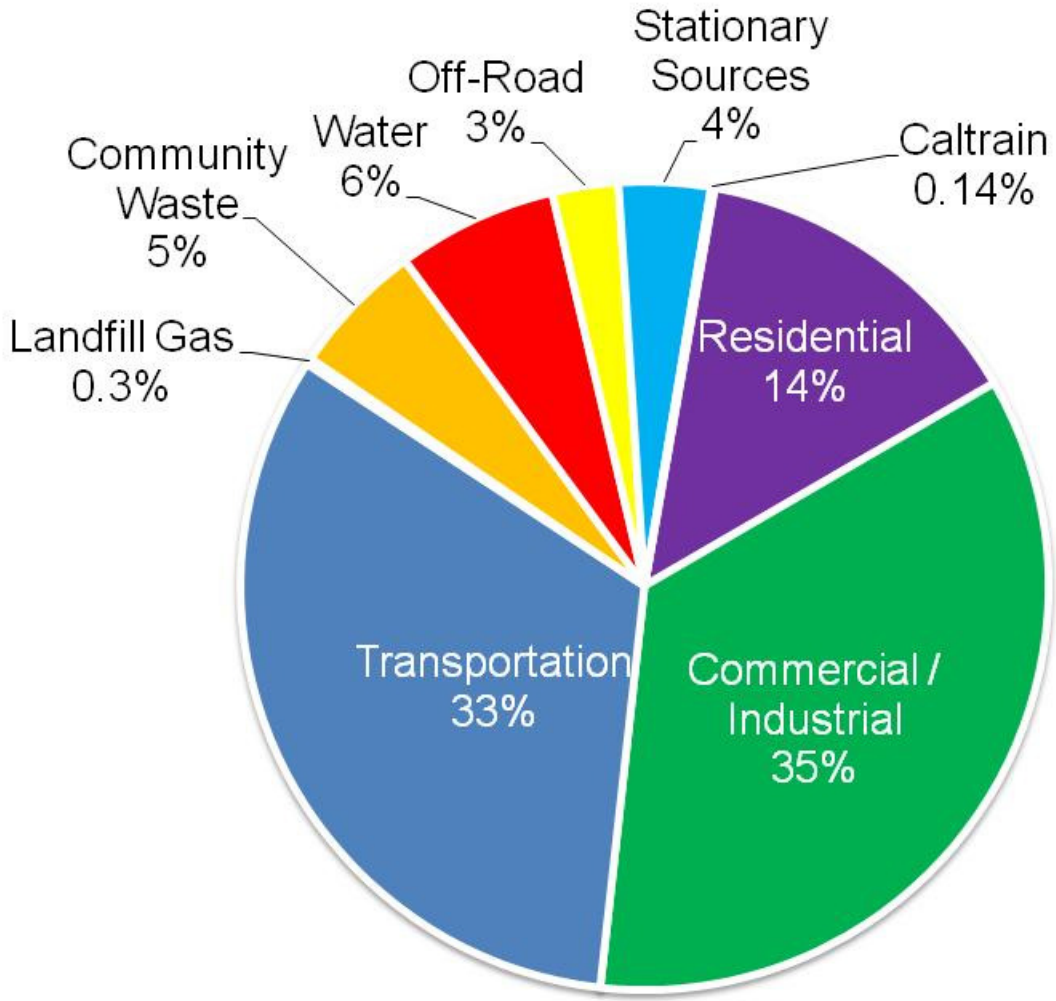
CITY OF SUNNYVALE

HORIZON 2035

