Programs Study Session

Board of Directors Meeting
April 10, 2024

**SILICON VALLEY
CLEAN ENERGY**

Today's goals

- Shared understanding of key SVCE data

- Visibility into some program specifics – **residential vehicles** today
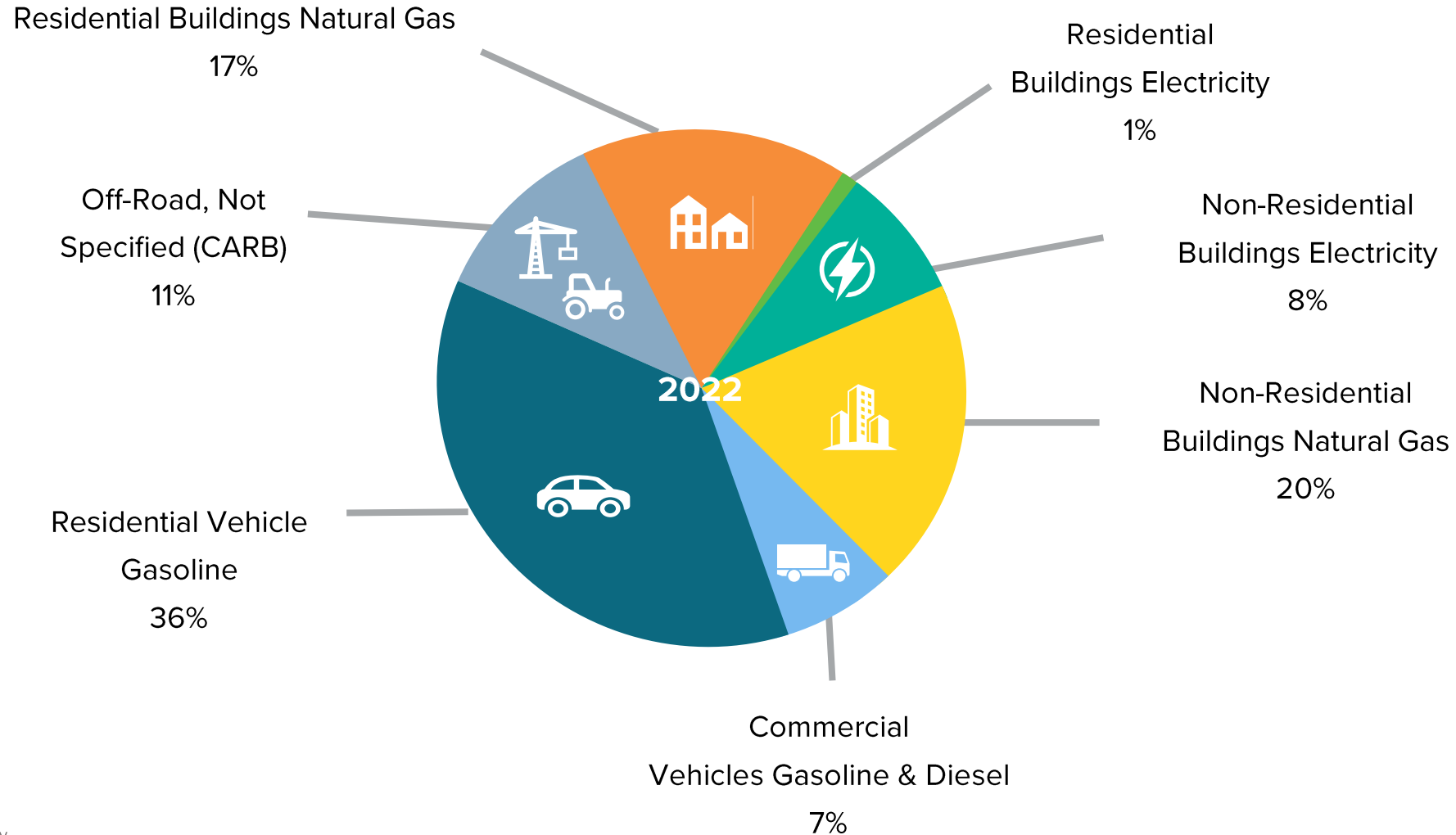
- Rich discussion

Agenda

1. SVCE Emission Statistics

2. Deep Dive into Residential Vehicle and EV Charging Trends
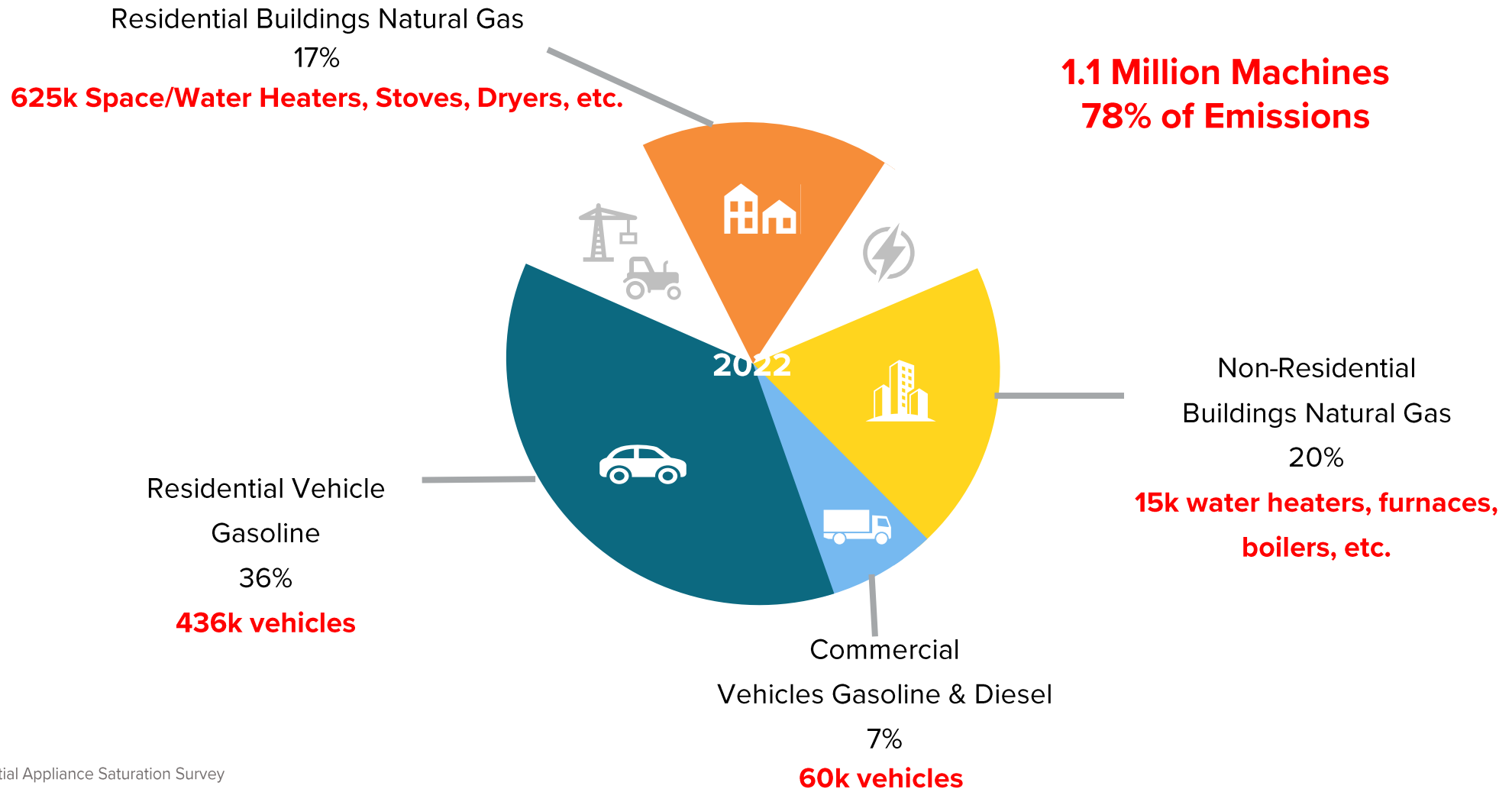
3. Program Highlights

SVCE territory emissions decreased from 4 million MT CO2e in 2015 to 3.1 million MT CO2e in 2022

Residential Buildings Natural Gas
17%

Off-Road, Not Specified (CARB)
11%

Residential Vehicle Gasoline
36%

2022

Residential Buildings Electricity
1%

Non-Residential Buildings Electricity
8%

Non-Residential Buildings Natural Gas
20%

Commercial Vehicles Gasoline & Diesel
7%

Source: SVCE 2022 GHG Inventory

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Emissions come from over 1 million fossil fuel machines we need to replace

Residential Buildings Natural Gas

17%

625k Space/Water Heaters, Stoves, Dryers, etc.

**1.1 Million Machines
78% of Emissions**

2022

Non-Residential

Buildings Natural Gas

20%

15k water heaters, furnaces,

boilers, etc.

Residential Vehicle

Gasoline

36%

436k vehicles

Commercial

Vehicles Gasoline & Diesel

7%

60k vehicles

Source: 2019 Residential Appliance Saturation Survey

Today's discussion is on residential vehicle emissions

SVCE Programs and Initiatives Influencing Residential Vehicles

$28M Budget
10 Active
3 Planning
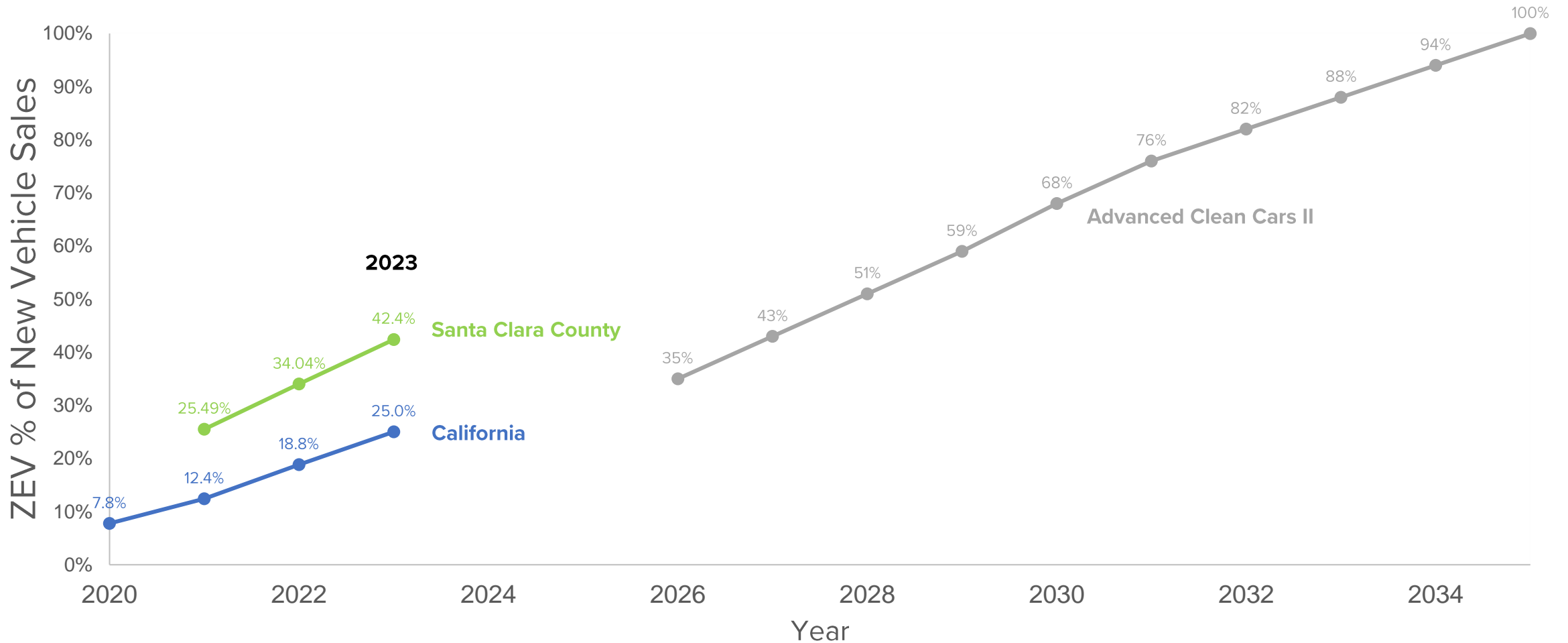8 Closed

Sector Emissions
1.1 million MT CO2e

2022

Residential Vehicle Gasoline

36%

436k ICE vehicles
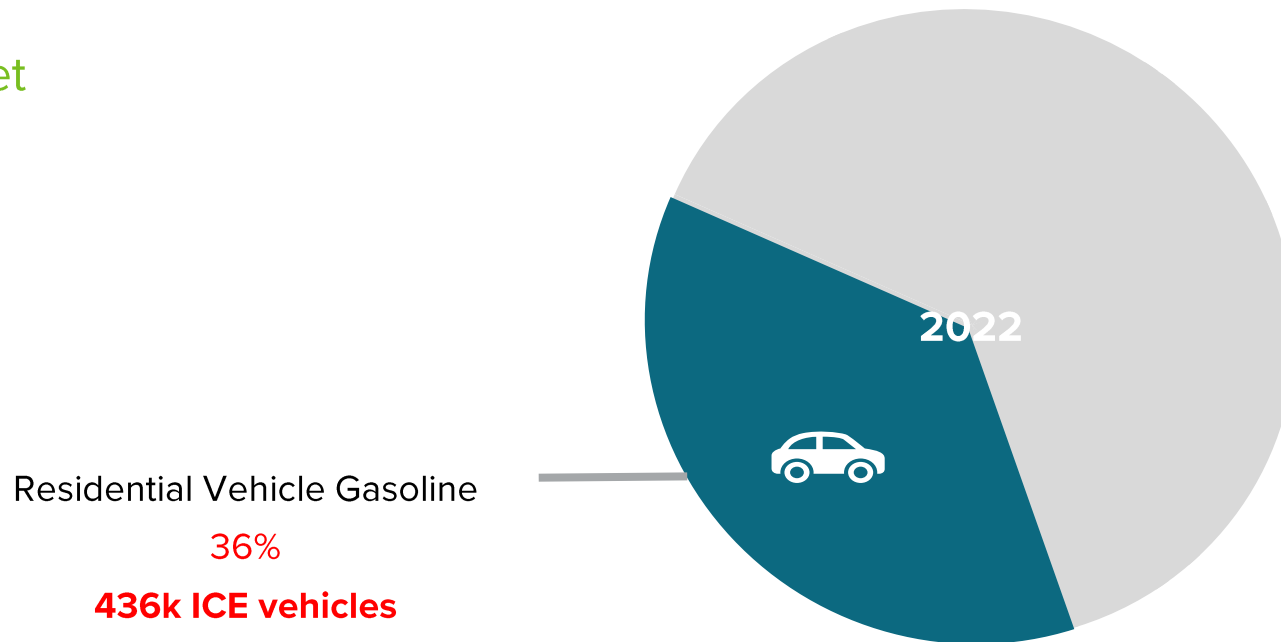
As of Dec 2022, SVCE territory had 33.5k registered Battery Electric Vehicles (BEVs)

