Memo

To: City of Santa Clara
From: Raimi + Associates
Date: 11/3/20
Re: Task 2.3 Recommend and Forecast GHG Targets

The following memorandum summarizes the greenhouse gas (GHG) forecasts developed by Raimi + Associates for the City of Santa Clara through 2050 and presents recommendations for GHG reduction targets to be incorporated into the updated Climate Action Plan. Our review assesses the City's GHG emissions trends, the City's current emissions profile, and community focus group input.

Key Findings

- Projections based on ABAG demographics data show that by 2050, the City's population is estimated to grow by 28% and the number of jobs in the city is estimated to increase by 172% from 2016.
- In 2016, nonresidential energy use accounted for 61% of total emissions.
- The Business-as-Usual forecast shows GHG emissions are projected to increase by 126% in 2050 from 2008 baseline levels.
- The Adjusted Business-as-Usual forecast shows GHG emissions are projected to decrease by 49% in 2050 from 2008 baseline levels.
- Initial community outreach demonstrates support for adopting State emissions targets (40% reduction in GHG emissions by 2030 and 80% by 2050 or carbon neutrality by 2045), at a minimum.

California's Regulatory Landscape

California has been a leader in climate action since early 2000. AB 32 set California's first GHG target to reduce emissions to 1990 levels by 2020. Greenhouse gas reduction targets can be defined as emission reduction levels that governments set out to achieve by a specified time. In this memo, the terms goals and targets are used interchangeably; however, the term "goals" is also used to refer to desired climate action achievements more broadly. California is on track to exceed its 2020 climate target, while the economy continues to grow. SB 32 extended the goals of AB 32 and established a mid-term 2030 goal of reducing emissions 40% from 2020 levels and a long-term goal of reducing emissions 80% by 2050. In 2018, Executive Order B-55-18 set the target of statewide carbon neutrality by 2045.

The reduction targets specified by the State are consistent with substantial scientific evidence published by the IPCC and the United Nations Framework Convention on Climate Change (UNFCCC) regarding the need to ultimately reduce global GHG emissions down to 80% below 1990 levels by 2050. This consistency is important for creating a "qualified" CAP. The concept of having a "qualified" CAP means that a CAP meets the criteria specified in CEQA Guidelines Section 15183.5(b) for a plan for the reduction of greenhouse gas emissions, such that a

"qualified" CAP may then be used for the specific purpose of streamlining the analysis of GHG emissions in subsequent projects. Local governments have discretion on what levels or targets are established in a "qualified" CAP, provided they are based on substantial evidence.

Furthermore, some GHG reduction measures applicable to new development can be implemented through codes, ordinances, or other rating systems. GHG reduction measures in a CAP that are determined to be applicable at the project-level and could be used for tiering by future projects should be specified as mandatory in the CAP (through building performance standards or building code requirements, for example), and not as voluntary measures that may not be enforced during development review. Ultimately, local agencies should put forth their best efforts to make sure that GHG reductions associated with the primary measures in a CAP are quantifiable and based on substantial evidence.

2050 Emission Forecasts

R+A developed two emissions forecasts through the year 2050, Business-as-Usual (BAU) and Adjusted Business-as-Usual (ABAU), to show future emissions trends for the City of Santa Clara. The forecast is based on changes to the number of people who live and work in Santa Clara. As the population grows and there are more jobs in the community, there will be an increase in the amount of energy used, vehicle miles traveled (VMT), trash generated, and other activities that produce GHG emissions. R+A utilized the City's most recent GHG inventory from 2016 and demographics projections from the Association of Bay Area Government's (ABAG) Plan Bay Area program. Table 1 shows the assumed demographic changes.

