

A scenic view of a Colorado city, likely Fort Collins, with a hot air balloon floating in the sky. In the background, there are large, snow-capped mountains under a clear blue sky. The city below is a mix of green trees and urban buildings.

# Three Cities EV Challenge

Fort Collins, Loveland, Boulder  
Colorado, USA  
in Partnership with Drive Electric Northern  
Colorado





## Background

- Colorado Population 5.2 Million
- Northern Colorado Front Range population 600,000
  - Fort Collins
  - Loveland
  - Boulder
  - Longmont



# Where We Are



# The Challenge

## PV + EV: A Perfect Union

The Three Cities have compelling policy directives to make significant carbon reduction of 80% by the year 2030. Electric vehicles and residential solar can make a significant impact on carbon.

24% of Fort Collins Greenhouse Gases are from vehicle use  
21% of Boulder's Greenhouse Gas are from vehicle use

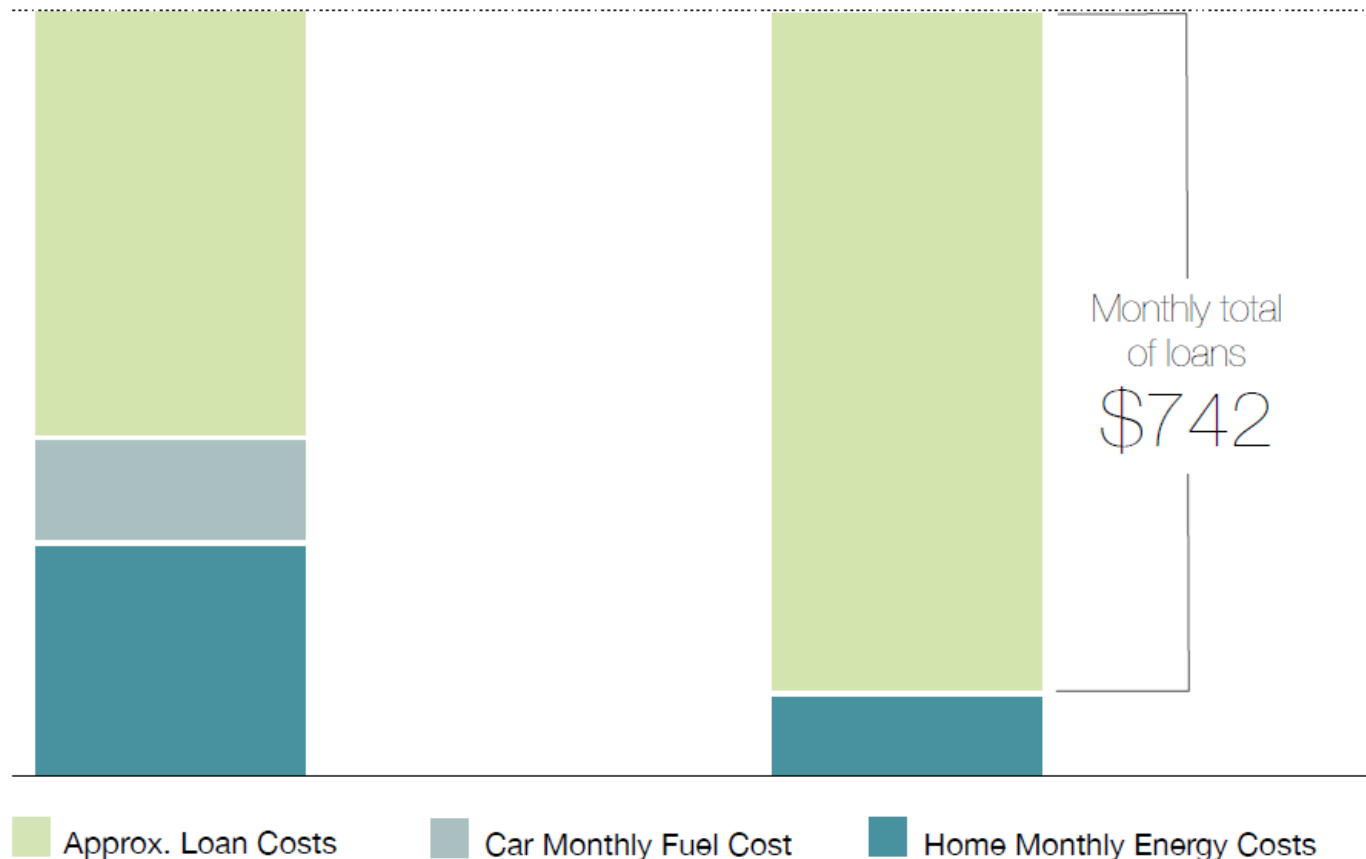


Thinking of buying  
a Toyota Camry?