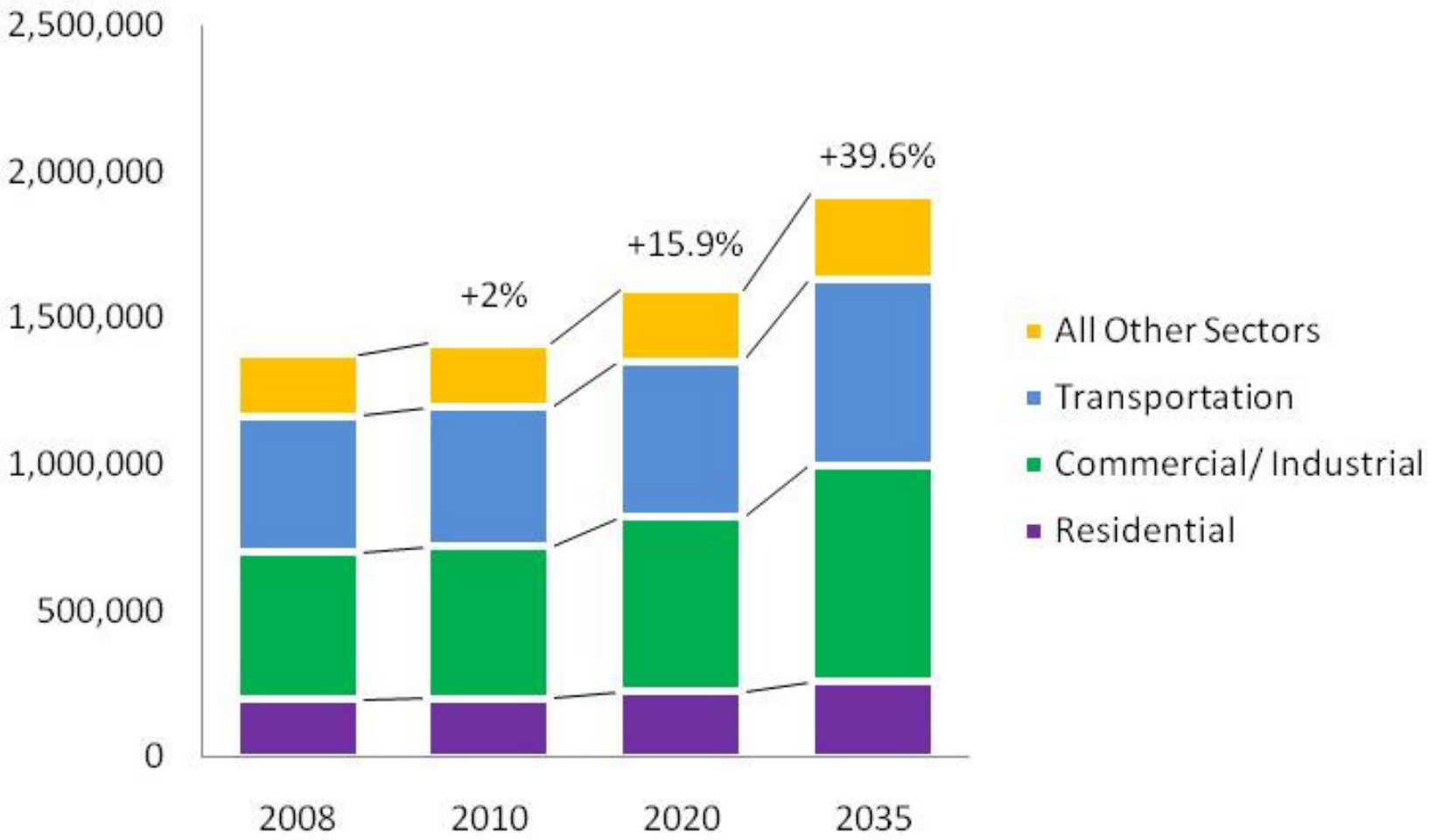
CLIMATE ACTION PLAN
Reduction Measure Analysis