Table 1. Santa Clara Demographics Projections (2020-2040)

	2020	2025	2030	2035	2040	2045	2050
Population	131,655	137,215	142,425	151,715	159,500	167,285	175,070
Jobs	143,565	151,310	165,255	169,590	170,575	171,560	172,545
Housing Units	50,505	51,590	52,675	55,720	58,190	60,660	63,130
Service Population	275,220	288,525	307,680	321,305	330,075	338,845	347,615

The Business-as-Usual forecast shows how the City's emissions would change over time due to projected growth without any climate action at the local or State levels. Climate action is the implementation of various strategies and measures that reduce greenhouse gas emissions. Strategies and measures are programs, policies, or standards that reduce the GHG emissions of activities (i.e. minimum energy efficiency standards for appliances or Transportation Demand Management programs). The analysis shows that the City's BAU emissions are projected to increase from 1,862,824 $MTCO_2e$ in 2008 to 4,246,957 $MTCO_2e$ in 2050, a 126% increase. Table 2 shows the forecasted emission levels for each sector in future years.

Table 2. Forecasted Business-as-Usual Total Annual Community GHG Emissions 2020-2040 (in MTCO2e)

Sector	2008	2016	2020	2025	2030	2035	2040	2045	2050	Percent Change (2008-2050)
Residential electricity	*68,818*	*60,132*	65,370	66,775	68,179	72,120	75,317	78,514	81,711	19%
Residential natural gas	*84,279*	*72,780*	79,120	80,820	82,519	87,290	91,159	95,029	98,898	17%
Residential Energy	*153,200*	*132,912*	144,490	147,594	150,698	159,410	166,476	173,543	180,609	18%
Nonresidential electricity	*805,360*	*980,317*	2,364,897	2,364,897	2,582,851	2,650,604	2,665,999	2,681,394	2,696,789	235%
Nonresidential natural gas	*304,181*	*99,945*	228,764	241,106	263,326	270,234	271,804	273,373	274,943	-10%
Nonresidential Energy	*1,109,541*	*1,080,262*	2,593,662	2,606,003	2,846,177	2,920,838	2,937,803	2,954,768	2,971,732	168%
On-Road Transportation	*523,000*	*505,989*	774,137	811,561	865,440	903,764	928,432	953,101	977,769	79%
Landfilled Waste	*36,686*	*38,744*	56,861	59,610	63,568	66,382	68,194	70,006	71,818	96%
Wastewater Treatment	*9,200*	*24,292*	35,651	37,375	39,856	41,621	42,757	43,893	45,029	389%
Off-Road	*31,300*	*8,634*	-	-	-	-	-	-	-	
TOTAL	***1,862,824***[1]	***1,790,833***[2]	**3,604,801**	**3,662,143**	**3,965,739**	**4,092,016**	**4,143,663**	**4,195,310**	**4,246,957**	**126%**

[1] Difference in emissions from 2013 CAP due to addition of business waste tonnage.

[2] Difference in emissions from 2018 CAP Progress Report due to addition of business waste tonnage and off-road emissions.

It is important to note that the BAU forecast may overestimate the emissions due to electricity because it assumes the utility's emission factor from 2016 remains constant. The carbon intensity of SVP energy in 2016 was significantly higher than subsequent years because the utility still procured energy from a coal-fired power plant. SVP exited this coal contract in 2017, which greatly reduced their emissions. R+A will update this forecast with a more realistic emissions factor if one becomes available.

Additionally, the Adjusted Business-as-Usual (ABAU) forecast is presented to show how Santa Clara's emissions are anticipated to change accounting for the impacts of adopted State policies if no action is taken at the local level. There are four major policies that the State has adopted to reduce GHG emissions at the local level:

1. **Renewables Portfolio Standard (RPS):** This law requires that electrical utilities provide an increased amount of electricity from eligible renewable sources. SB 100 requires that 33% of electricity sold by utilities in 2020 be renewable, 60% be renewable in 2030, and 100% be carbon-free in 2045.
2. **Title 24:** Title 24 is the set of regulations that specifies how new buildings must be constructed, including specifying minimum energy efficiency standards. These standards are updated triennially to be more stringent. California has set a goal for zero-net energy new construction by 2030.