Consider  
a Nissan Leaf (EV) + Solar (PV) +  
Energy Efficiency (EE)

Car + Home Energy  
Monthly Expenses: \$836

Car + PV + EE + Home energy  
Monthly Expenses: \$836



DENVER, CO

Paid off in

4.5 years

Avg. yearly savings

\$3,300

Savings over 10 years

\$18,000

Savings over 20 years

\$50,000

Long-term savings does not  
include energy escalation rates.

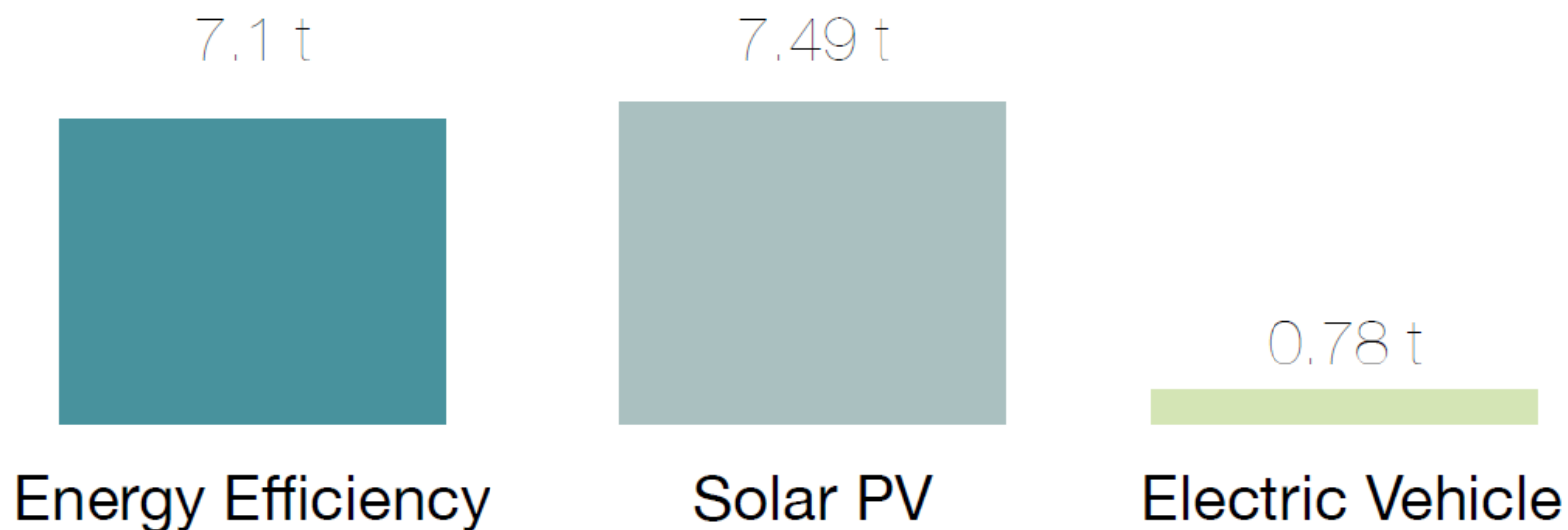
Leaf: \$15,500 after rebates  
Solar PV: \$11,900 after rebates  
Solar PV Capacity: 6.5kW  
Efficiency Upgrade: \$8,400  
Loan rate: 5% APR