Stakeholder Advisory Committee
Meeting
January 19, 2011

GHG Inventory



Preliminary BAU Forecast

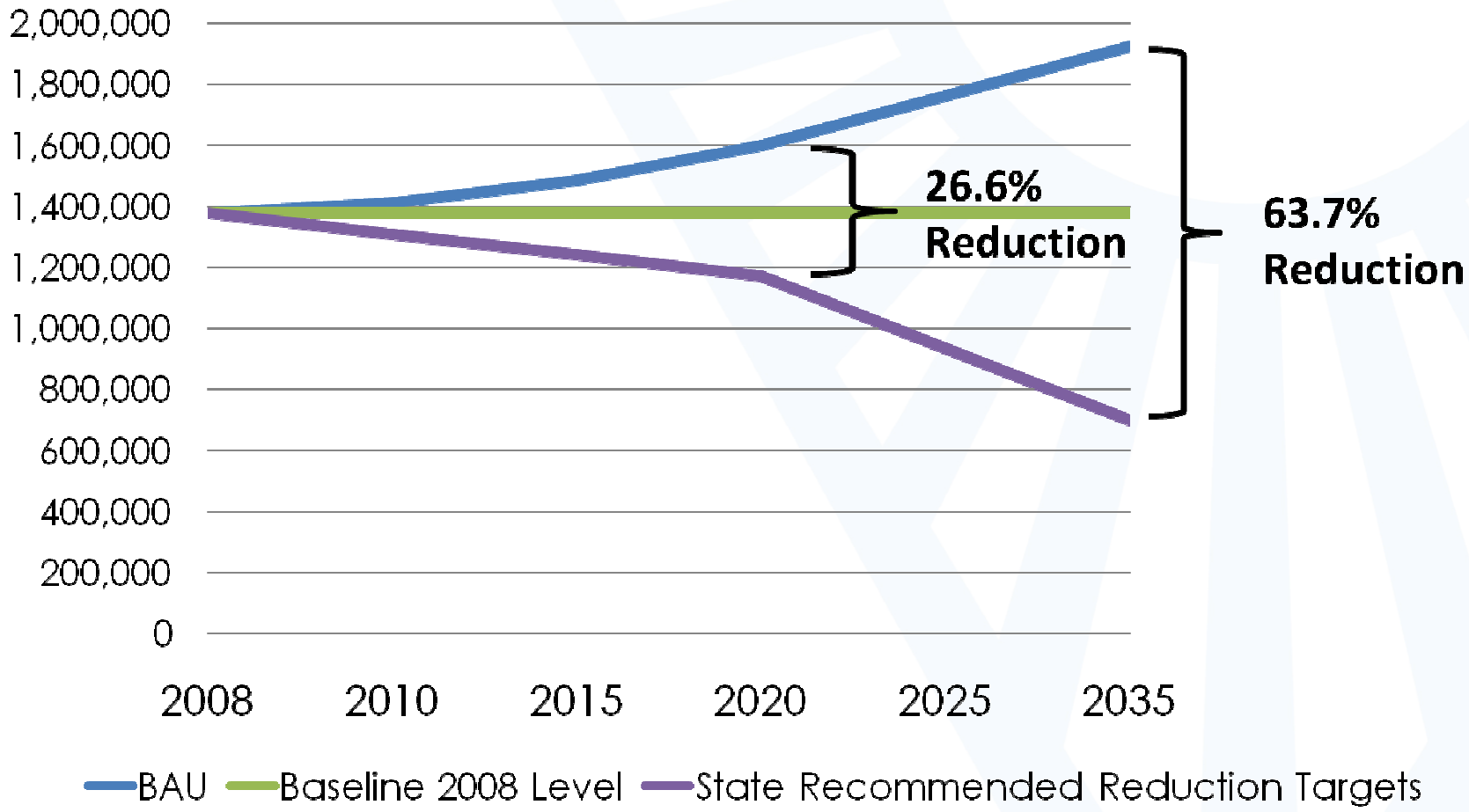


Preliminary BAU Forecast

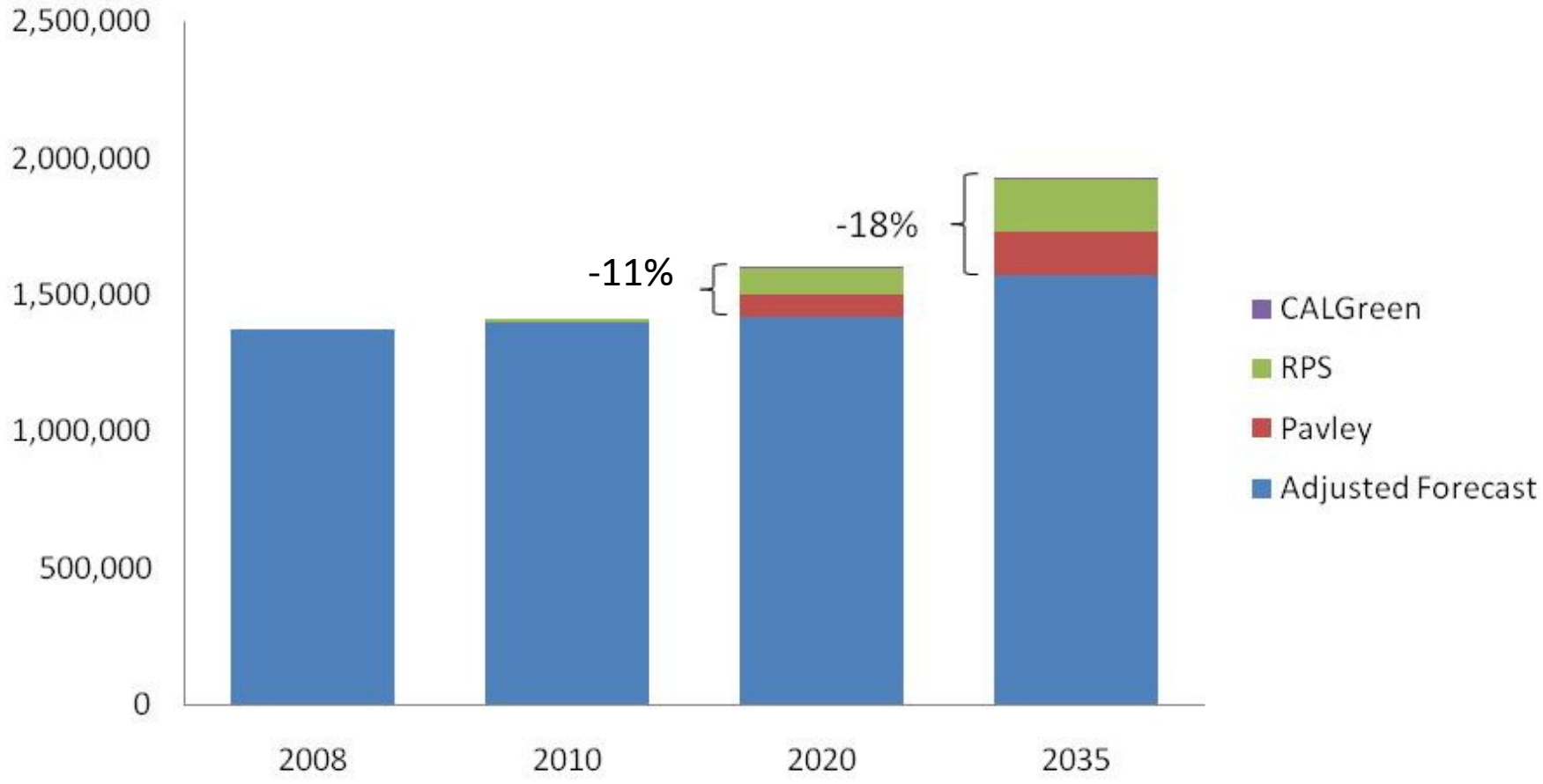
2008 Community Growth Forecast	BAU Change from 2008 - 2020	BAU Change from 2008 - 2035
Residential	12.49%	30.33%
Commercial/ Industrial	18.82%	47.40%
Transportation	14.82%	36.46%
Landfilled Waste	16.73%	41.77%
Landfill Gas	-21.34%	-41.73%
Water	14.82%	36.46%
Off-Road	14.64%	35.99%
Caltrain	11.21%	27.00%
TOTAL	15.94%	39.63%