Source: SVCE 2022 GHG Inventory

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CA's Advanced Clean Cars II rule establishes a roadmap to 100% new ZEV sales by 2035
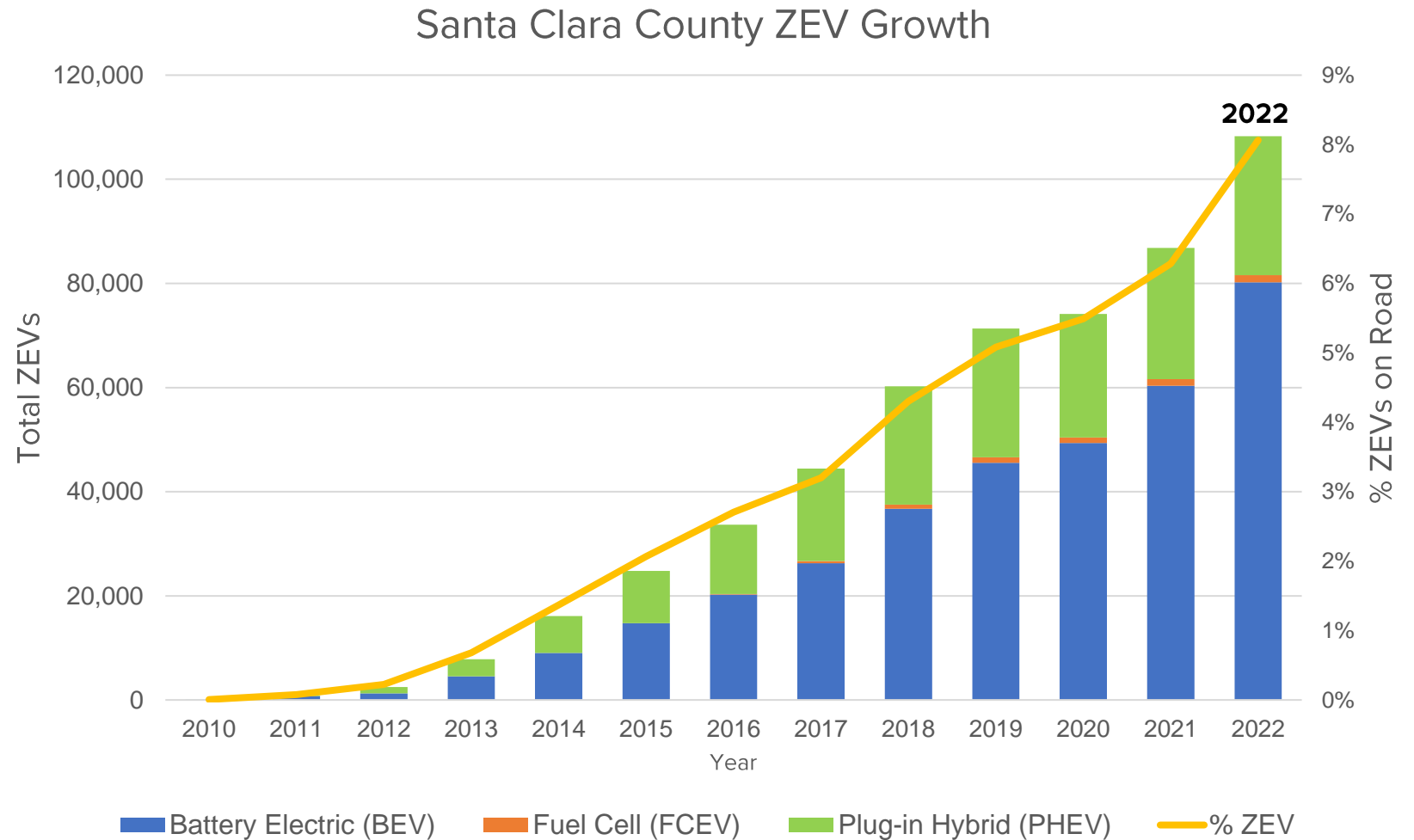
In 2023, Santa Clara County led the nation with **42.4%** new ZEV sales

ZEV adoption is soaring in Santa Clara County

Between 2018 and 2022, the number of Battery Electric Vehicles in Santa Clara County territory has more than **doubled**
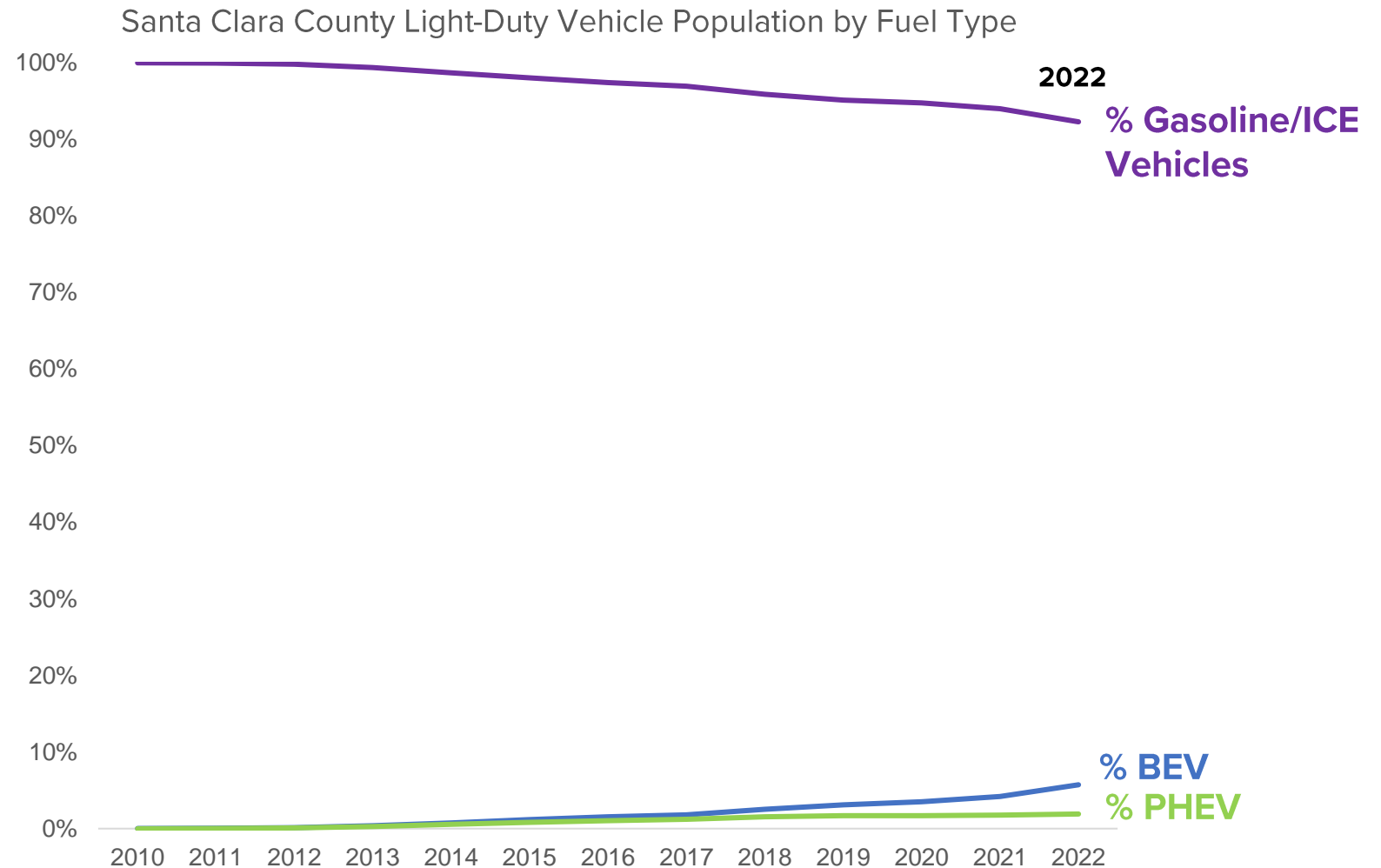
Santa Clara County ZEV Growth

Legend: Battery Electric (BEV) | Fuel Cell (FCEV) | Plug-in Hybrid (PHEV) | % ZEV

But we still have a long way to go

92% of Santa Clara's light-duty vehicles are fueled with gasoline or diesel

Santa Clara County Light-Duty Vehicle Population by Fuel Type

2022

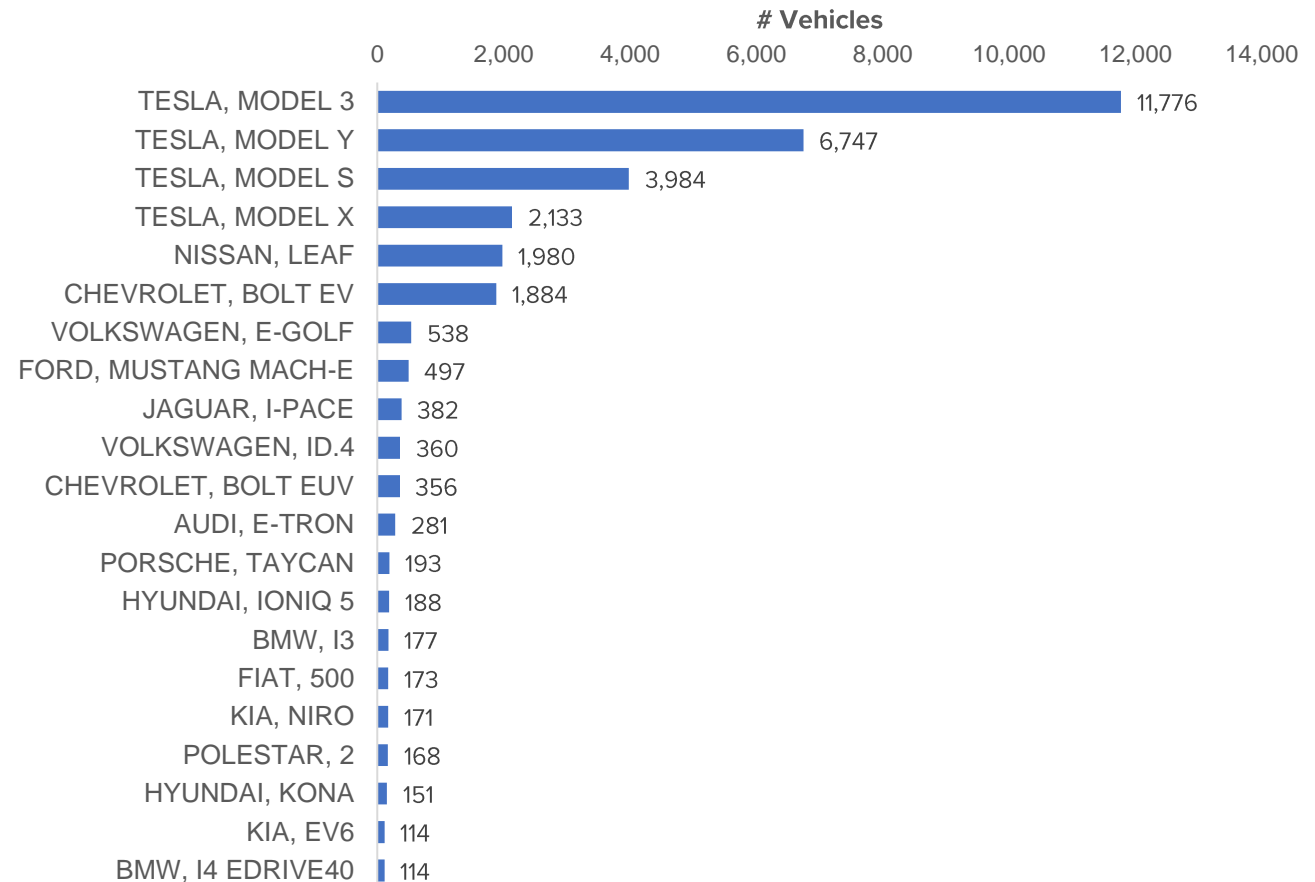**% Gasoline/ICE Vehicles**

% BEV
% PHEV

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2022 Light-duty BEV population in SVCE territory

In 2022, **7.2%** of light-duty vehicles in SVCE Territory were Battery Electric Vehicles (BEVs)
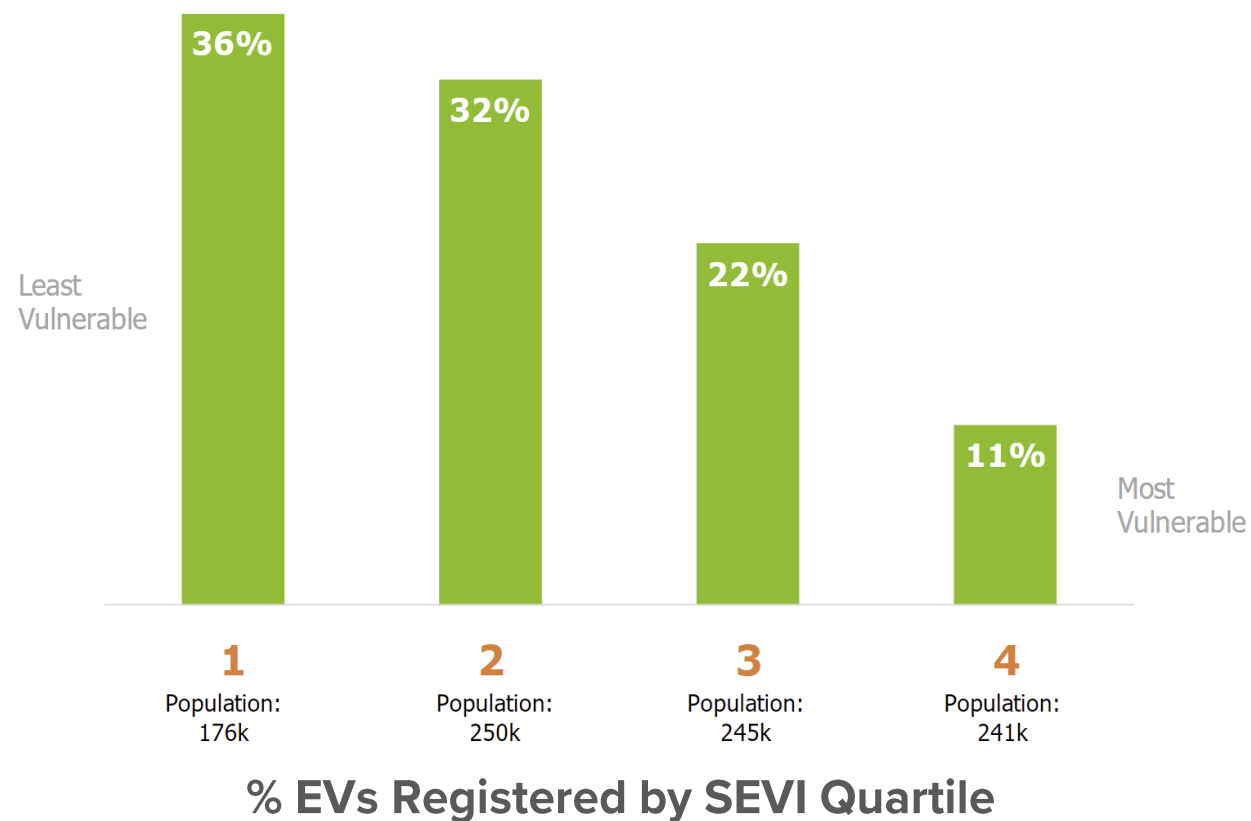
Tesla models are 73% of all BEVs

Top BEV Models (2022)

