that could utilize RNG include, the Roaring Fork Transit Authority, the city fleet, the county fleet, refuse fleets servicing the landfill, food and beverage transportation, package delivery/logistics, and regional trucking.

Because Aspen is a destination location, incentivizing people to make the trip in a PEV will require strategic deployment of charging infrastructure to provide range security and extension. The report suggested three charging categories that will be important to a successful charging network: workplace charging, Level 3 (also known as fast charging) corridors, and public charging. Workplace charging is very effective at increasing PEV adoption – employees with access to charging are 20x more likely to own a PEV than employees who don't have charging access. The City should consider joining the U.S. Department of Energy's Workplace Charging Challenge and work with employers in the area to educate them about the benefits and incentives to provide charging. Level 3 charging, which charges most PEVs in thirty minutes or less, is essential to enabling convenient electric road trips to and from Aspen. Possible locations for Level 3 charging along the highway 82 corridor include Glenwood Springs, Carbondale, Aspen, and Independence Pass. Another important infrastructure component is Level 1 and 2 public charging access at locations like Aspen Ski Company, trailheads, parks, the airport, and downtown.

One important aspect of implementing the recommendations is education and outreach. There are a lot of avenues the city can consider to raising awareness about the benefits of PEVs to the community. There are plenty of grants and incentives available for vehicle and infrastructure costs that fleets, local governments, and the general public may not be aware of; the city could leverage existing programs by better promoting them through their networks and directly to city staff. Organizations like Clean Energy Economy for the Region that is already operating on the western slope providing education and fleet analysis for alternative fuels provide a great partner to the city. Ride-and-drive events with local leadership, celebrities, and the general public provide great media exposure and active education opportunities for

participants. There is also an opportunity to highlight the city's efforts and accomplishments by leveraging the national audience that the X-Games attracts annually.

Finally, there are some regulations or policies the city could consider to reduce transportation emissions: alternative fuels could be prioritized in city contracts by awarding higher value to contractors that use alternative fuels, and the city could encourage other businesses and organizations to do the same; building codes could be adjusted to require prewiring for future EVSE installation; Aspen Electric could design a PEV-specific time of use rate to incentivize charging on off -peak hours; and Aspen could require new vehicle purchases to decrease emissions from the vehicle it is replacing by a certain amount.

Additional information is provided at the end of the report that outlines existing grants, incentives, and regulations relevant to alternative fuels, and supplementary resources for more information.

Appendix 10: Resources

If you have any troubles accessing these resources or their associated links, please contact Laura Armstrong at Laura.Armstrong@CityofAspen.com or Canary@CityofAspen.com.

Analysis of Low Carbon Fuel and Vehicle Technology for the Aspen Community:

- "Low Carbon Fuel and Vehicle Technology Analysis: A research report identifying transportation solutions for the Aspen Community," Denver Metro Coalition: Clean Cities. Tyler Svitak, Kim Tyrrell, Britt Coyne, and Alex Lyakhov. 2015.

Colorado Electric Vehicle Readiness Plan Resources:

- Sample Development Regulations and Guidance
- Parking Best Management Practices
- ADA Compliance

Electric Vehicle Emissions Calculator:

- Union of Concerned Scientists, EV Emissions Tool, which compares carbon emissions of different vehicle types, specific to the area in which they drive and charge http://www.ucsusa.org/clean-vehicles/electric-vehicles/ev-emissions-tool.

Local Dealerships:

- Shae Singer, Neighborhood Electric Vehicle sales, shae@sopris.net or 970-948-7423.
- Mountain Chevrolet, Glenwood Springs. Jeremy Doerr, EV Specialist: jeremy.d@mtnchevy.com. Travis Campbell, Commercial and Fleet Manager: travis.c@mtnchevy.com. Michael Payne, Dealer/Owner: Michael.p@mtnchevy.com, (Work) 970-928-9777 x 1001, (Cell) 303-888-2061.
- Glenwood Springs Ford. Chet Garling. cgarling@gwsford.com
- Audi Glenwood Springs. Jeff Hummel. jhummel@boardwalkag.com
- Nissan Boulder. Nigel Zeid, EV Specialist: 720-878-6757, nigel@bouldernissan.com

Multi-Unit Housing Resources:

- Electric Vehicle Charging for Multi-Unit Dwellings, US Department of Energy: Alternative Fuels Data Center. Offers resources for residents and property owners, managers, and HOAs. http://www.afdc.energy.gov/fuels/electricity_charging_multi.html

Nonprofit Resources:

- Clean Energy Economy for the Region. Matthew Shmigelsky, mshmigelsky@cleanenergyeconomy.net
- The Community Office for Resource Efficiency. energy@aspencore.org.

Reasons to Drive Electric:

- Union of Concerned Scientists, "Top 7 Reasons for Considering an Electric Vehicle Today." http://blog.ucsusa.org/josh-goldman/top-7-reasons-for-considering-an-electric-vehicle-today-470

Rebates and Financing:

- Refuel Colorado is the electric vehicle department at the Colorado Energy Office. http://www.refuelcolorado.com/ The Colorado Energy Office: 1580 Logan St, Denver, Colorado. Phone: (303) 866-2100
- The Office of Energy Efficiency & Renewable Energy webpage about EV tax credits and incentives to learn about federal and state offerings: http://energy.gov/eere/eveverywhere/ev-everywhere-tax-credits-and-other-incentives

Workplace Charging:

- The US Department of Energy (DoE) has created a number of resources for employers, from tools to engage employees to charging station management policies to tax incentives and grant opportunities for EVSE purchase. These resources and more are found here: https://energy.gov/eere/vehicles/workplace-charging-challenge-install-and-manage-pev-charging.
- Join the DoE's Workplace Charging Challenge, which will provide resources and assistance to set up and run workplace charging stations, access to information sharing with other organizations around the nation, and recognition on various media sources. https://energy.gov/eere/vehicles/ev-everywhere-workplace-charging-challenge

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[xxiv] Image and charging station locations from www.plugshare.com.

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