* Preliminary estimate for discussion purposes

Preliminary BAU Forecast



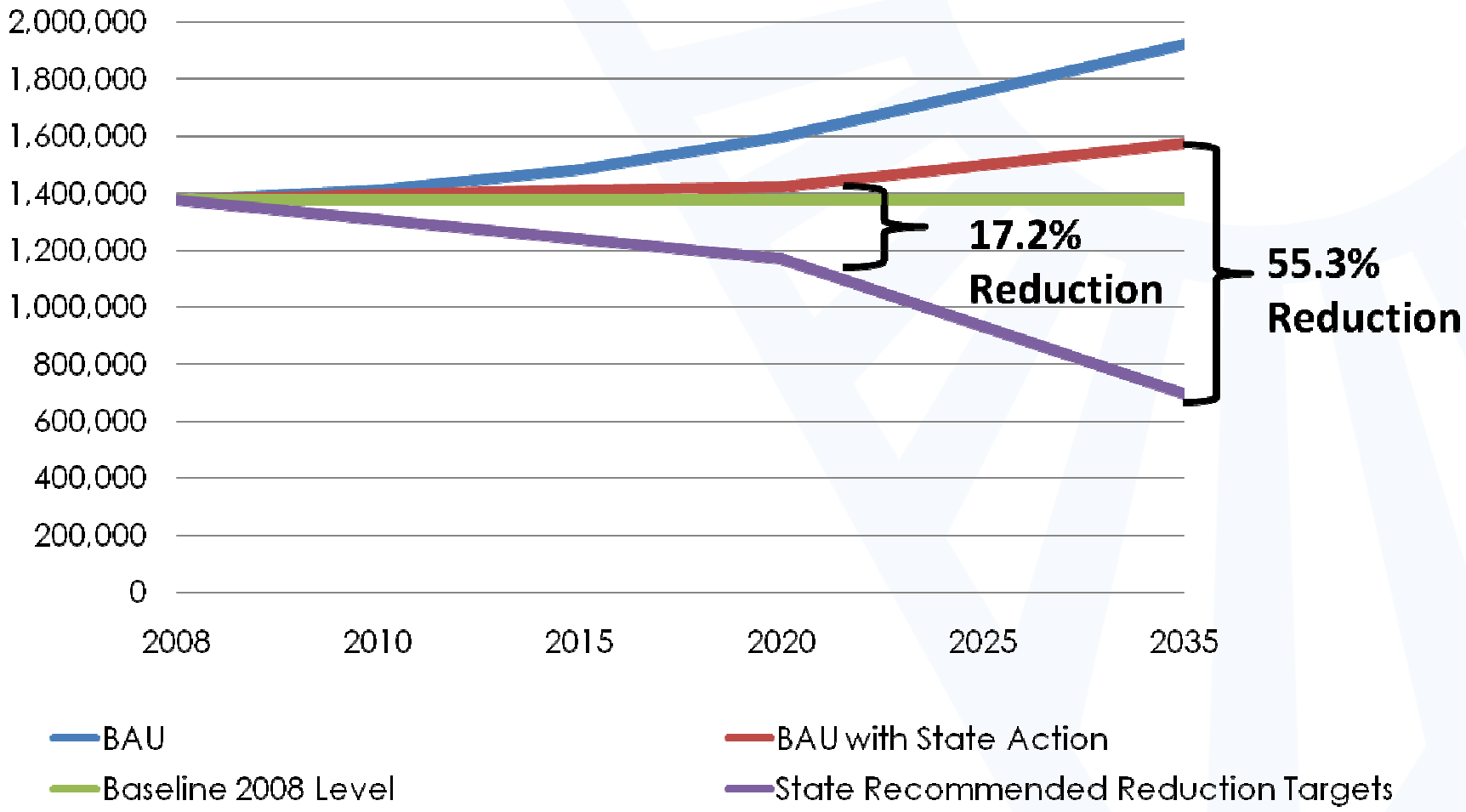
Preliminary Forecast



Preliminary Forecast

	2010	2020	2035
BAU Growth Projection (MTCO2e)	1,411,761	1,597,074	1,923,368
Pavley I Reductions (MTCO2e)	0	-81,512	-158,698
RPS Reductions (MTCO2e)	-14,490	-93,295	-186,532
CalGreen 2008 Title 24 Reductions (MTCO2e)	0	-1,512	-2,850
Total State Reductions (MTCO2e)	-14,490	-176,319	-348,080
Adjusted Growth Projection (MTCO2e)	1,397,271	1,420,755	1,575,287
Percentage Change From BAU	-1.03%	-11.04%	-18.10%

Preliminary Forecast



Purpose of CAP Analysis

- Feasibility
- Implementation Phasing
- CEQA Tiering
- Consistency with AB 32 and SB 375
- City Budgeting
- Implementation Monitoring

Levels of Analysis

Goals

Policies

Actions

CAP Policy Detail

- Topic Area
- Reduction Measure Text
- Description
- Existing Efforts/Policies
- Implementation Actions
- Implementing Department/Agency
- 2010, 2020, and 2035 GHG Reduction
- 2010, 2020, and 2035 Cost and Cost Savings to the City
- Co-Benefits
- Performance Target