 # Vehicles

Model	# Vehicles
TESLA, MODEL 3	11,776
TESLA, MODEL Y	6,747
TESLA, MODEL S	3,984
TESLA, MODEL X	2,133
NISSAN, LEAF	1,980
CHEVROLET, BOLT EV	1,884
VOLKSWAGEN, E-GOLF	538
FORD, MUSTANG MACH-E	497
JAGUAR, I-PACE	382
VOLKSWAGEN, ID.4	360
CHEVROLET, BOLT EUV	356
AUDI, E-TRON	281
PORSCHE, TAYCAN	193
HYUNDAI, IONIQ 5	188
BMW, I3	177
FIAT, 500	173
KIA, NIRO	171
POLESTAR, 2	168
HYUNDAI, KONA	151
KIA, EV6	114
BMW, I4 EDRIVE40	114

Source: Dec 2022 Vehicles in SVCE Territory (DMV), Silicon Valley Clean Energy

Multifamily EV adoption is significantly lower than single family EV adoption

13% Multifamily

87% Single Family
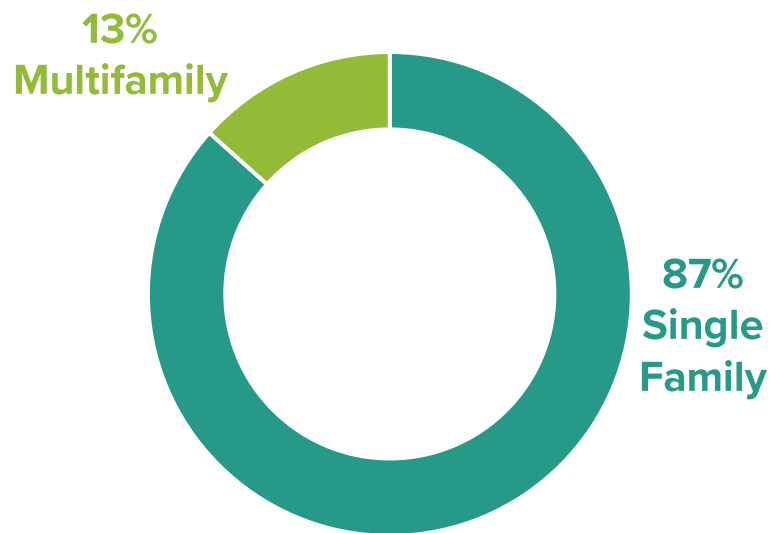
In SVCE's 2023 customer awareness survey, multifamily residents identified
- **EV purchase cost** (54%) and
- **Lack of home charging** (42%)
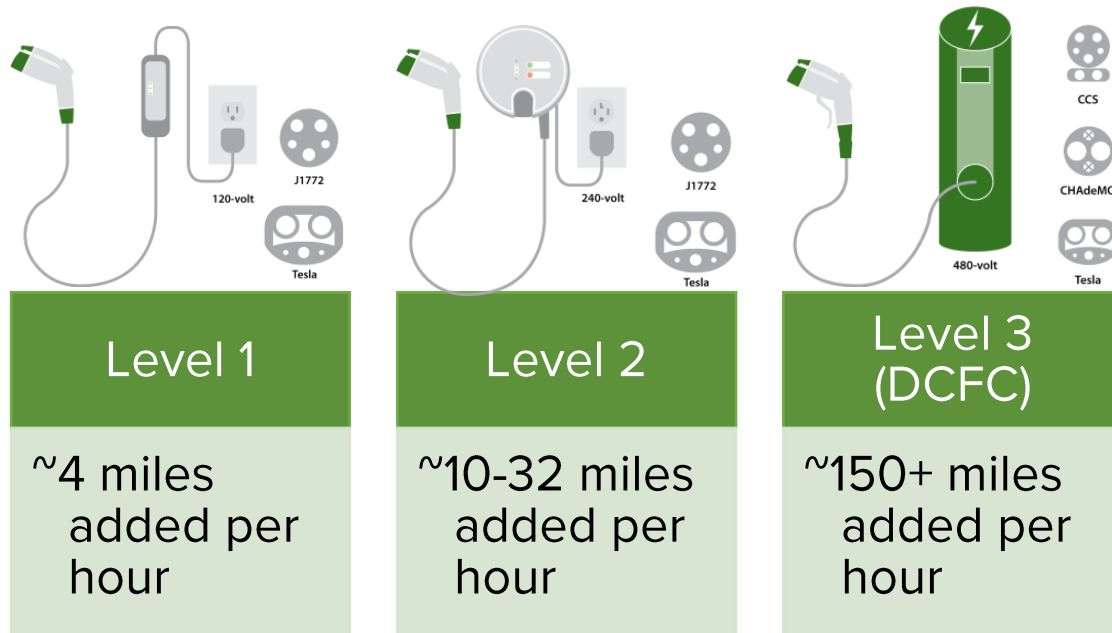
as the biggest barriers to EV adoption.

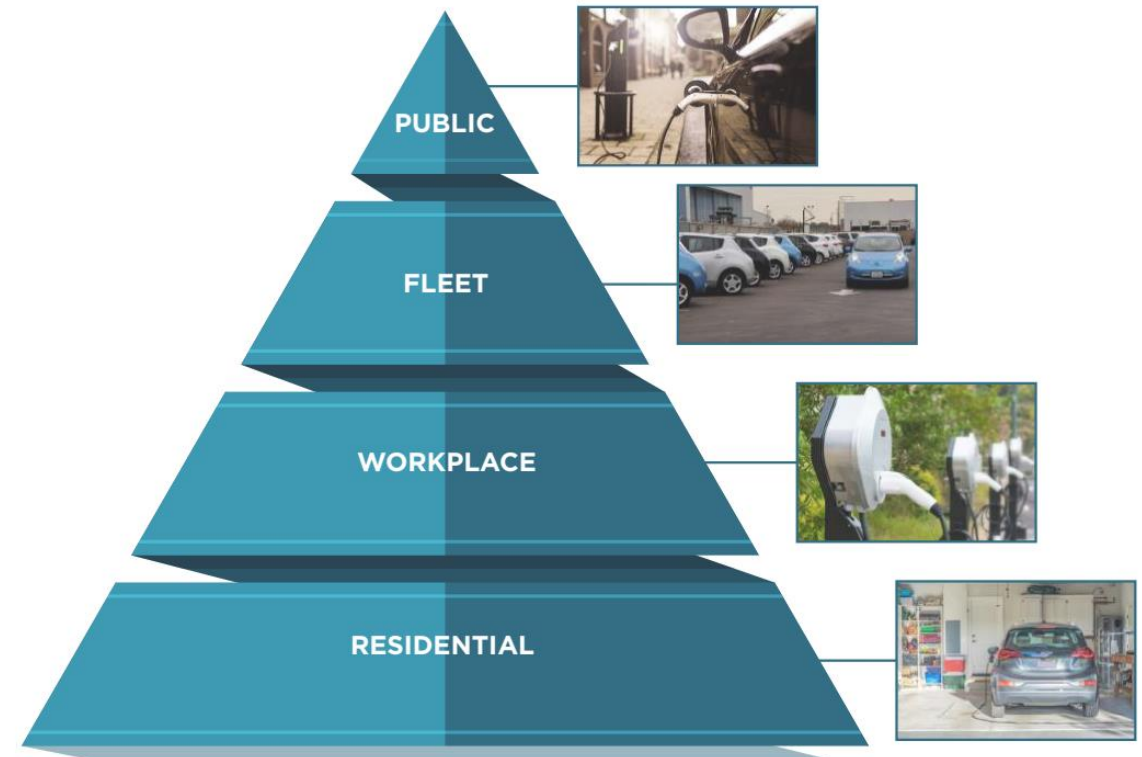Residents in the least vulnerable tracts (SEVI 1 and 2) own a disproportionate amount of all EVs

Least Vulnerable

Most Vulnerable

36%	32%	22%	11%
1	**2**	**3**	**4**
Population: 176k	Population: 250k	Population: 245k	Population: 241k

% EVs Registered by SEVI Quartile

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EV Charging Terminology

Charging Speed

Level 1
~4 miles added per hour

Level 2
~10-32 miles added per hour

Level 3 (DCFC)
~150+ miles added per hour

The average resident of Santa Clara County drives 17.6 miles per day.
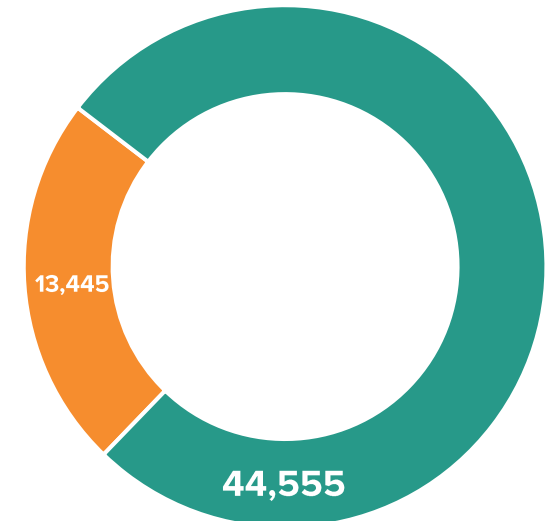
EV Charging Pyramid

PUBLIC

FLEET

WORKPLACE

RESIDENTIAL

More EV charging is needed to reach State goals

Public EV Charging Ports in 2023
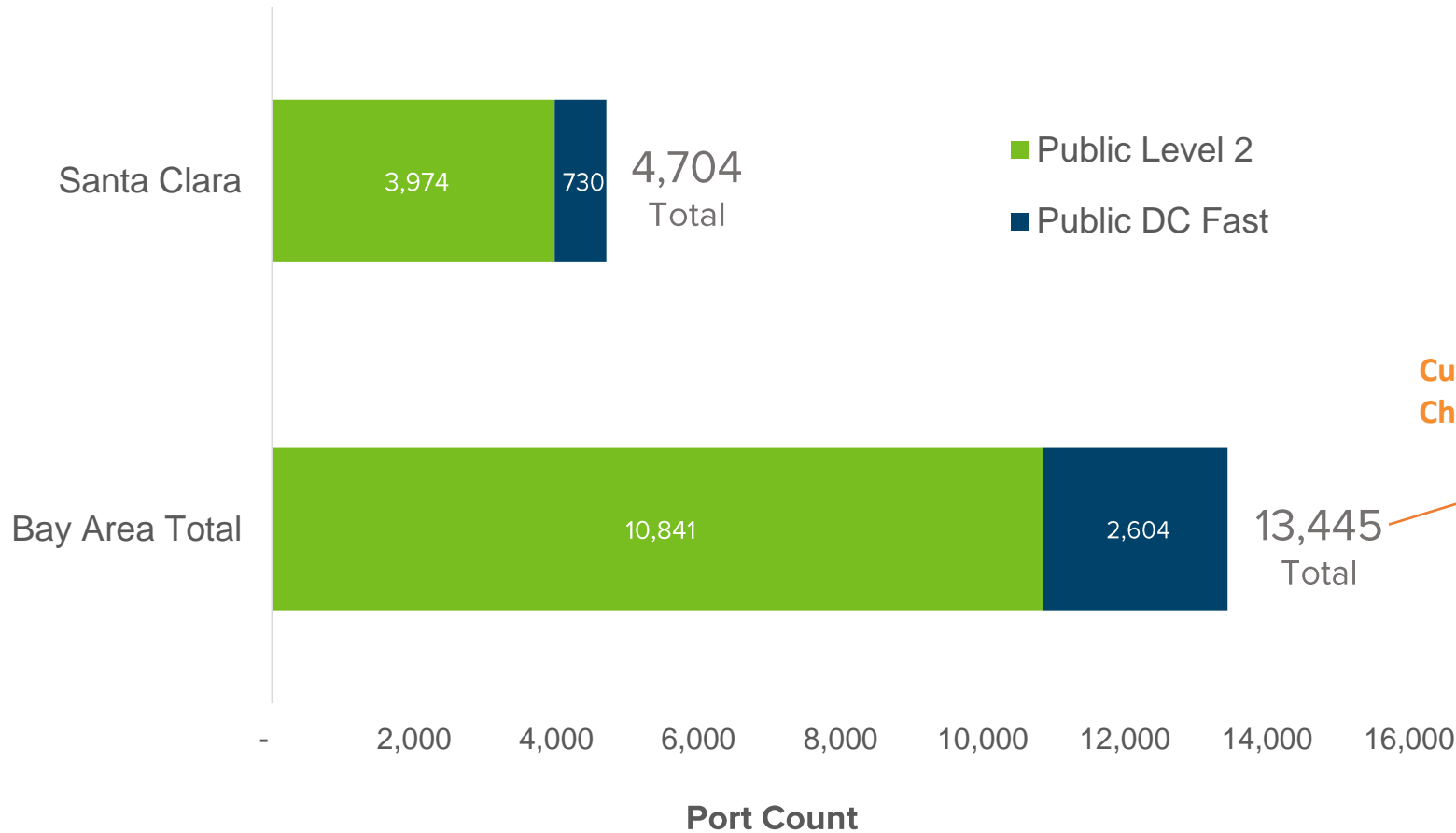
Bay Area Public Charging Goals

- Public Level 2
- Public DC Fast

Santa Clara: 3,974 / 730 — **4,704** Total

Bay Area Total: 10,841 / 2,604 — **13,445** Total

Current Public Charging Ports: 13,445

Estimated Additional Public Charging Ports Needed by 2030 (NREL): 44,555

Port Count

Current EV Chargers in SVCE Territory

Total Ports

1,703 L2

392 DCFC

Level 2

- 1-3
- 4-12
- 13-20
- 21-73
- 74-123

DCFC

- 1-2
- 3-6
- 7-12
- 13-20
- 21-28
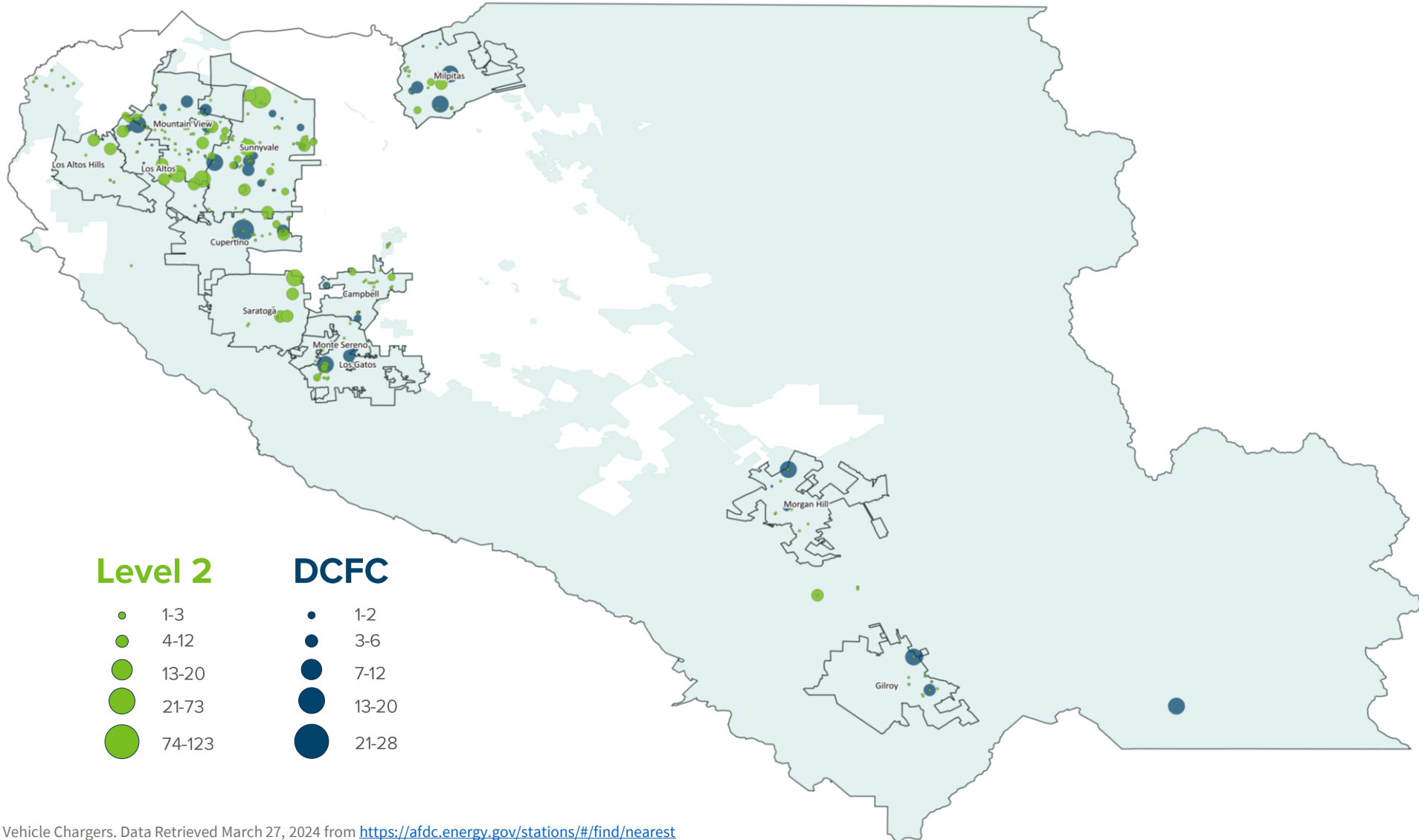
Transportation Electrification Customer Programs

Charging Installation Incentive Program
Incentives for multifamily properties to install Level 1 or 2 charging on site.