2400 SqFt home  
Camry: \$22,500



## Yearly CO2 reduction per optimized household

16.3 metric tons



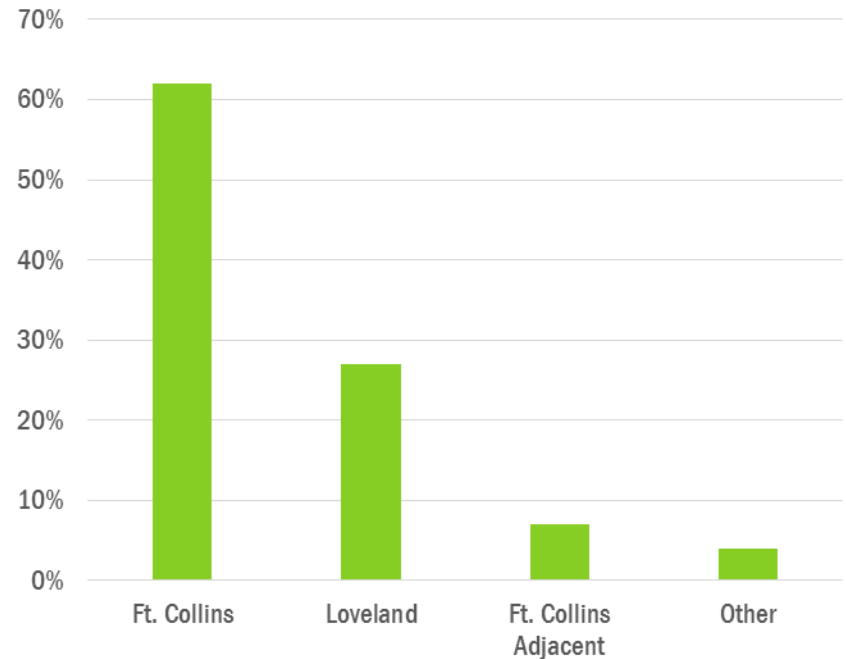
DENVER, CO

# The Challenge

## Metrics

- Increase deployment of electric vehicle new sales to be 5% of the market by 2015
- Develop a network of EV charging stations to have one publicly available charging station no more than 50KM apart between Fort Collins and Boulder by 2020
- Increase use of residential PV to be 5% of total urban residential rooftops by 2020

Registered PEVs by Jurisdiction



# The Challenge

## We are dependent on driving

	Boulder	Fort Collins	Loveland
Total	53,247	75,098	33,379
Drove Alone	52%	72.9%	80.9%
Carpooled	5.8%	8.2%	8.9%
Public Transportation	8.2%	1.5%	.3%
Motorcycle	0.4%	0.3%	0.5%
Walked	9.8%	3.8%	1.4%
Other Means	0.8%	0.7%	0.5%
Worked at Home	12.3%	6.1%	6.2%



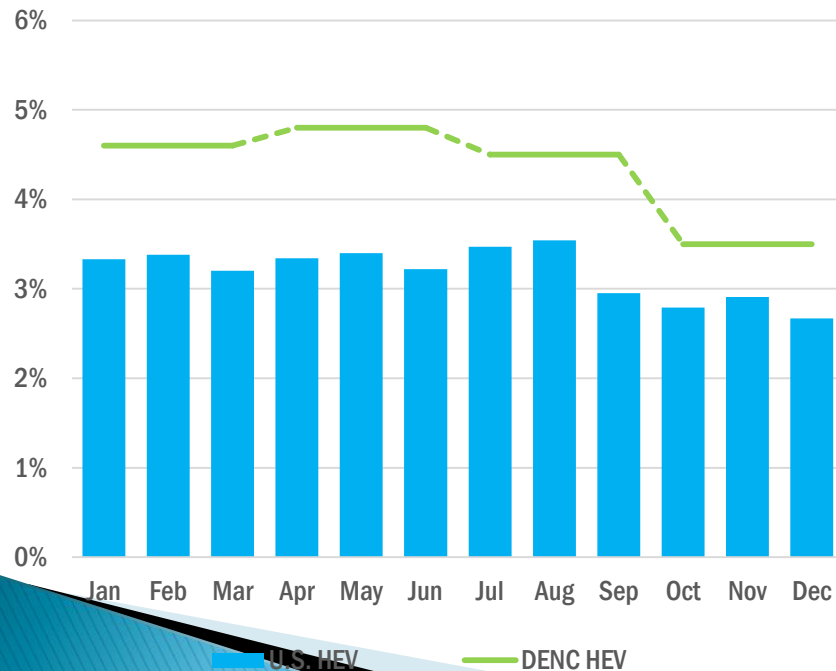


# The Northern Colorado Vehicle Market in Context

PEVs account for about 1 percent of passenger vehicle sales in Northern Co. Yet, the experience of the hybrid market offers reason for optimism.

