

City of Santa Clara CAP

Updated GHG Reduction Potential Analysis

Background

The consulting team prepared this memo in response to guidance received from City Council regarding interest in exploring an interim target of 80% reduction by 2035. This additional analysis was conducted to show the potential for GHG reduction in line with this target and modifications to proposed CAP strategies and actions in order to achieve them as outlined in Table 1.

As this analysis was conducted, the consultant team also identified and incorporated the following updated data sources, which also resulted in slight adjustments to model outcomes:

- Census Bureau reporting for the [number of jobs in 2016](#), which is higher than what was originally provided in 2016 inventory. This adjustment makes the jobs projection numbers more consistent to historic data trends.
- SVP's 2016 [Power Content Label](#), which provides a more accurate estimate of SVP's renewable fuel mix (52%) than previous estimations. This adjustment resulted in a slight increase in GHG emissions per kWh (see Table 2).

The overall impact of these adjustments is a modest reduction in forecasted emissions from 2020-2045. For CAP target year 2045, the Adjusted Business-as-Usual (ABAU) forecast decreased from 932,574 MTCO_{2e} to 814,949 MTCO_{2e}. The updated ABAU forecast is included as Table 3 at the end of this memo.

Given the aggressiveness of the new 80% reduction by 2035 target compared to baseline year 2016, the consultant team considered the use of a per-capita or per-service population¹ target, as opposed to a total (mass) target. This approach is consistent with State guidance, CEQA guidelines, and approaches taken by other California municipalities. Outcomes from this analysis are summarized below.

Key Findings

1. 80% reduction by 2035

The current Draft CAP measures do not meet this target. Required modifications to the Draft CAP to achieve this target on a per-service population basis are as follows:²

- SVP provides 100% carbon neutral electricity by 2035 (modification to action B-3-1).
- Require all-electric new construction (modification to action B-1-5).

Modeling indicates that 100% carbon neutral electricity would be required to reach the 80% reduction by 2035 goal. At 95% carbon neutral electricity, for example, we estimate that the City would achieve a 76% reduction in emissions by 2035. Due to high nonresidential electricity use

¹ Service population refers to the total number of people who live and/or work in Santa Clara.

² Based on modeling that estimates a 79% reduction in per-service population emissions compared to the baseline year.

in Santa Clara, pursuing other strategies such as energy efficiency would not be sufficient to “make up the difference” to achieve the 80% goal.

2. Compliance with SB 32 (40% reduction by 2030)

The current Draft CAP measures meet this target given the following modification:

- SVP provides 70% carbon neutral electricity by 2030 (modification to B-3-1).

To incorporate these requirements, the current Draft CAP has been updated to specify that SVP attains a 70% carbon-neutral fuel mix by 2030 in action B-3-1.

3. Carbon neutrality by 2045

In addition to the actions in the Draft CAP, the following supplemental actions would be required to reach carbon neutrality by 2045:³

- Provide 100% carbon neutral electricity by 2045 (only applicable if Council does not adopt the 80 x 2035 target which would achieve carbon neutral electricity by 2035).
- Electrify and increase efficiency of at least 95% of all existing buildings by 2045, such as through a burn-out or retrofit ordinance.
- Require all-electric new construction (modification to action B-1-5).

Recommendations

Given these findings, the consultant team recommends the following modifications to the Draft CAP:

1. **Update near-term targets to be per-service population**, rather than on a mass (total) basis, to account for high job increases projected for Santa Clara, and thus increase likelihood of meeting near-term targets.
2. **Update action B-3-1 to specify that SVP achieve at least a 70% carbon neutral fuel mix by 2030**, which will be required to meet the SB 32 2030 target.
3. **Consider incorporation of the following measures** to provide a defensible pathway toward meeting the Council-directed 80% reduction by 2035 target:
 - a. SVP provides 100% carbon neutral electricity by 2035 (modification to action B-3-1).
 - b. Require all-electric new construction (modification to action B-1-5).

³ Based on modeling that estimates a 93% reduction in total emissions compared to the baseline year.

Table 1. GHG Reduction Potential Summary Table

The following table summarizes the key findings detailed above.

Green = pathway toward meeting SB32 requirements + 80% by 2035 goal

CAP Measures	SVP Fuel Mix	Reduction from 2016 Baseline Year (per service population)			Progress Toward Carbon Neutrality
		2030	2035	2045	2045*
Draft CAP	RPS compliant	-28%	-47%	-82%	-86%
Draft CAP + Existing Building Requirements	RPS compliant	-31%	-51%	-91%	-93%
Draft CAP	<ul style="list-style-type: none"> 70% carbon neutral in 2030 100% carbon neutral in 2035 	-40%	-79%	-82%	-86%
Draft CAP + Existing Building Requirements	<ul style="list-style-type: none"> 70% carbon neutral in 2030 100% carbon neutral in 2035 	-43%	-83%	-91%	-93%

*Reduction compared to the BAU 2045 forecasted emissions, as opposed to the baseline year.

Additional Observations

- Greatest potential for rapid reductions in GHG emissions is to accelerate SVP's achievement of the SB 100 goal of 100% carbon neutral electricity by 2045.
- Additional options to achieve emissions reductions include: 1) PV installations or purchases of GHG offsets to negate residual natural gas emissions, 2) further actions to accelerate EV adoption, 3) additional infrastructure enhancements to promote greater mode share of transit and active transportation.

Table 2. Updated Electricity Emissions Factors

	2008	2016	2020	2030	2035	2040	2045
MTCO ₂ e/kWh (RPS compliant) ⁴	0.00031	0.000309556	0.000309556	0.00023812	0.000160731	0.0000833	0
RPS (SB 100) Requirement			33%	60%	73%	86%	100%
SVP % carbon neutral (from 2016 Power Content Label)	52%	52%	52%				

Table 3. Updated ABAU Emissions Forecast (MTCO₂e)

Sector	Subsector	2008	2016	2020	2030	2035	2040	2045
Residential Energy	Residential electricity	68,818	60,132	-	-	-	-	-
	Residential natural gas	84,279	72,780	77,742	82,150	86,253	90,318	94,188
Nonresidential Energy	Nonresidential electricity	805,360	980,317	1,275,649	1,129,520	782,426	408,059	-
	Nonresidential natural gas	304,181	99,945*	130,116	149,774	153,703	154,596	155,489
Transportation	On-Road Transportation	523,000	505,989	593,606	480,335	470,138	458,688	466,227
Solid Waste	Landfilled Waste	36,686	38,744	56,861	51,271	53,546	55,010	56,474
Off-Road	Construction and Lawn Equipment	31,300	8,634					
Water	Water and Wastewater	9,200	24,292	35,374	39,547	41,298	42,425	42,572
Adjusted Total		1,862,824	1,790,833	2,169,350	1,932,598	1,587,365	1,209,096	814,949

* Drop may be due to unreported entities due to the 15/15 Rule.

Changes made to original ABAU forecast:

1. Updated electricity emissions factor (see table above)
2. Updated number of jobs for 2016 from US Census Bureau data

⁴ Assumes that the MTCO₂e/kWh emissions factor under a 0% carbon-neutral fuel mix is 0.0005953.