Priority Zone DCFC*
Incentives for DC fast charger installations near older multifamily housing.

CALeVIP*
Incentives for DC fast chargers and Level 2 chargers in public, multifamily, or business parking lots.

EVmatch
Co-funded CEC grant for shared public access charging at multifamily housing.

FutureFit Assist
Technical assistance for multifamily properties, agencies, and SMBs for planning EV charging.

Fleet Electrification Planning
Fleet electrification technical assistance for public agencies and SMB fleets.
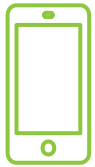
Ecology Action Direct Install*
Co-funded CEC grant for direct installation of EV chargers in multifamily housing.
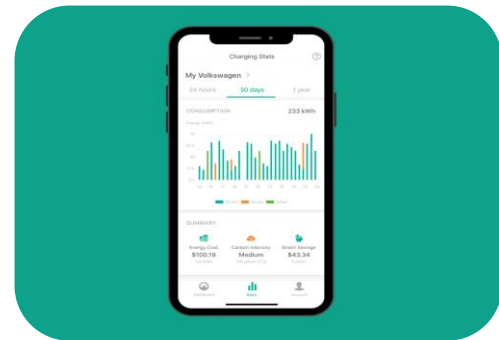
GridShift
Managed EV charging app that optimizes charging to reduce costs and emissions.

Program Types

Incentive

Technical assistance

Direct install

Other

*Currently closed to new enrollments

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Program Impacts by the Numbers

1,303
GridShift app users

21
Multifamily Sites with EV Charging

310
Level 1 or 2 Chargers Installed

14
DC Fast Chargers Installed

$2.4M
Incentives paid for EV charger installations

52
Properties enrolled in FutureFit Assist EV Charging

496
Level 1 or 2 Chargers Reserved
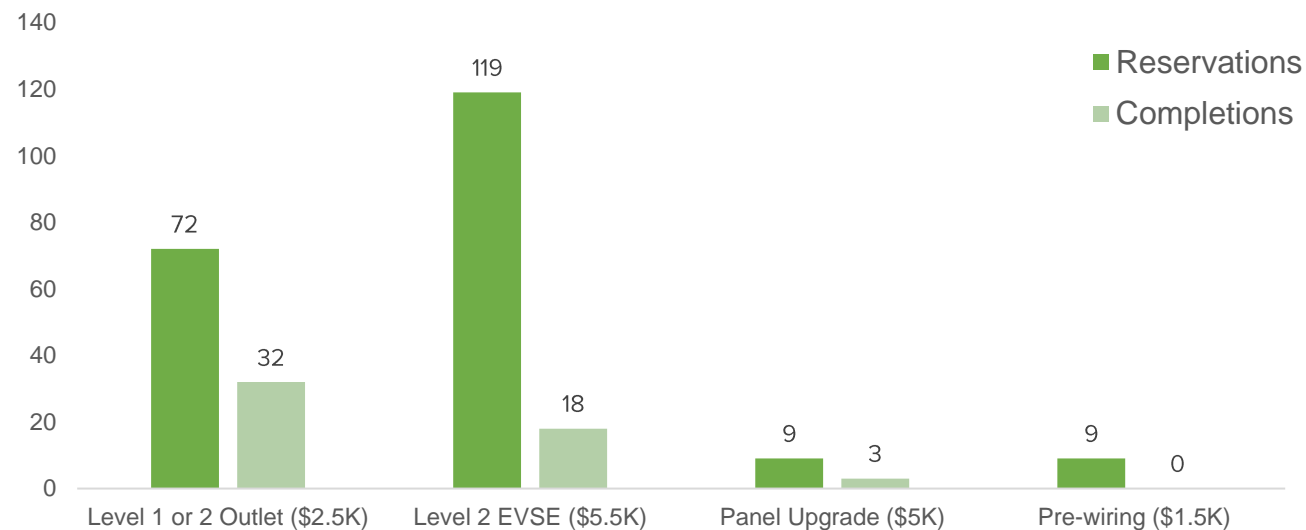
82
DC Fast Chargers Reserved

Data as of 2/22/24

Program Impact: Charging Installation Incentive Program (CHIIP)

Program Target:	150+ EVSE installed in at least 35 MUDs
Status Today:	Installed: 50 EVSE in 5 MUDs Reserved: 198 EVSE for 21 MUDs in progress

Affordability

Awareness and acceptance

Product Availability

Workforce

Active   Homepage Link

Reservations and Claims, by Type

Legend:
- Reservations
- Completions

	Level 1 or 2 Outlet ($2.5K)	Level 2 EVSE ($5.5K)	Panel Upgrade ($5K)	Pre-wiring ($1.5K)
Reservations	72	119	9	9
Completions	32	18	3	0

Data as of 2/22/24

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Case Study: Park Plaza, Mountain View

Park Plaza, Mountain View

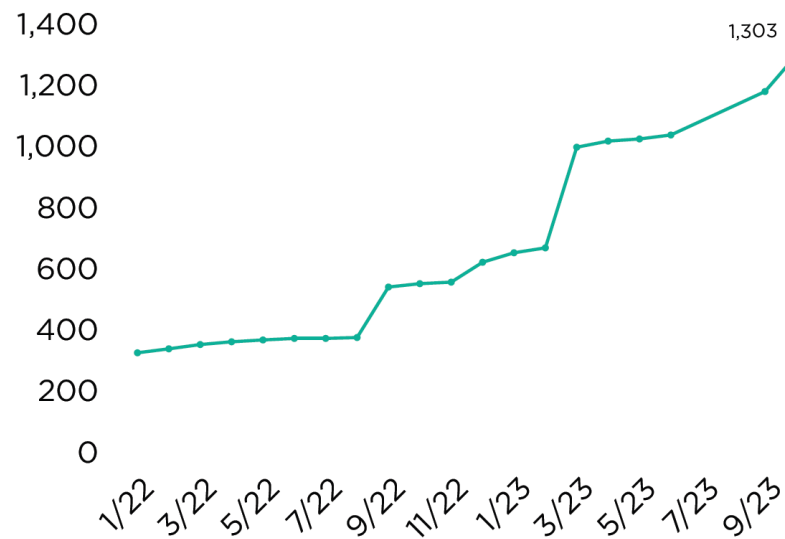|	
Number of Units	155
Year Built	1963
Number of EVSE Installed	22 shared Level 2 chargers
CHIIP Incentives Claimed	$50,000

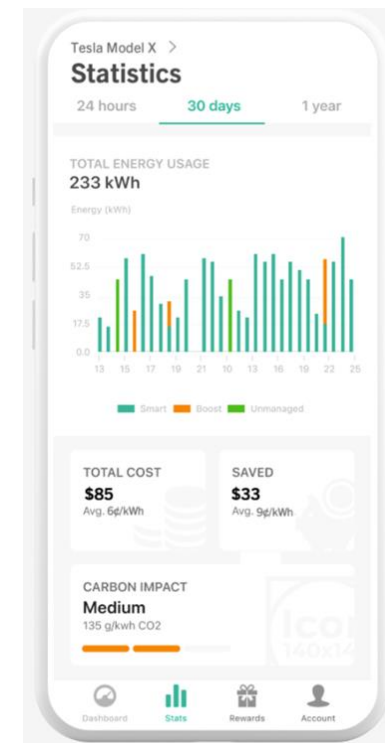Park Plaza's chargers are accessible by residents and the public via the EVmatch app.

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Program Impact: GridShift: EV Charging

Program Target:	Have 2,000 EVs enrolled by end of year 2024
Status Today:	Enrolled 1,303 EVs

Affordability Awareness and acceptance Product Availability
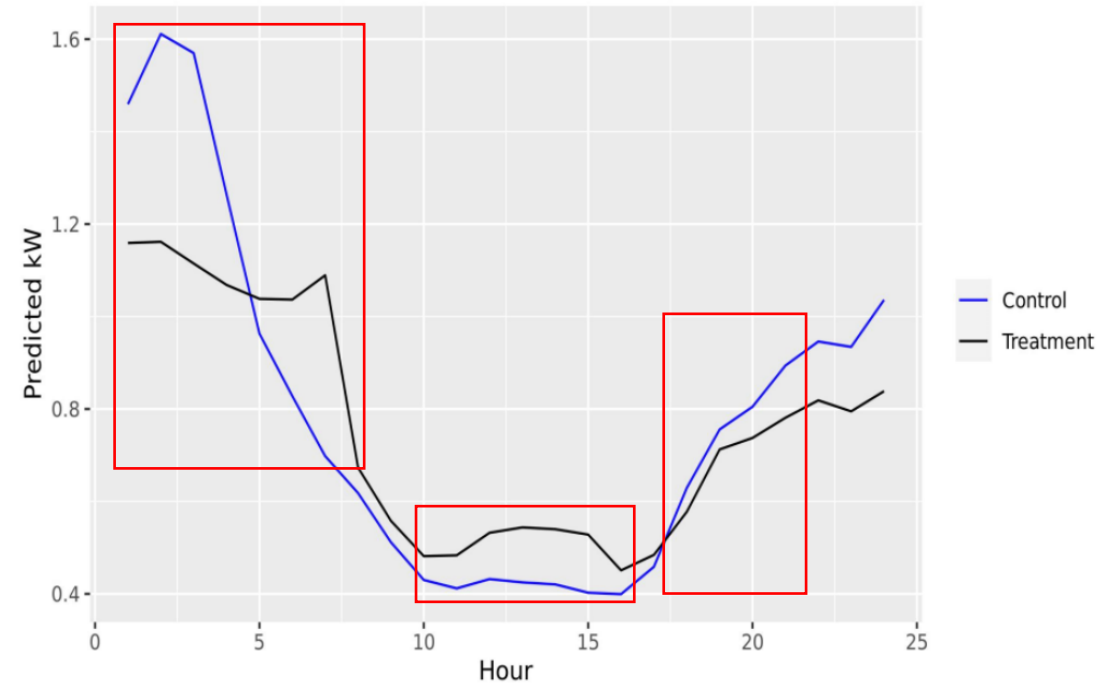
Active   Homepage Link

Number of Enrolled EVs

Program Impact: GridShift: EV Charging
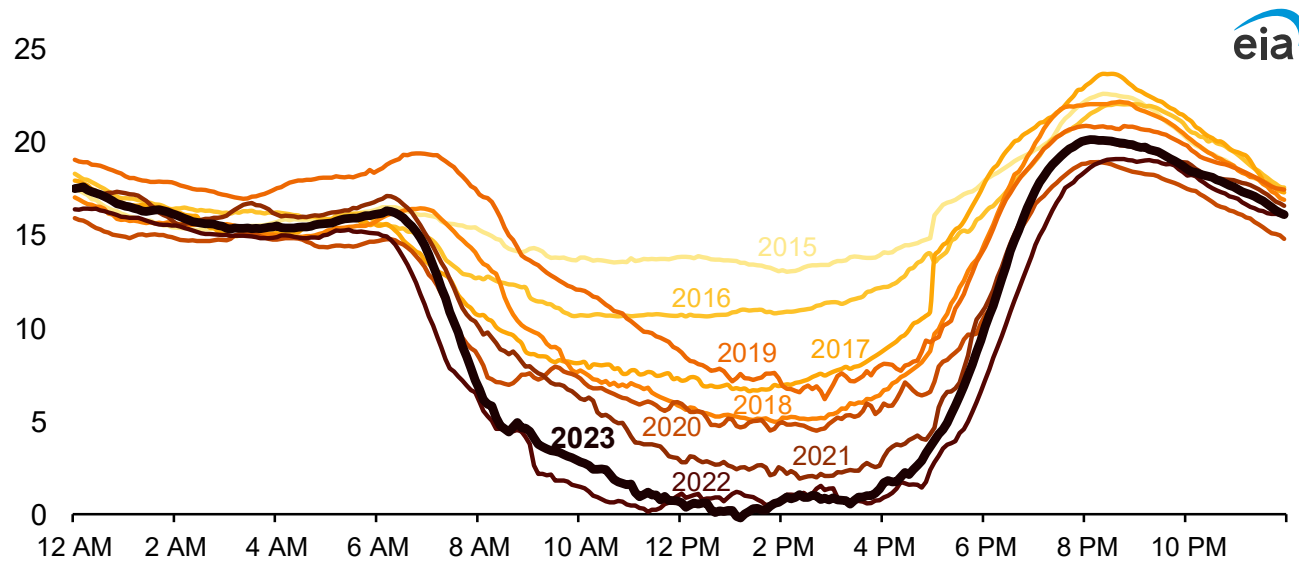
GridShift steady-state impacts

New customer programs under development

Expanding our reach to...

Affordable Multifamily

Clean, Healthy, Affordable Multifamily Properties (CHAMP)

No-cost direct installation of building electrification and EV charging for affordable housing.

Low-income Residents

E-bike Rebates

Rebates for low-income residents to purchase e-bikes.

Renters

Benefits:
- ✓ Zero tailpipe emissions
- ✓ Apply Federal Tax Credit
- ✓ Great driving experience

EXPLORE

Pre-Owned Electric Vehicles

EV Education & Incentives

EV incentives and targeted outreach to low-income and multifamily customers.

Local Workforce

Workforce Development

Develop education and training program to grow local workforce to meet future electrification needs.

Program Types
- Incentive
- Direct Install
- Other

How you can keep helping to expand and enable decarbonization

- Review updates on decarb work

  Quarterly Report in BOD packet

  List of active programs on SVCE website

  Reach out with questions, ideas, interest!