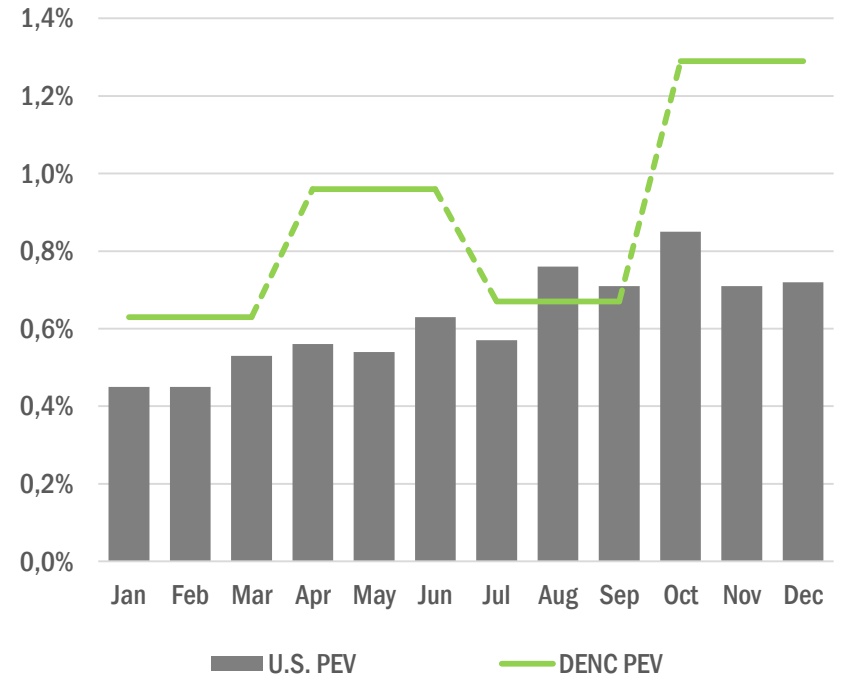
- › HEVs have historically achieved sales rates well above the national average in Northern Colorado, suggesting that the market is receptive to AFVs.

## 2013 HEV PENETRATION RATE (NATIONAL VS. NOCO)



- › The data for PEVs is similarly encouraging, with market share in 2013 significantly outpacing the national average.

## 2013 PEV PENETRATION RATE (NATIONAL VS. NOCO)

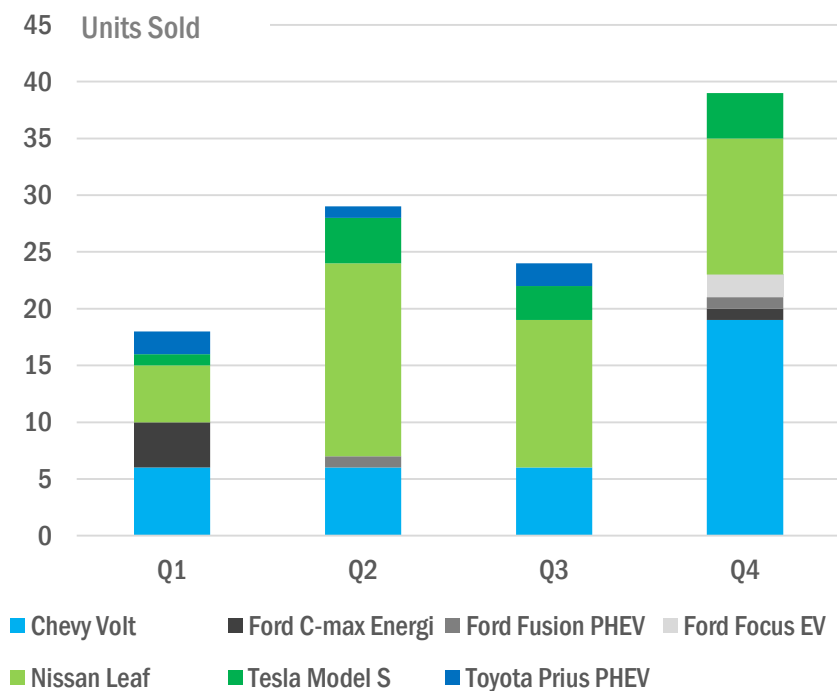


# The Pathway to 5 Percent: Increasing Options

Today, there are Seven available options for consumers seeking to purchase a PEV in Northern Colorado. This needs to be expanded rapidly.