3. **Clean Car Standards:** These standards require that vehicles sold in California meet minimum fuel efficiency requirements, and that fuel sold in the state emits less GHGs during production and use.
4. **SB 1383:** This law requires that food scraps and other organic material is diverted from landfill disposal. The State goal is that 75% of organic material is diverted from landfill by 2025.

The measures listed above and their associated GHG reductions are counted toward Santa Clara's overall community emissions reductions and progress towards targets. Based on the results of the ABAU forecast, emissions are expected to fall from 1,862,824 MTCO2e in 2008 to 932,574 MTCO2e in 2050, a decrease of 49%. Table 3 shows the forecasted ABAU emission levels for each sector in future years. The ABAU forecast illustrates the importance of supporting the State's climate targets to reduce emissions statewide and kickstart local actions.

Table 3. Forecasted Adjusted Business-as-Usual Total Annual Community GHG Emissions 2020-2050 (in MTCO2e)

Sector	2008	2016	2020	2025	2030	2035	2040	2045	2050	Percent Change (2008-2050)
Residential electricity	*68,818*	*60,132*	26,122	20,730	18,634	15,780	11,286	-	-	-100%
Residential natural gas	*84,279*	*72,780*	77,742	80,450	82,150	86,253	90,318	94,188	98,057	16%
Residential Energy	*153,200*	*132,912*	*103,864*	*101,180*	*100,784*	*102,034*	*101,605*	*94,188*	*98,057*	-36%
Nonresidential electricity	*805,360*	*980,317*	827,740	731,322	699,205	584,468	402,839	-	-	-100%
Nonresidential natural gas	*304,181*	*99,945*	207,509	239,069	259,660	269,094	271,545	273,114	274,684	-10%
Nonresidential Energy	*1,109,541*	*1,080,262*	*1,035,249*	*970,391*	*958,865*	*853,562*	*674,384*	*273,114*	*274,684*	-75%
On-Road Transportation	*523,000*	*505,989*	593,606	511,767	480,335	470,138	458,688	466,227	479,476	-8%
Landfilled Waste	*36,686*	*38,744*	56,861	48,074	51,271	53,546	55,010	56,474	57,938	58%
Wastewater Treatment	*9,200*	*24,292*	35,374	37,085	39,547	41,298	42,425	42,572	42,590	363%
TOTAL	***1,862,82***[1]	***1,790,833***	**1,824,955**	**1,668,497**	**1,630,802**	**1,520,578**	**1,332,111**	**932,574**	**952,745**	-49%

Community Input

Over the first week of April 2020 Raimi + Associates hosted a series of stakeholder focus group calls in lieu of the first Community Workshop for the Climate Action Plan Update. The first series of focus groups were held as online webinars. Overall, R+A spoke with 10 community members representing various community organizations, sectors, and opinions. Each focus group was asked the following questions:

1. What climate issues are important to you and your industry/organization?
2. What does a climate friendly Santa Clara look like to you?

3. How much should Santa Clara strive to reduce its emissions? How ambitious should the City be relative to peer cities?
4. Should the City apply the existing State targets? 50% by 2030? 80% by 2050? or carbon neutrality by 2045?
5. What barriers or challenges do you think could prevent the City from reaching its emissions reduction targets?
6. What do you see as Santa Clara's biggest climate threat?

Overall, participants on the focus group calls were generally excited to hear the City of Santa Clara was updating its CAP and making climate action a priority for the City. However, many expressed a lack of knowledge about the topic and ways to reduce emissions. Common themes from across each sector are summarized below:

- Current imbalance between the number of jobs and housing units – there is a need for housing in the City to balance the large number of jobs and to improve regional mobility and mobility options. By 2040, the jobs to housing ratio will be almost 3:1.
- Lack of knowledge and awareness about the City's current climate action efforts and future GHG reduction strategies
- As companies establish their own climate goals, SVP's ability to provide an increasing amount of carbon-free energy or collaborate with companies on renewables solutions will be critical for business retention
- Santa Clara's GHG reduction targets should be aligned with peer cities and State regulation
- The City should consider sector-specific targets and total annual and per capita GHG targets
- Any near-term targets should set the City up to achieve long-term targets
- Climate related threats include: sea level rise, lack of awareness, lack of city/regional coordination, and political will