- Help us get programs to your residents

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Appendix

Program Portfolio Data

SILICON VALLEY
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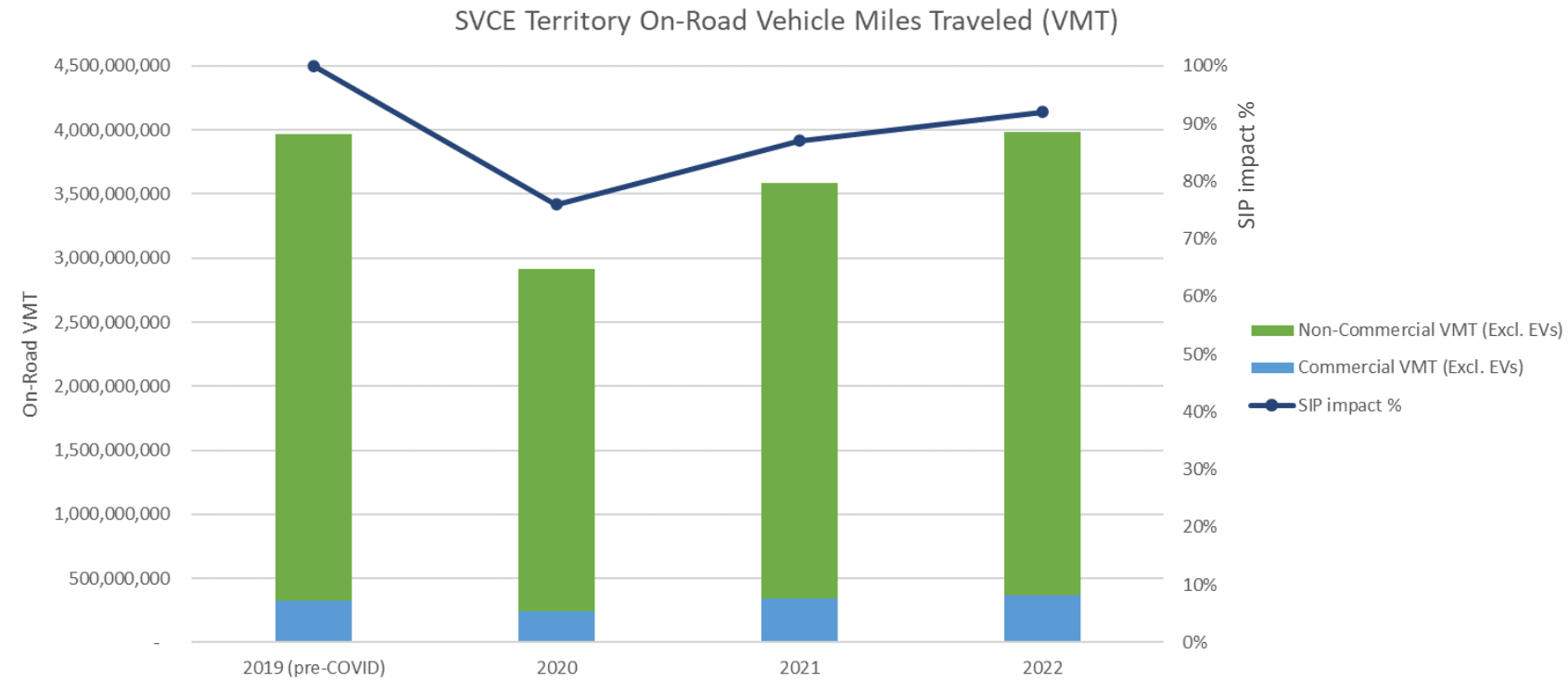
2022 Emissions Driver: On-Road Transportation

Increase in on-road transportation emissions driven by **VMT rebound post-COVID/shelter-in-place (SIP)**

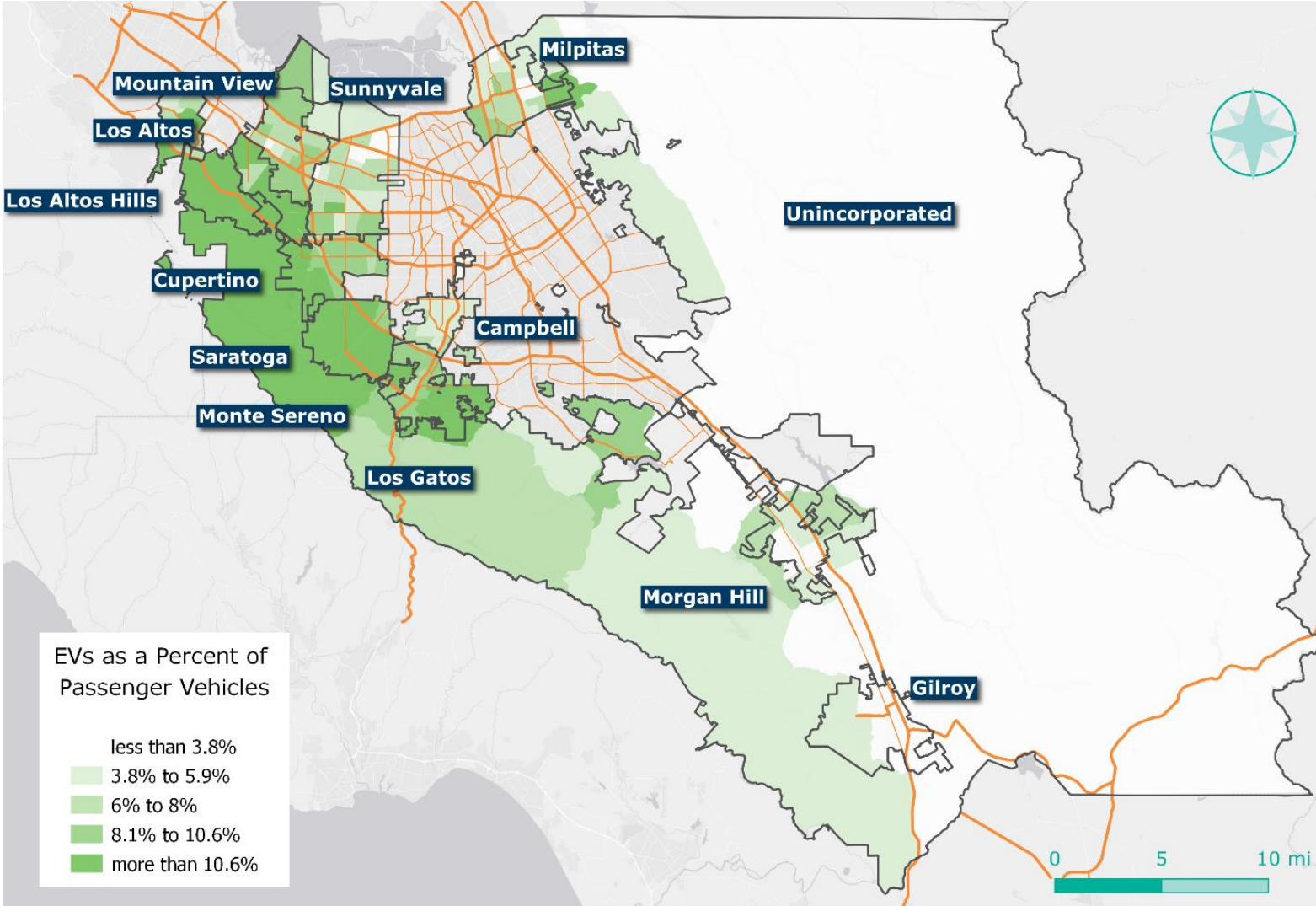The 2022 CARB Scoping Plan calls for reductions of VMT per capita by **25% by 2030** and **30% by 2045**

SVCE Territory On-Road Vehicle Miles Traveled (VMT)

Legend:
- Non-Commercial VMT (Excl. EVs)
- Commercial VMT (Excl. EVs)
- SIP impact %

Source: SVCE 2022 GHG Inventory

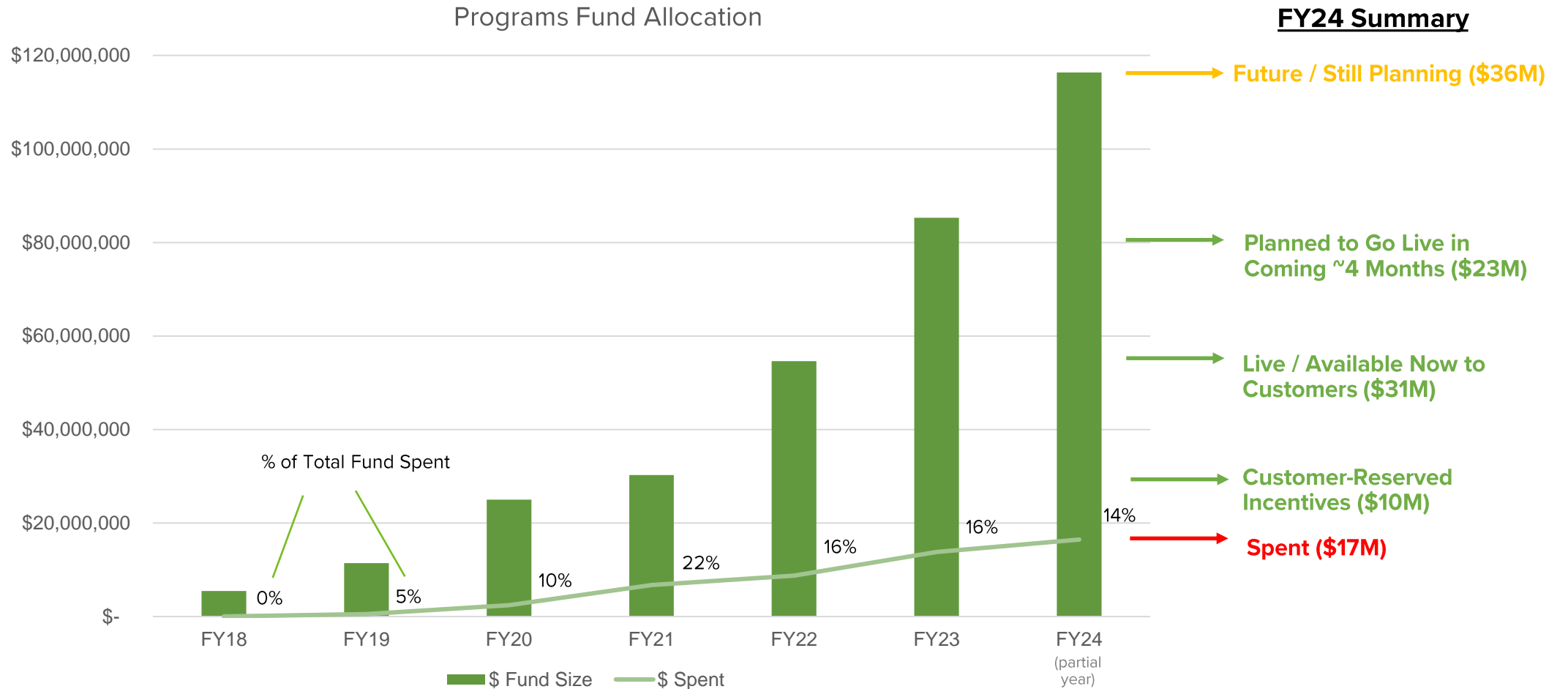# EV adoption varies across SVCE

- Highest adoption rates in West Valley

- Varying adoption in Sunnyvale and Mountain View

- Lowest adoption rates in Eastern and Southern Santa Clara

EVs as a Percent of Passenger Vehicles

- less than 3.8%
- 3.8% to 5.9%
- 6% to 8%
- 8.1% to 10.6%
- more than 10.6%

Source: Department of Motor Vehicles Registration Data - SVCE EV and EVI Baselines Study (2021)

Budget Allocation

Programs Fund Allocation

FY24 Summary

→ **Future / Still Planning ($36M)**

→ **Planned to Go Live in Coming ~4 Months ($23M)**

→ **Live / Available Now to Customers ($31M)**

→ **Customer-Reserved Incentives ($10M)**

→ **Spent ($17M)**

% of Total Fund Spent

FY18: 0%
FY19: 5%
FY20: 10%
FY21: 22%
FY22: 16%
FY23: 16%
FY24: 14%

■ $ Fund Size ── $ Spent

FY24 (partial year)

Data as of 3/14/24

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Load Forecasting

Board Study Session
April 10, 2024

SILICON VALLEY
CLEAN ENERGY

Agenda

Objectives of study session: SVCE Board Members have improved understanding of the uses and methodology for SVCE's load forecast and policies which may change our load over time.

Item	Time
Key Terms	1 minute
Why We Forecast	5 minutes
How We Forecast	10 minutes
Current Forecast Results	15 minutes
Planned Next Steps	2 minutes

Key Terms

Term	Definition
Baseline	Traditional "normal" electricity use for buildings. Load forecast results, minus the impact of load modifiers.
Load modifiers	Key drivers of changing load. Incremental impact to load associated with energy efficiency (EE), electric vehicles (EV), behind the meter PV (BTM PV), behind the meter storage (BTM ST), and building electrification (BE).
IEPR	California Energy Commission's Integrated Energy Policy Report Forecast. The state's de-facto load outlook.
8760	Number of hours in non-leap year; generally the most granular forecast done for long-term horizons
Short-term Forecasts	Used for day ahead or week ahead scheduling; largely driven by weather forecasts. Out of scope for this meeting.

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Why We Forecast: Purpose

1) Forecasting allows us insight into our expected progress toward decarbonizing the SVCE service territory

2) Understanding our load allows us to better target programs and incentives that can help decarbonization.