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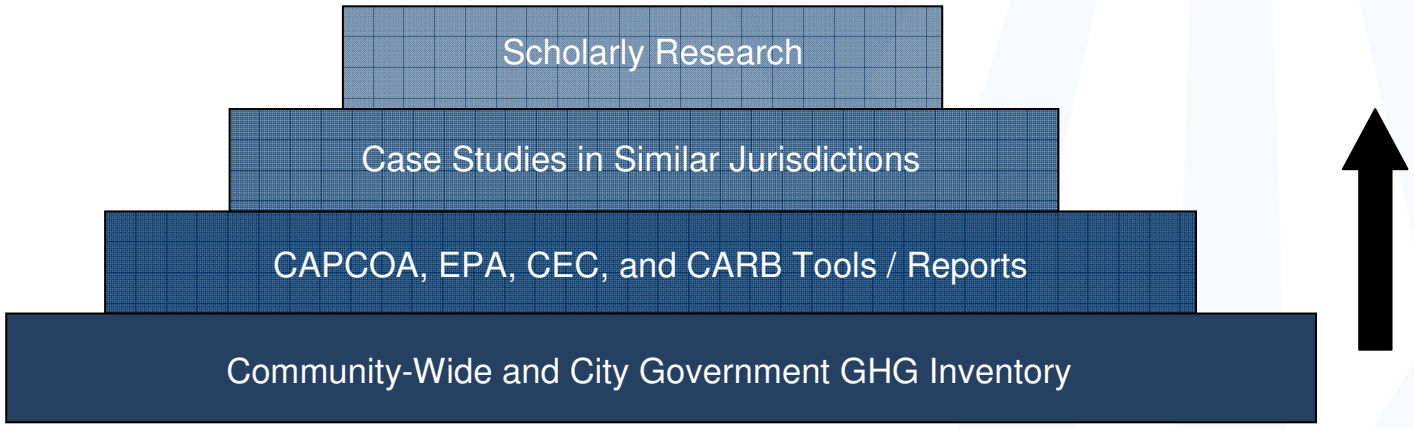
GHG Analysis

- Three Types of GHG Reductions:
  1. Avoided emissions as a result of decreased demand or need for a GHG-producing activity.
  2. Increased efficiency of GHG-producing activities.
  3. Sequestration (i.e. absorption) of GHG by vegetation and plants

GHG Analysis

- How GHG is Quantified
  1. Determine the performance indicator
  2. Establish a 2010, 2020, and 2035 performance target based in *substantial evidence.*



GHG Analysis

- How GHG is Quantified, Cont.

3. Calculate how the performance target affects GHG-producing activity.

4. Convert 2010, 2020, and 2035 activity to GHG

Example 1: Car Sharing

TRI-2: Car Sharing

Promote the use of carsharing in Sunnyvale in order to establish and maintain at least one viable car share operation within the City by 2020.

OVT-3.1. Work with car sharing companies such as Zipcar and City Car Share to increase the availability of car share programs in Sunnyvale.

OVT-3.2. Identify appropriate locations, and require facilities for car share vehicles in new parking garages, job, centers, commercial cores, neighborhoods, and transit hubs.

Example 1: Car Sharing

	Description	Factor	Source
A	% reduction in car-share member annual VMT	37%	Millard-Bail, 2005.
B	Number of car share members per shared car	20	Cambridge Systematics, 2009.
C	Population per shared car based on suburban context	2,000	Cambridge Systematics, 2009.
D	Percent VMT reduction	0.0037	Calculation = A * B / C
E	Annual VMT Reduction in 2020	3,832,110	Calculation = D * 2020 VMT (Inventory)*
F	Annual GHG Reduction in 2020 (Metric Tons CO2e)	4,673	Calculation = E * Emission factor for passenger cars (Inventory)*

Example 2: Cool Pavement

E-4. "Cool" Roofs and Pavements.

Reduce the amount of dark, non-reflective roofing and paving material in order to mitigate the urban heat island effect and reduce energy associated with heating and cooling.

E-4.1. Require all new and resurfaced parking lots, sidewalks, and crosswalks to be made of materials with high reflectivity, such as concrete or reflective aggregate in paving materials.