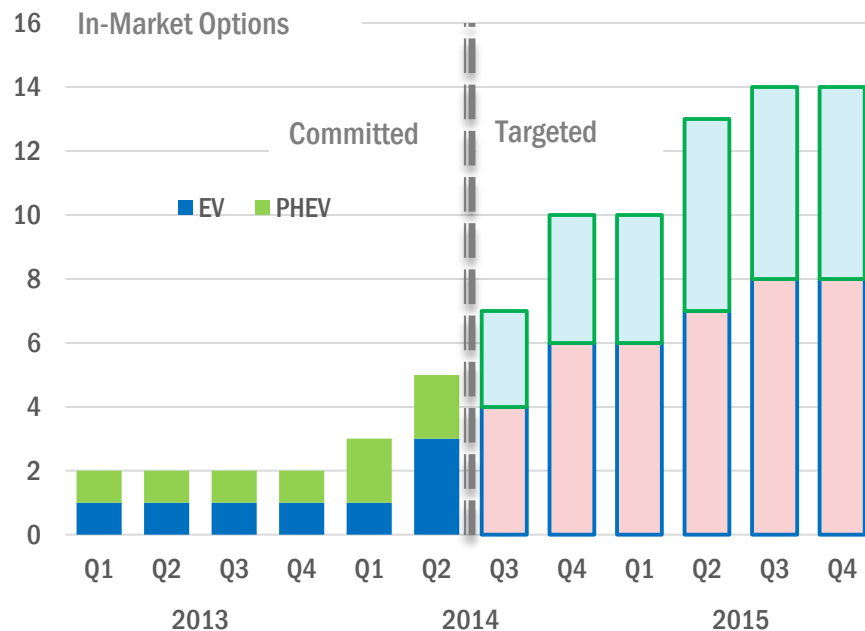
- Through Q3 2013, six different PEV models had been purchased in Northern Colorado. However, only two, the Leaf and Volt, were sold in-market.

## 2013 NOCO PEV SALES BY OEM AND MODEL



- In-market inventory of plug-in electric vehicles will need to expand rapidly for DENC to achieve its Q4 2015 sales target.

## NOCO PEV OPTIONS (COMMITTED AND TARGETED)



# Outreach Education and Marketing

Education and marketing campaigns that leverage partner resources are critical to increasing the visibility of PVs & PEVs and the success of this program

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## Marketing

- › Three Cities plans to develop a coordinated marketing effort that will utilize existing partners and traditional media to greatly increase the visibility of PEVs in the region. This will likely include radio, online, and direct mail programs.
- › Three Cities will develop a combined EV/PV program marketing campaign
- › Putting people behind the wheel will continue to be a critical outreach strategy. The Three Cities will hold “Ride and Drive” events each month and participate in exciting events that will provide opportunities for large crowd public engagement. We will also engage thought leaders through a “Drive CEO” program.
- › Three Cities will launch two campaigns to engage businesses – a “Fleet Transition Challenge” and “Workplace Charging Challenge.”
- › Launching innovative outreach and marketing programs will also be important – DENC will launch a “neighborhood marketing” program that will utilize existing owners to market the vehicle at a neighbor to neighbor level.



# Data and Analytics: Refining Our Approach

PEV efforts to date have lacked the required partnerships and marketing to succeed. But they have also failed to use data to refine their approach.

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## Analytics

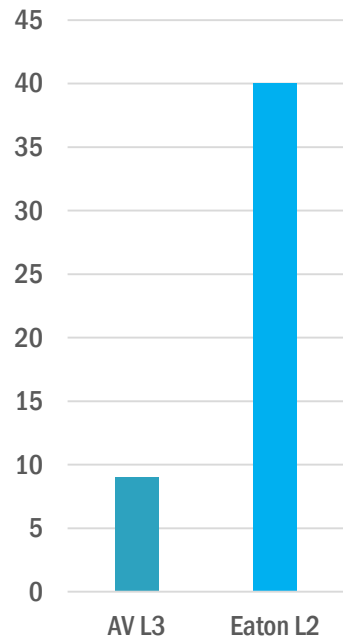
- › Approximately 50% of EV owners have solar on their roofs., demonstrating a strong overlap between the EV/PV market and need for a greater marketing effort.
- › Three Cities plan to track utilization from all charging stations to better understand charging habits and determine which kinds of locations and charge-levels are most effective. We are working with the cities and private entities to get access to the charging utilization data.
- › Charging stations carry fee for use (\$1/hour for 220V or \$3/session for DC fast charging), which will allow us to investigate consumer behavior with a price per hour of being plugged-in versus the free parking that is otherwise available.
- › As EVs sales grow, we will be acquiring higher resolution data (Zipcode+4) to identify high-density clusters.
- › Combining vehicle location data with EVSE utilization data will enable improved charging station deployment planning.