- **What's the GHG-value of shifting EV load?**
- **What's the value of BTM solar + storage vs. solar only?**

However, there are many key components driving load that SVCE has no control over. State Policy in particular is a major driver and changes to it could dramatically shift SVCE's forecast going forward.
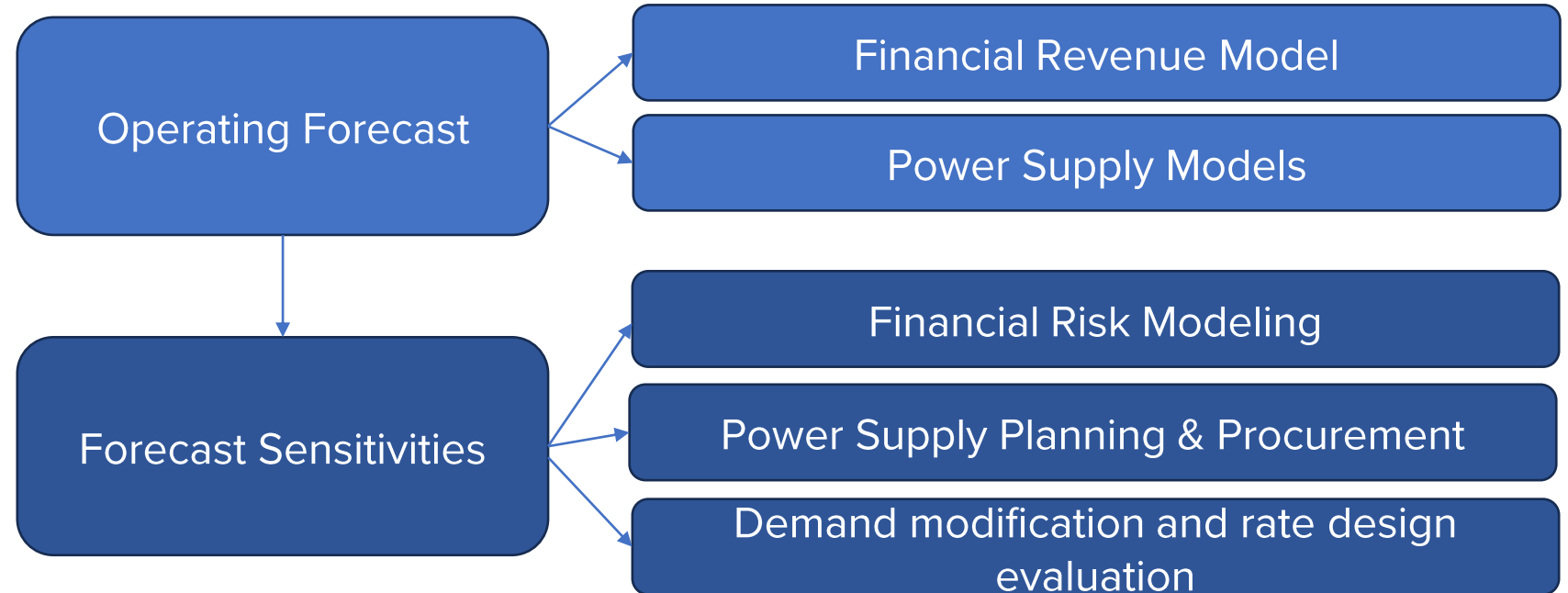
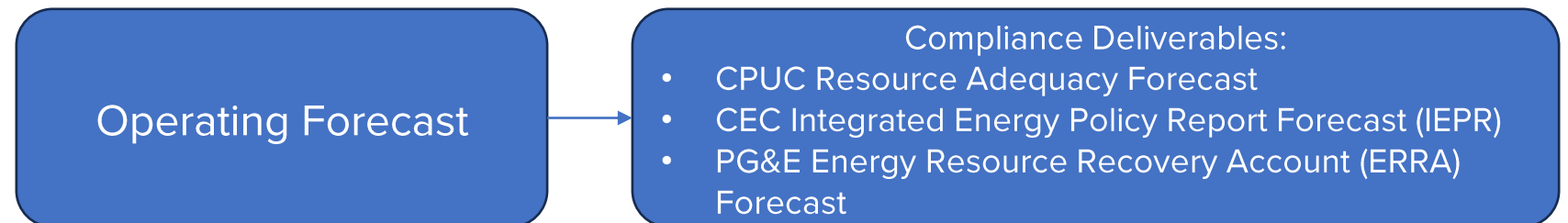- **Internal Combustion Engine (ICE) Ban**

Why We Forecast: Conclusion

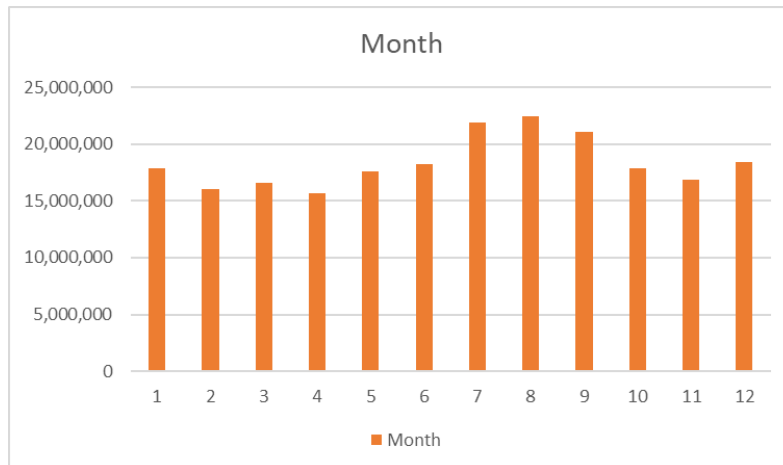*"All models are wrong, but some are useful"* – George E.P. Box
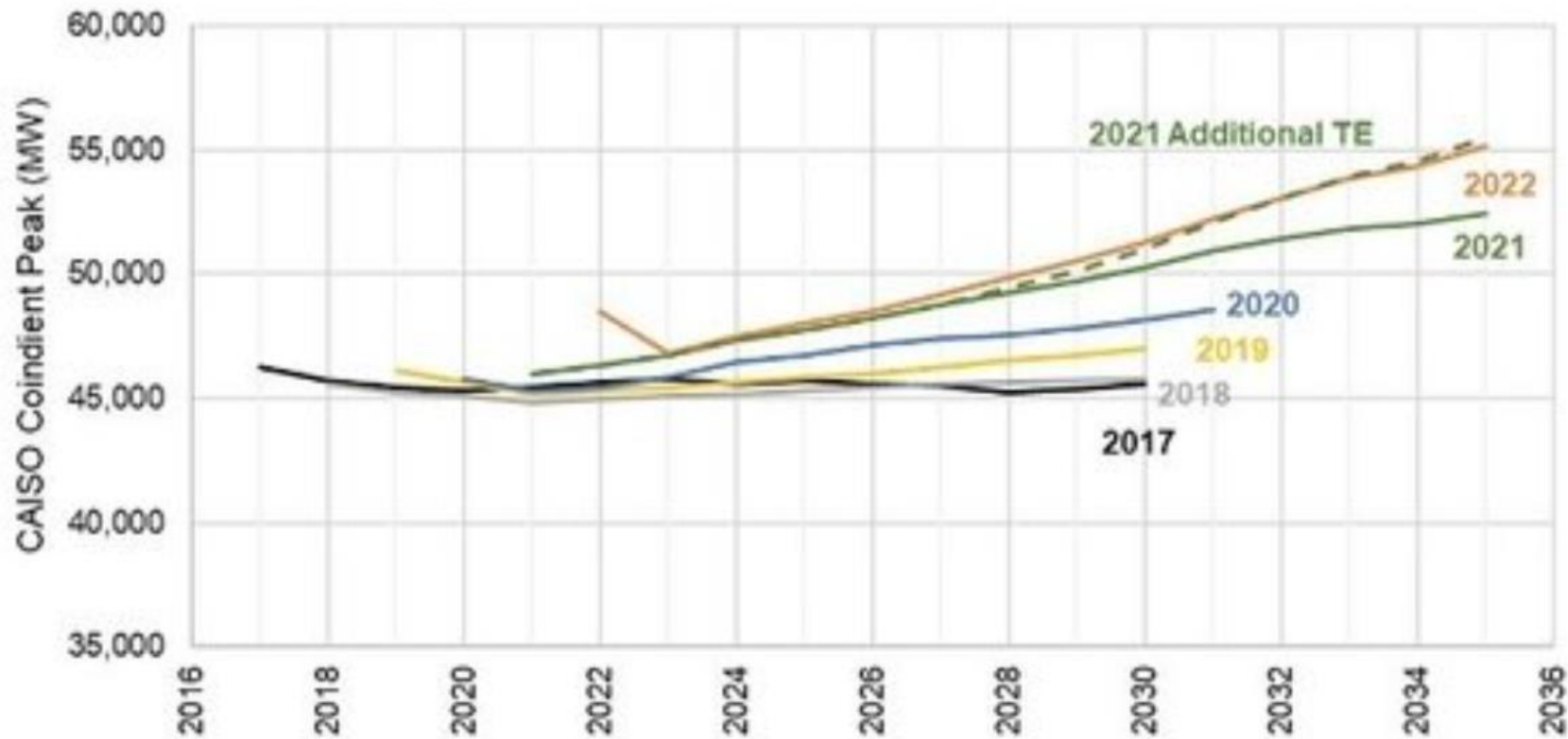
How We Forecast: Improved Methods

SVCE has historically relied on 3rd party forecasters but has recently brought this function in house and significantly expanded its functionality.
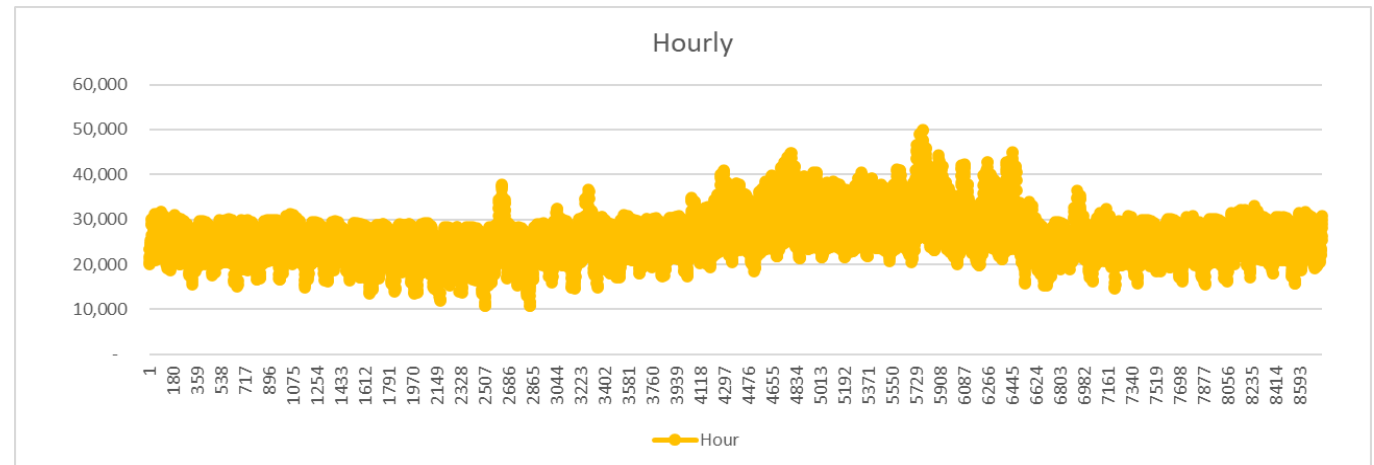
Old Forecast:
- Monthly sales volumes
- Monthly peaks

New Forecast:
- Forecast each class and load modifier (BTM PV, EV, EE, BE and BTM Storage)
- Hourly shapes (8760 hours per year) for each load component

Significantly improved granularity

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How We Forecast: Methodology

The forecast is built using a mix of historic data and projections from both external sources as well as insights from SVCE staff

Key Inputs:
- Historic data, normalized for weather
- Economic projections to determine baseline load growth
- Insights from SVCE's subject matter experts on load modifier growth
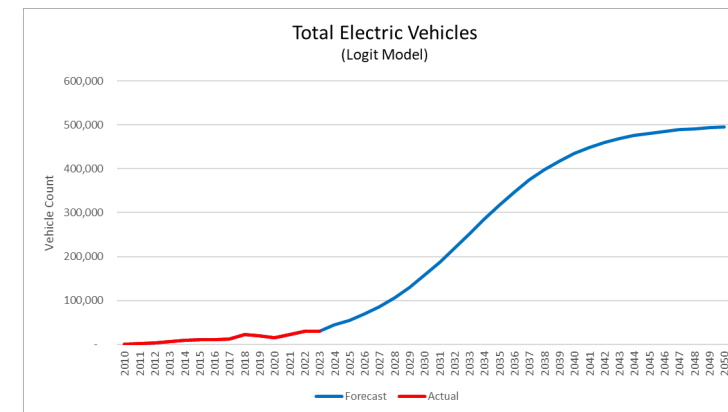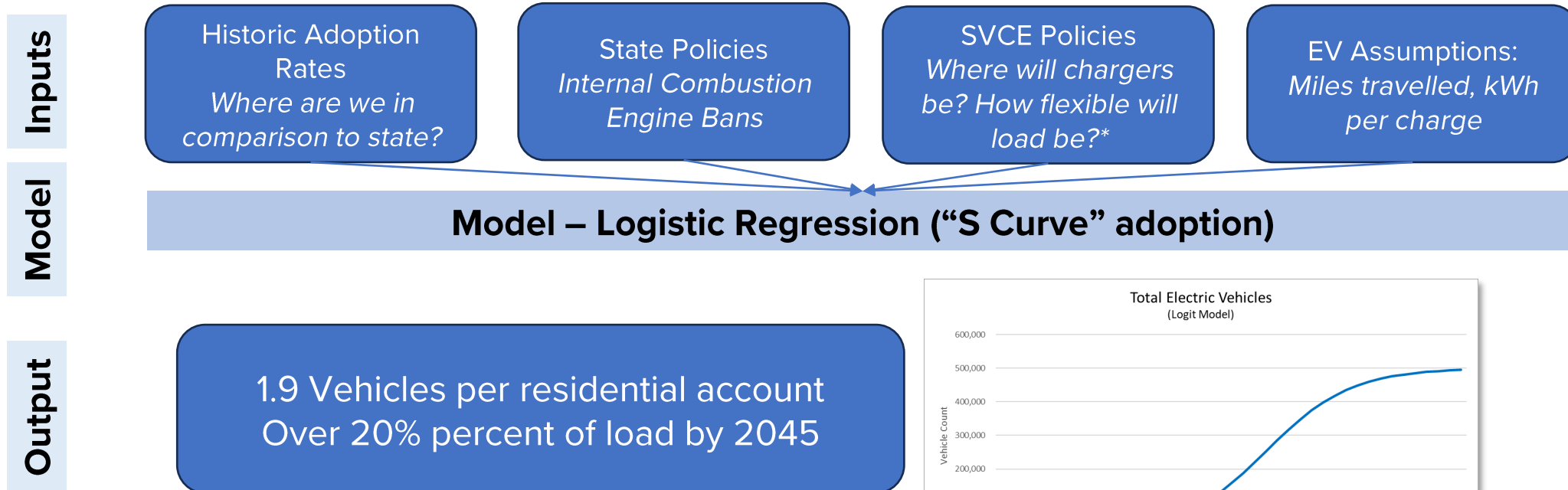
Models:
- Statistical forecasting model
- Several modifiers forecasted using adoption models

How We Forecast: Load Modifiers

Load Modifiers are modelled utilizing historic adoption for our territory plus assumptions driven by expected state policies and SVCE programs.

Example: Electric Vehicles

Inputs

| Historic Adoption Rates *Where are we in comparison to state?* | State Policies *Internal Combustion Engine Bans* | SVCE Policies *Where will chargers be? How flexible will load be?** | EV Assumptions: *Miles travelled, kWh per charge* |

Model

Model – Logistic Regression ("S Curve" adoption)

Output

1.9 Vehicles per residential account
Over 20% percent of load by 2045

Total Electric Vehicles
(Logit Model)

*sensitivities to explore value of flexibility in scope for near-term work

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How We Forecast: Modifier Inputs

SVCE's operating forecast has what staff believe to be aggressive but realistic outlooks for key modifiers.