E-4.2. Require new multi-family buildings and re-roofing projects to install 'cool roofs' consistent with the current California Green Building Code (CalGreen) standards for commercial and industrial buildings.

E-4.3. Commit to using a warm aggregate mix for all asphalt patching, overlay, and reconstruction.

Example 2: Cool Pavement

	Value	Description
a.	40%	Percent of pavement for crosswalks and parking lots (Pomerantz, 2010)
b.	30%	Maximum albedo increase from total pavement replacement (Akbari, 2008)
c.	12%	Albedo increase from replacement of parking lots and crosswalks (a * b)
d.	-0.40	Temperature change, degrees Celsius (For every 30% increase in albedo, urban temperatures will drop 1 degree Celsius)
e.	3%	Percentage change in electricity demand per degree Celsius (Akbari, 2008)
f.	23,010,067 kWh	Reduction in Sunnyvale electricity demand in 2020, kWh (d * e * 2020 Sunnyvale kWh)
g.	6,820	GHG Reduction, 2020, Metric Tons CO2e (f * 2020 electricity emissions factor)

Quantification and Measure Language

- **Bicycle, Pedestrian and Transportation Design Elements.** Create streets and connections that facilitate bicycling, walking, and transit use throughout the City in order to increase the modal split such that automotive trips represent **less than 50% of trips as** measured annually.
- **School Commutes.** Encourage carpooling, bicycling, walking and transit access to elementary, middle and high schools so that the number of car trips is **no more than 20%** of the number of students at any school.
- **Lighting Efficiency.** Increase the use of efficient indoor and outdoor lighting technologies to reduce energy consumption associated with lighting **by 80%.**

Example 3: Renewable Energy

EP-2. Local Small-Scale Renewable Energy. Expand the electric energy portfolio for Sunnyvale so that 40% of energy used comes from local renewable sources by 2025.

RE-1.1. Require new homes and businesses and major remodels to be 'solar ready' by pre-wiring for solar hot water heating and solar electricity.

RE-1.2. Participate in a Property Assessed Clean Energy (PACE) or similar financing program to offer low-interest loans to residents and businesses for renewable energy installations (also included as E-2.2).

RE-1.3. Prevent buildings and additions from shading more than 10% of roofs of other structures.

Example 3: Renewable Energy

	Value	Description
a.	10%	Percent participation in program, 2020 (Sonoma County)
b.	60%	Percentage of program participants to renewable energy, 2020 (Sonoma County)
c.	1,781	Residential participation, owner-occupied homes (a * b * Number of 2020 owner-occupied homes per Housing Element)
d.	572	Commercial participation (a * b * Number of businesses)
e.	4,926	Average residential solar installation kWh/year in Bay Area
f.	12,327	Average commercial solar installation kWh/year in Bay Area
g.	15,824,250	Total kWh/year from program participation ((c*e)+(d*f))
h.	0.8%	Percentage of overall electricity demand in 2020 (g/2020 kWh)
i.	4,690.5	GHG Reduction per year (g*2020 electricity coefficient)

Cost Analysis

- Three Cost Categories:
  - Hard Costs (Equipment, supplies, etc.)
  - Staff Costs
  - Maintenance Costs (Labor and Supplies)
- Costs are modeled, added, and put into ranges.

Cost Analysis

City Costs and/or Savings	
Cost in Dollars	**Qualitative Description**
0	Negligible
$1-$25,000	Low
$25-$100,000	Low-Mid
$100,000-$500,000	Medium
$500,000-$1,000,000	Medium-High
Over $1,000,000	High

Cost Analysis

- Why Represent Costs as Ranges?
  - Costs are changing too quickly
  - Uncertainty in available rebates, grants, and incentives in the future
  - Cost ranges are quickly becoming standard in CAPs
  - There will be an outlet for more detailed analysis in the CAP implementation plan at time period of implementation

Implementation Phasing

- Staff and PMC will make an initial recommendation of implementation phase based on cost, cost savings, GHG benefit, and staff availability.

Timeframe	
This Year	Immediate
By 2015	Short-Term
By 2020	Mid-Term
By 2035	Long-Term

Next Steps

- Combine committee reduction goals & policies with reduction actions
- Quantify GHG, cost, and other metrics discussed today
- Develop Administrative Draft CAP