# Analyzing Charging Station Utilization

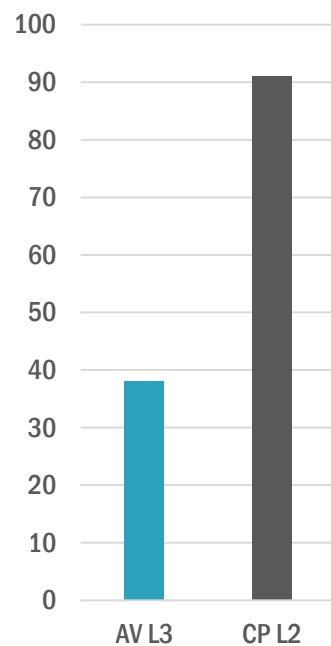
By understanding how chargers are used at various locations and based on the type of charger, Three Cities aims to refine future charger installations.

## SAMPLE CHARGING STATION DATA: AUGUST TO DECEMBER 2013

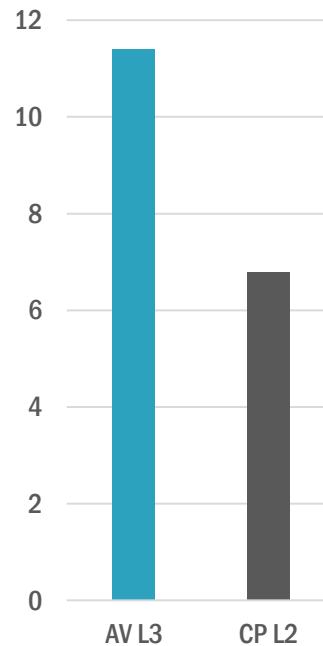
Unique Users



Avg. Minutes/Charge



Avg. kWh per Use



- › Currently we have data from three Fort Collins stations from three different manufacturers:

**Charge Point (CP):** 240V L2

**Eaton:** 240V L2

**Aerovironment (AV):** 480V L3

- › Data tracked includes number of unique users, total uses, time charging, and kilowatt hours consumed per charge.
- › We are creating a reporting system that will provide the most consistent information from all stations as is possible.

# Policy Options being considered

## Summary of policy options for expanding the use of Electric Vehicles

Policy	TimeFrame	Difficulty	Potential GHG Impact
<b>Financial</b>			
Feebates	Short–medium	High	High
Rebates for Evs	Short term	Medium	Medium
Financing	Short Term	Medium	Medium
<b>Public Fleets</b>			
Performance Contracting	Short Term	Low	Public sector can lead
Transit Electrification Pilot	Short Term	Medium	Low
Use of Grants	Short term	Medium	Medium



# Policy Options being considered

## Summary of policy options for expanding the use of Electric Vehicles

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- Development of policy and incentive options that put EV and PV together and simplify permitting
- Work with Colorado State University & University of Colorado to develop further research and implementation strategies around plug and play options for EV/PV
- Work with the business community to develop cost effective private offerings that amplify the attractiveness of implementation
- Work with business/university

# Citizen Acceptance & Behavior Change

Early Adopters are risk takers and willing to try new options. Most of the public needs more assurance before accepting new technology.