Electric Vehicles: By 2050 SVCE will hit near complete saturation (1.9 Vehicles per residential account)

Building Electrification: Aggressive electric heat pump and water heater build out – all new build will have electric heat and water by end of decade, plus 5,000 electric HPWH replacements.
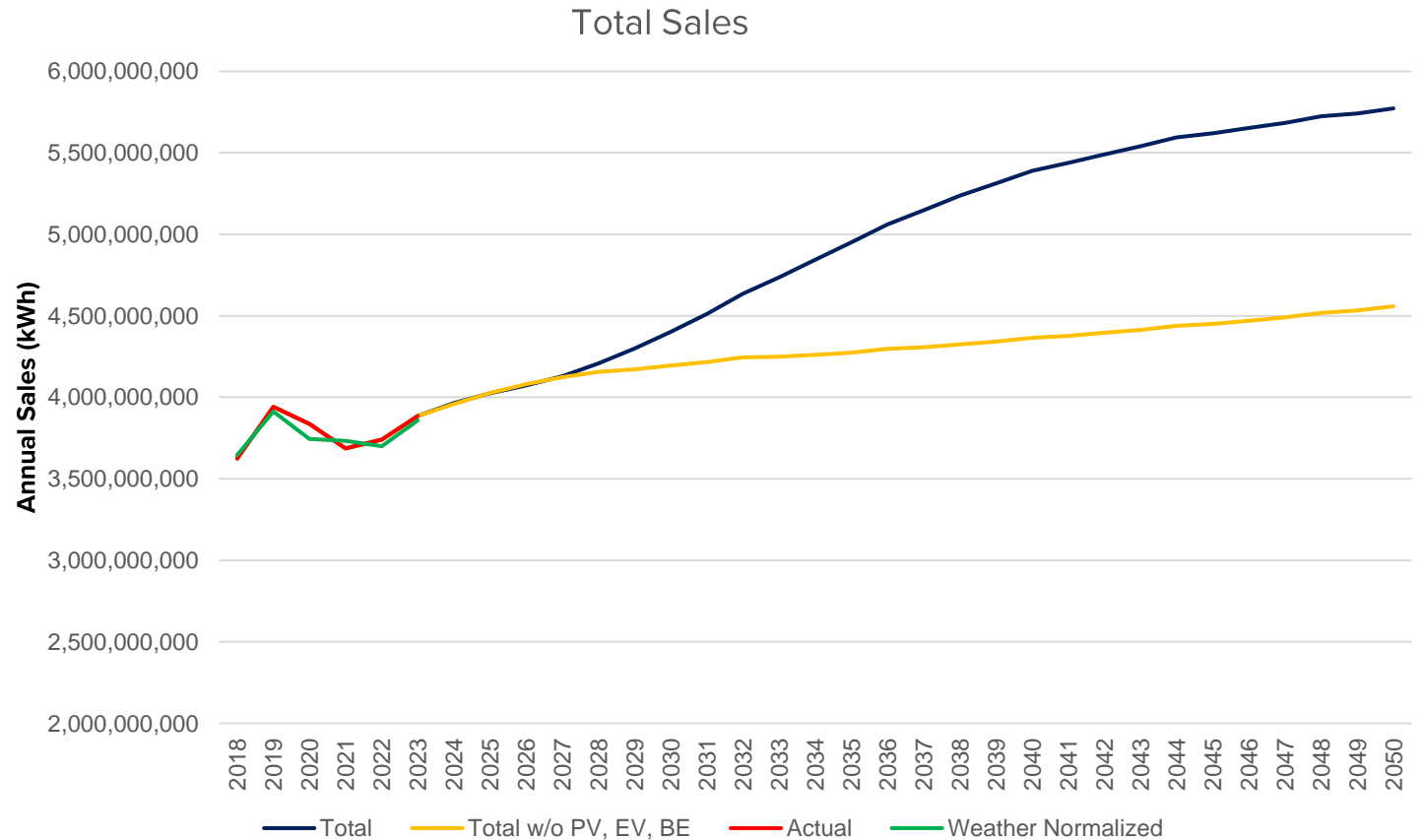
BTM PV: Adoption increases nearly 50% by 2050 (~25% of home and 8% of commercial accounts with BTM PV).

Results: 2024 Operating Forecast

Total load is forecast to increase ~45% by 2050.

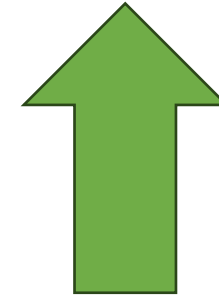Load modifiers are the key driver of growth over the forecast horizon.

Total Sales

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Results: Load Modifier Impacts

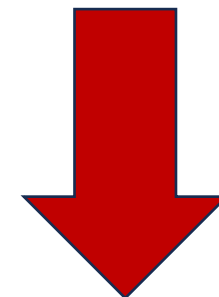**The key load modifiers considered have different impacts on load.**

Increase Load:
- Electric Vehicles
- Building Electrification
- BTM Storage (due to round trip efficiency losses)

Decrease Load:
- BTM PV
- Energy Efficiency

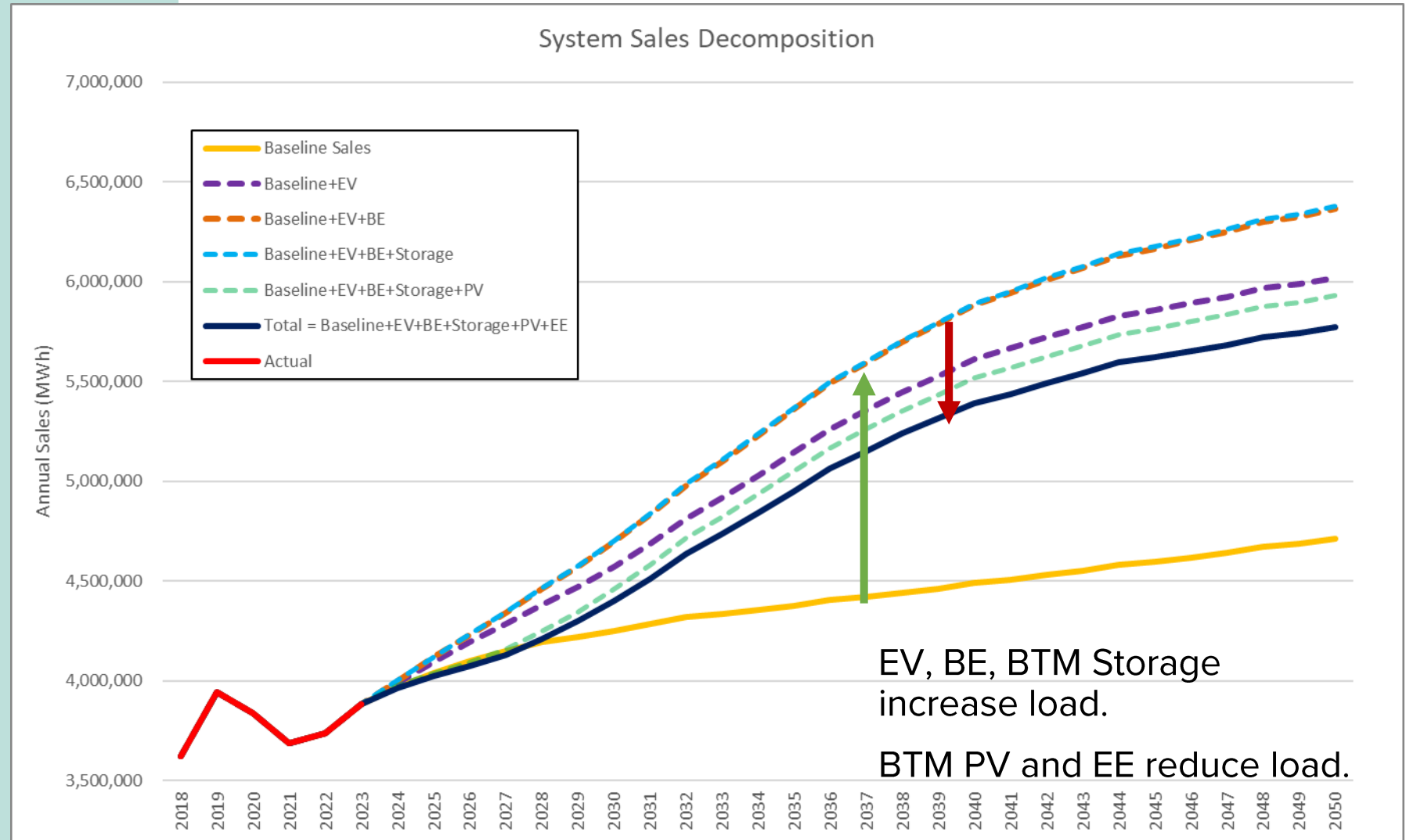# Results: Load Modifier Outlook

EVs are the key driver of growth in the near-term.

Longer-term building electrification becomes increasingly important to load growth.

System Sales Decomposition

EV, BE, BTM Storage increase load.

BTM PV and EE reduce load.

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Results: Load By Class

SVCE's load will be increasingly driven by residential customers – over 40% by 2045 vs. ~30% today.
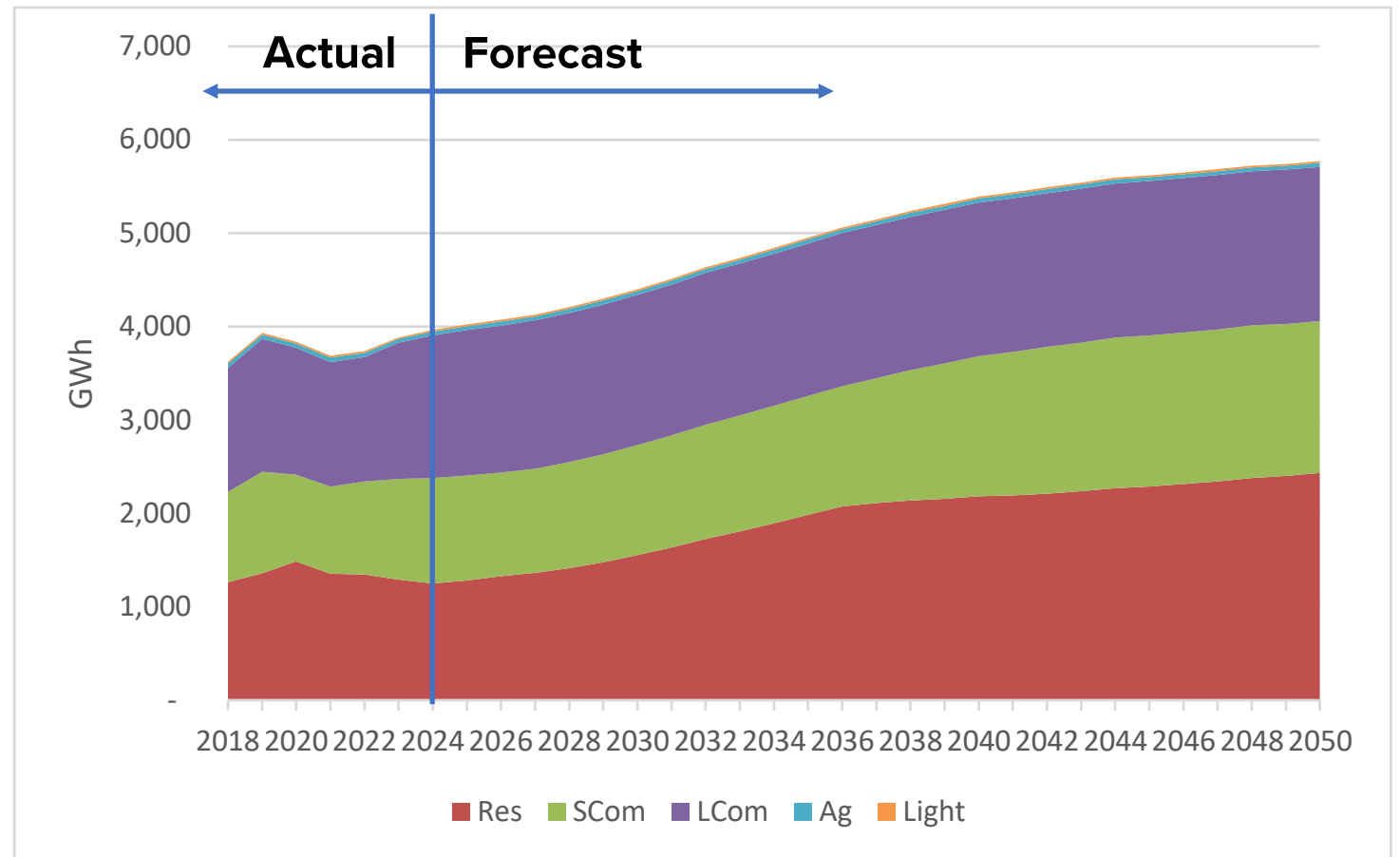
Planned Next Steps

Analysis with 2024 Operating Forecast
- Currently developing sensitivities for financial risk assessments (more at June meeting)
- Assessing how improved 8760 forecast impacts long-term finance and power supply outlook
- Support Virtual Power Plant and Real Time Pricing valuation efforts

Continuous Improvement Efforts for 2025 Operating Forecast
- Consider inclusion of climate change impacts
- Further analysis for key load modifiers
  - EV shape impact
  - BTM storage outlook
  - Deep dive into numerous model assumptions

# Appendix

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Key Drivers by Rate Class

- **Residential baseline growth tied largely to tech employment; load modifier growth drives bulk of the new energy demand for this sector**
- **Large commercial growth driven by economic forecast for Santa Clara county**
- **Small and Medium growth near-term driven by economic forecast, later in the horizon increasing EV public EV charging**
- **Agriculture held constant – most agricultural load in SVCE territory is residential water pumps**
- **Google load calculated separately – inputs from Google team**

How do we compare to the IEPR forecast?

Total Retail Sales Forecast
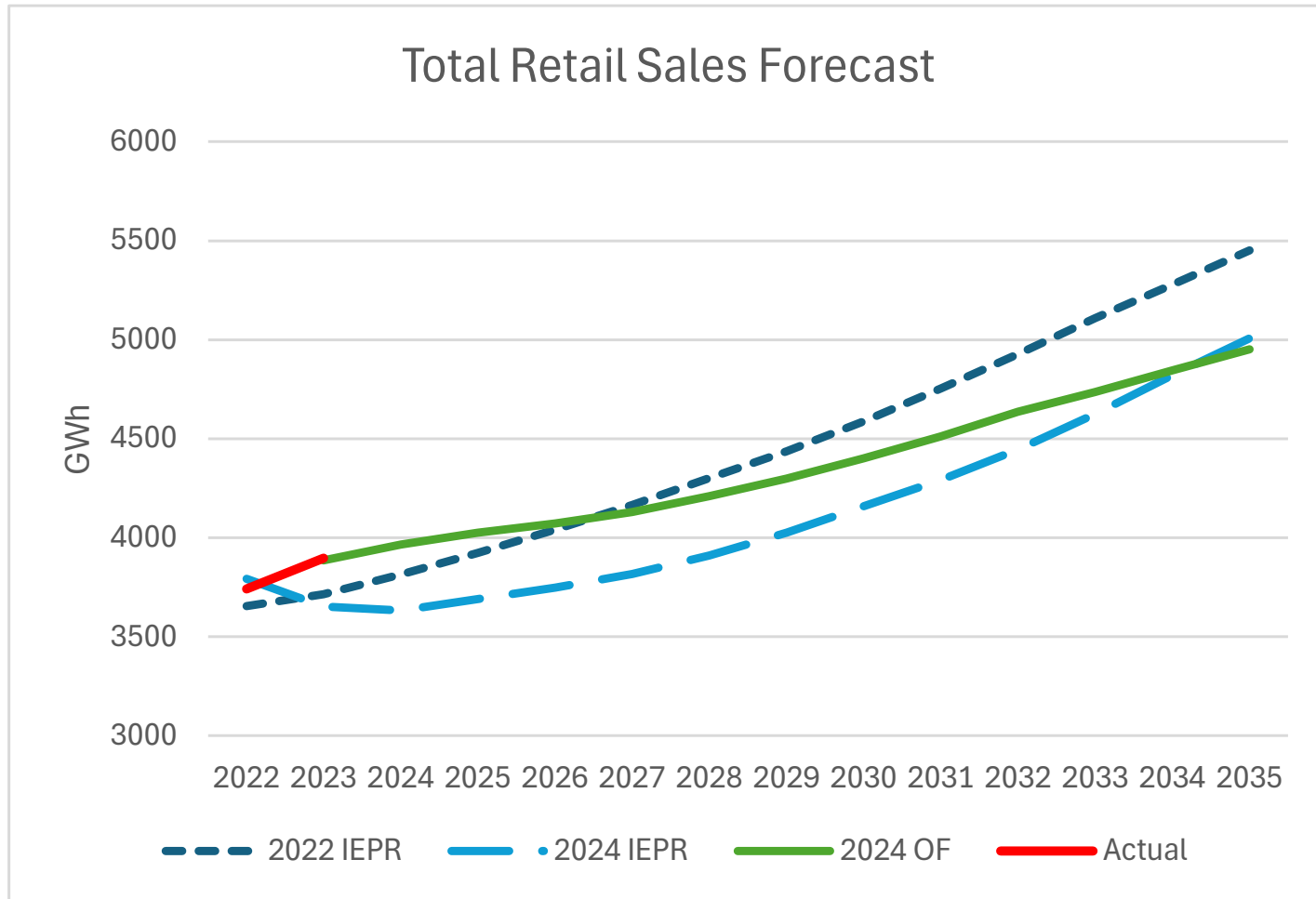

- **Results are SVCE load share of IEPR forecast**
- Due to early adopters of EV in our service territory our load will not grow as quickly as the state average
- The IEPR forecast is incredibly aggressive in Building Electrification assumptions, more than SVCE staff thinks is reasonable.