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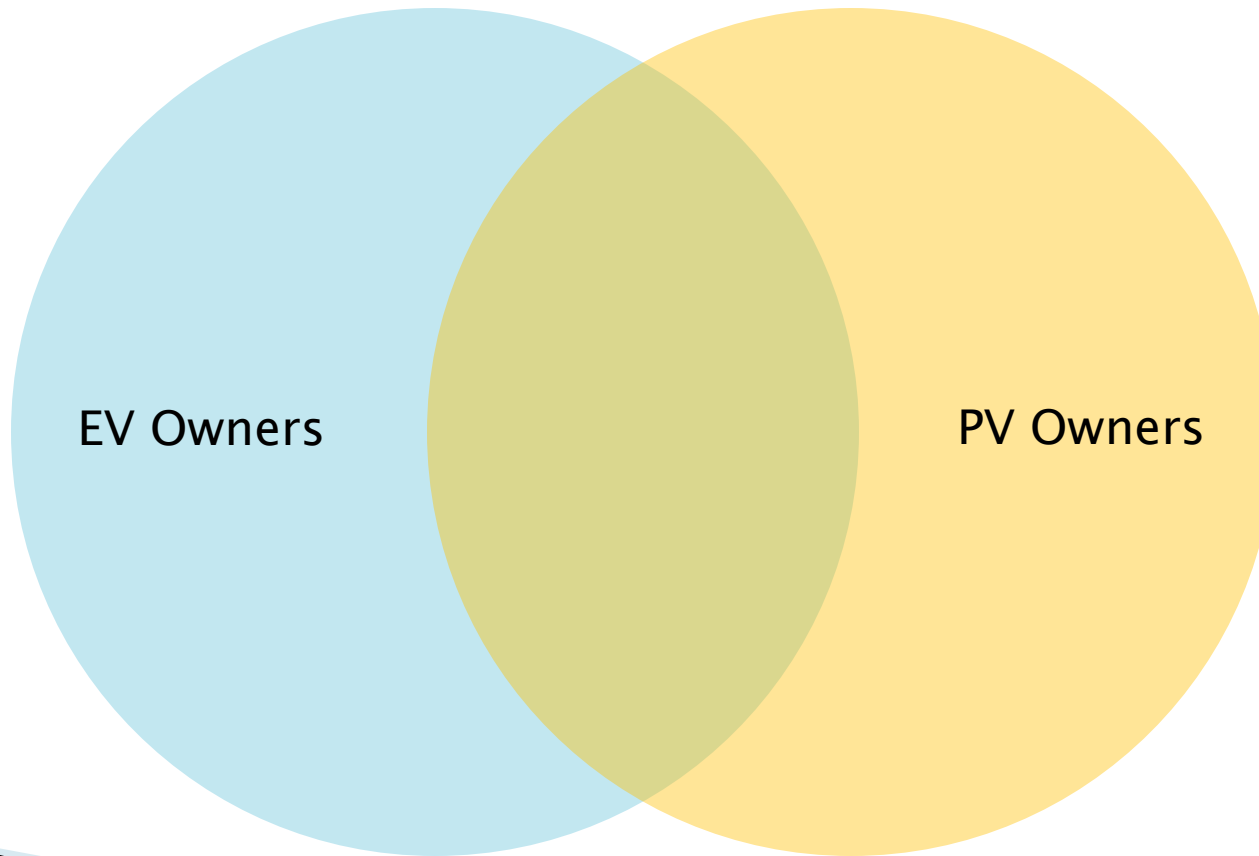
## Behavior Change Considerations

- › Car buying behavior- are we constrained to people that are ready to buy a new car or buy new cars every few years?
- › How to address consumers that typically buy used cars
- › How to address consumers that drive their car forever, and aren't ready
- › Driving patterns
- › Perception vs. reality, i.e, are users concerned that they would get "stranded", even though they typically drive distances within battery range
- › Willingness to adjust route/distances/patterns/lifestyle to incorporate

# Citizen Acceptance & Behavior Change

Develop an Ambassador Program with the existing owners of EVs and PVs

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# Moving Forward

A coordinated plan will be required including finance, policy, technical analysis, & installations,

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## ACTIONS

- › Develop a strategic plan for development and implementation of a network of high speed charging stations that are publicly available
- › Develop a coordinated set of policies for implementation of EV charging
- › Prepare a coordinated plan to promote EV purchasing by residents
- › Develop a strategy for aggregate purchasing of Evs
- › Track data use to compare EV use and electricity demand and compare with emergence of solar residential
- › Coordinate with Colorado Energy Office
- › Seek Grants and funding for deployment

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## ACTIONS

› Potentially develop as an Initiative of ICN

› Technical Advisors

› Implementers

› Funders

› Endorsement







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