Electric Vehicles

EV growth will continue, driven by policy and consumer preferences, until SVCE service territory hits near-saturation at the end of the forecast period.

Total Electric Vehicles (Logit Model)
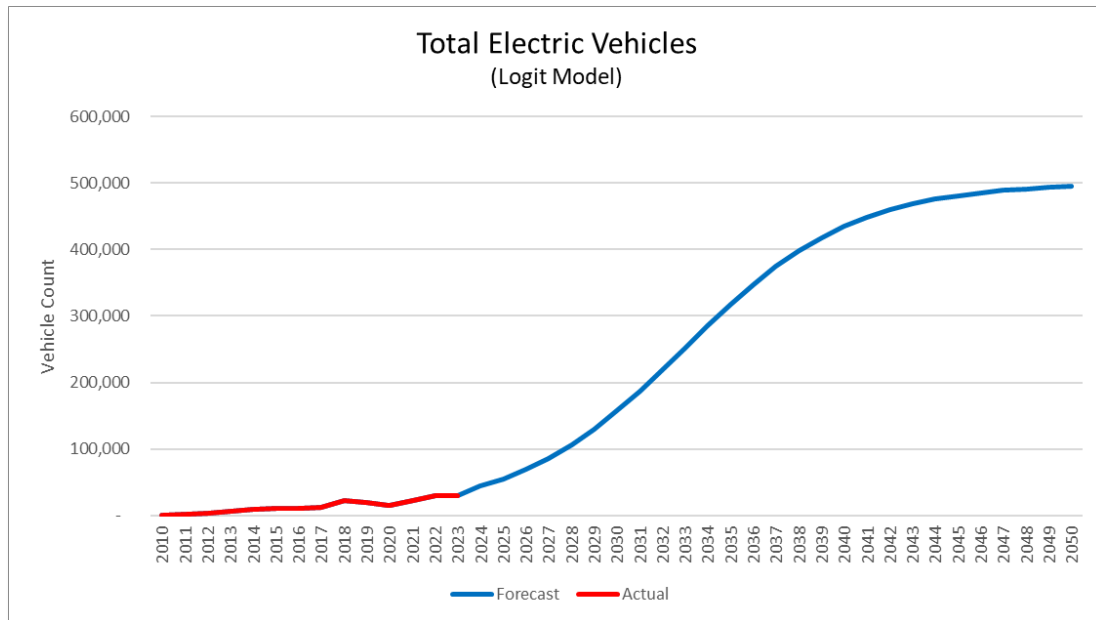
Method:
- S Curve Adoption; assumes nearly complete saturation

Key Assumptions:
- Consider historic adoption
- Due to policy and customer preferences, we will hit near-saturation (1.9 vehicles per residential account) by 2050
- Assumes 75% at home charge, 25% public charging

Building Electrification

BE growth will increase, especially later in the decade, as new housing units are developed, and consumer preferences shift away from gas appliances.
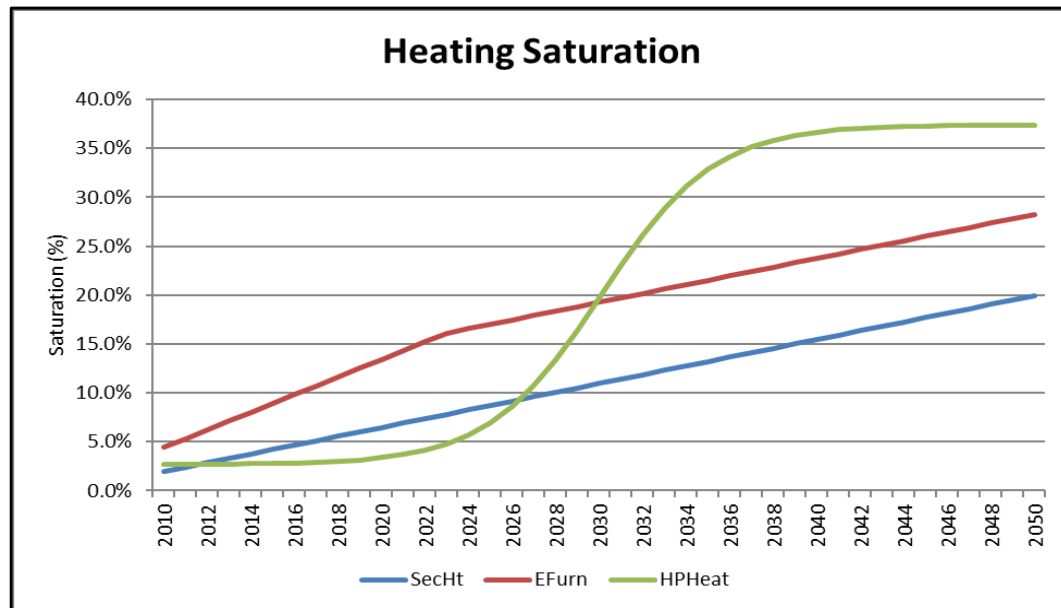
Method:
- Assume CEC RASS historical trends for most end-uses
- For water heaters assume 0.2%/Year
    - Based on CEC RASS trend and SVCE expectation.
- For heat pumps assume 19.7% in 2030
    - All new units install HPWP
    - Replacement 5000 by 2030
- Implied total heating from electrical sources: 50% in 2030

Key Assumptions:
- For most end uses historical trends are reasonable
- Aggressive growth assumptions for select appliances appear reasonable given likely policy scenarios

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BTM PV

BTM PV growth will slow due to changes in payback (near-term) and available sites (long-term).

SVCE Residential Forecast
(Based on Payback Model)
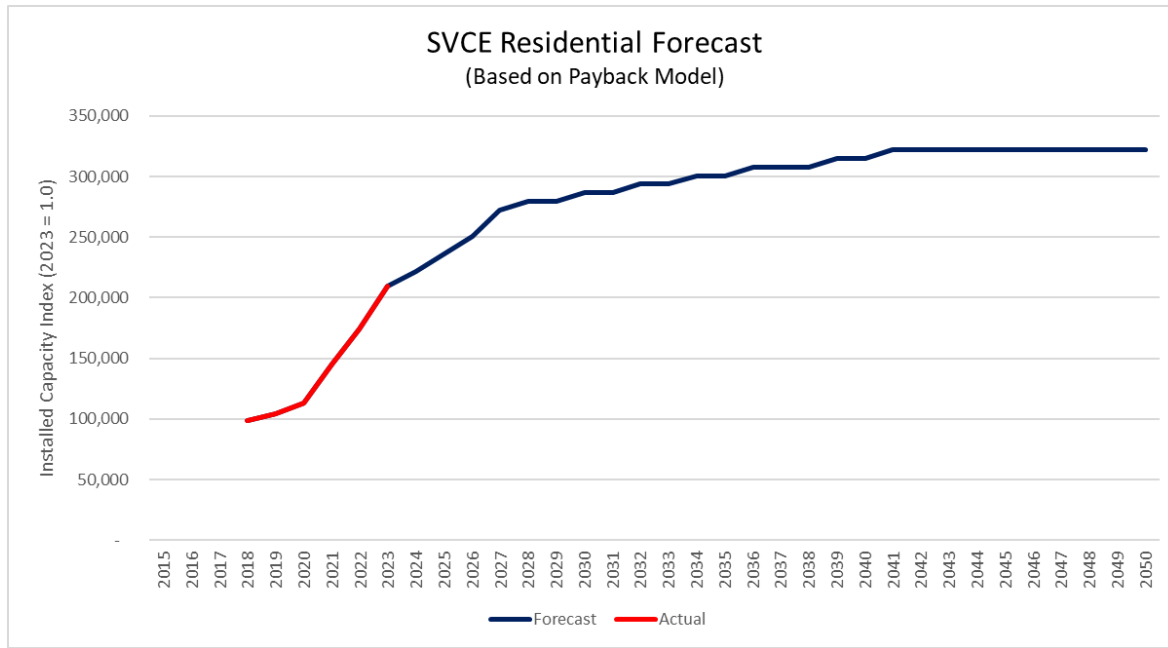
Method:
- Use residential payback model

Key Assumptions:
- Cost projections use Itron's projections, calibrated to SolarReview's 2023 estimates
- Payback period appears reasonably aligned with NEM payback targets.

Permit Modernization and Building Decarbonization Policy Update
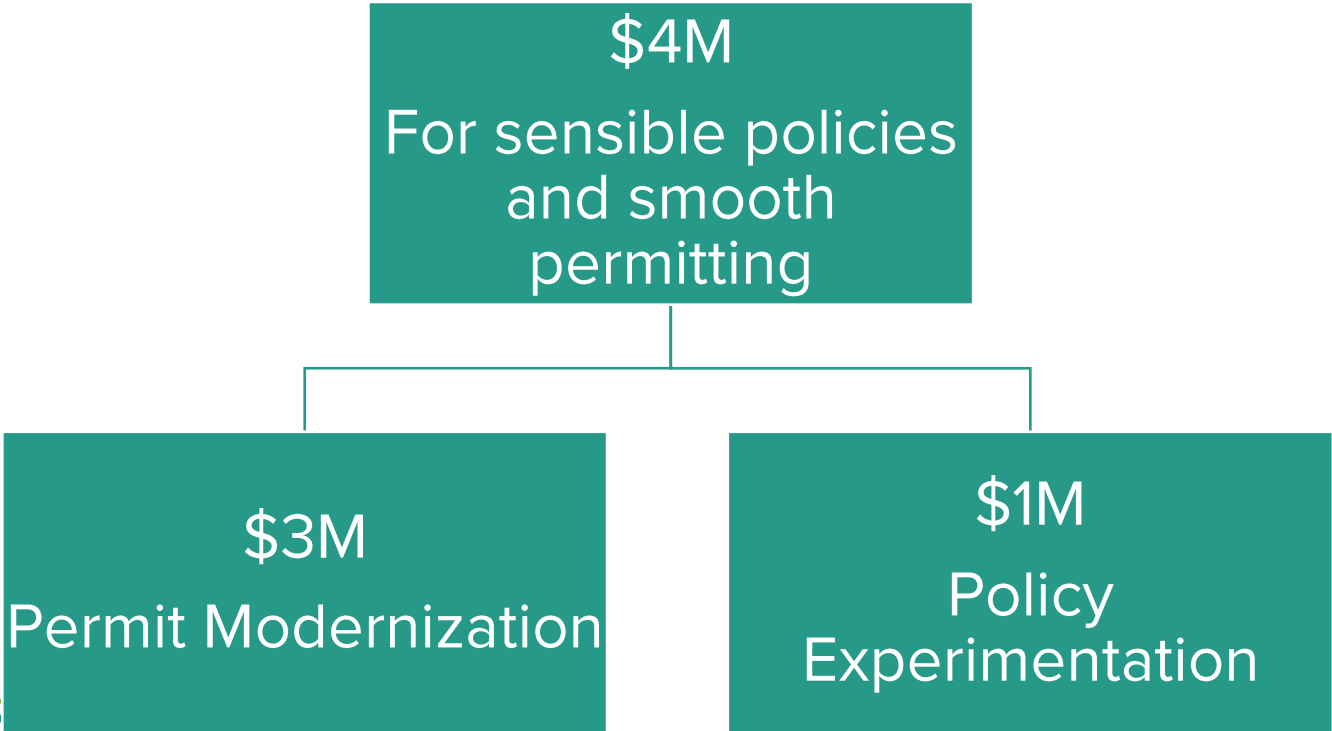
Board of Directors Meeting
April 2024

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Objective

1. Recap resources available to your agency

2. Provide status update

Our strategy focuses on sensible policies and practical processes to ease the transition.

Sensible local policies and smooth permitting processes can make the transition to pollution-free buildings easier and less costly, by helping people to prepare and electrify at the best time.

Technical resources can increase member agency capacity so staff can develop and implement policies with less burden.

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SVCE is providing a comprehensive set of resources to help each agency meet its goals.

	Resources Available	Permit Modernization	Policy Experimentation
Available to All	1:1 consultation w/SVCE staff (Board member & agency staff)	X	X
	Tailored action plan for each jurisdiction	X	X
	Technical, legal, and staff support resources	X	X
Available to Leadership Cohort	Access to national-level climate change trainings	X	X
	Stipend for part-time, one-year fellow	X	X
	Expanded consultant support to implement leading-edge initiatives	X	X

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Each agency selects from a menu of options and SVCE drafts a customized action plan.

There are three tiers of action.

Foundational Practices	Advancing Practices	Leading Practices
Complete required practices* + choose 2 additional from below	*Implement 3 advancing practices*	*Foundational + Advancing + Choose 2 from below*
*Review EVI code, update if needed	Incorporate Mechanical Siting best practices	Minimize barriers to inspections (blinders, virtual inspections)
*Review New Construction Reach Code (if applicable) and make compliant with Berkeley decision	Require Bi-Directional HVAC at time of AC replacement	BAAQMD ramp up (includes electrification readiness)
Provide staff training for expedited permitting	Establish HPWH permitting equivalency	Require disclosures about gas appliances at time of sale
Develop pre-application support materials		Implement Contractor Certification Program
Free permit pilot		Incentive-based remodels for electrification
Implement Permit Concierge		
Certificate of quality inspection		

SVCE has met with 13/13 Directors and staff from 10/13 agencies.

	PROGRESS UPDATE			
Member Agency	**Director Meeting**	**Staff Meetings**	**Action Plan Status**	**Commitment Level** *Foundational, Advancing, or Leading*
Campbell	1/17	2/2	SVCE drafting	TBD
Cupertino	1/19	2/14	SVCE drafting	TBD
Gilroy	1/30	2/26	SVCE drafting	TBD
Los Altos	1/26	2/7, 2/29	SVCE drafting	TBD
Los Altos Hills	1/19	2/24*	SVCE drafting	TBD
Los Gatos	1/9	2/6	SVCE drafting	TBD
Milpitas	2/5	2/5	SVCE drafting	TBD
Monte Sereno	1/9	?		TBD
Morgan Hill	2/9	?		TBD
Mountain View	2/13, 2/16	2/27, 4/3	SVCE drafting	TBD
Saratoga	2/1	3/8	SVCE drafting	TBD
Sunnyvale	2/5	2/14, 3/12	SVCE drafting	TBD
Santa Clara County	2/9	?		TBD

We will begin delivering action plans in April.

In lieu of meeting with staff, SVCE met with Environmental Commission.

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Thank you!

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