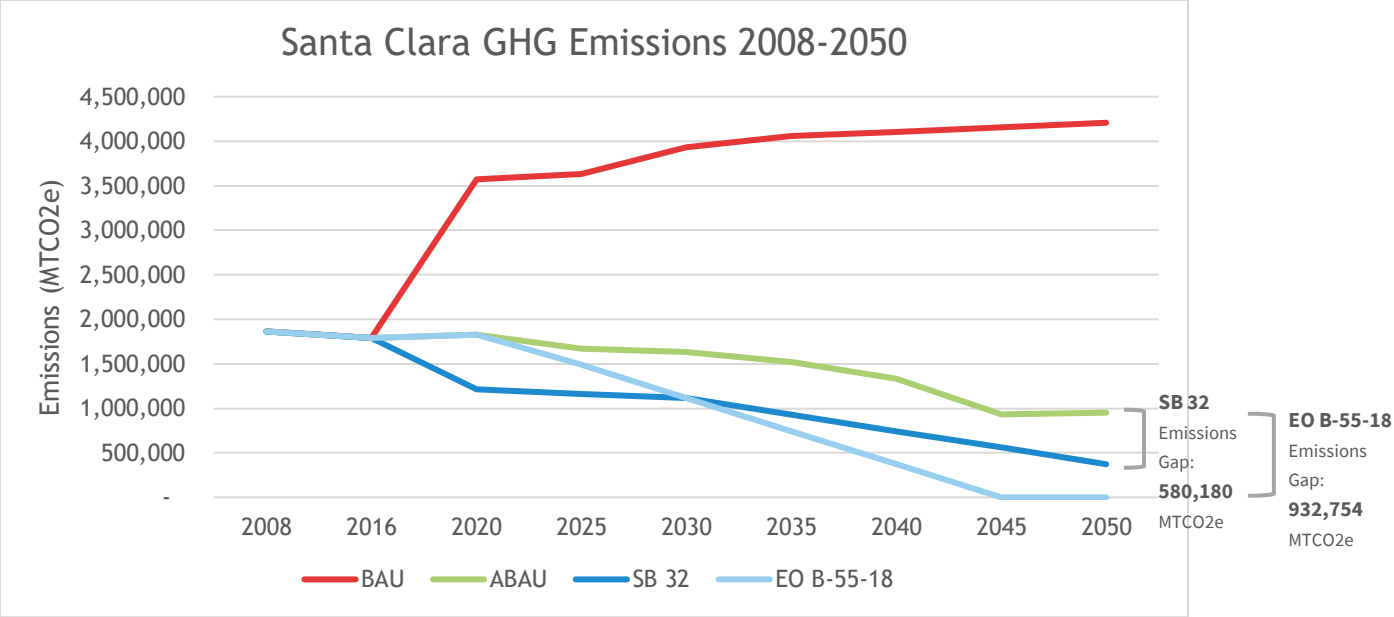
Recommended GHG Targets

Based on the review of the City's GHG forecasts and community input, there are four options for climate targets.

Option 1: Santa Clara adopts the goal of carbon neutrality by 2045. This target is based on Former Governor Brown's Executive Order B-55-18, which is likely to become law based on the State's current trends and actions around climate change. Many local jurisdictions have already adopted the goal of carbon neutrality including the cities of Fremont, San Luis Obispo, Sacramento, Menlo Park, and the County of Santa Clara. Furthermore, this target would create a stronger basis on which to qualify the CAP in terms of CEQA and provide for future streamlining and tiering of projects. By 2045, the City would need to implement additional local climate action measures to close the 932,574 $MTCO_2e$ emissions gap. This is the recommended option because it aligns the City with the State as well as its peer cities in the Bay Area and cities across California.

Option 2: Santa Clara adopts the State's emissions reduction targets set forth in SB 32. These targets include a mid-term and long-term goal of reducing GHG emissions 40% below baseline levels by 2030 and 80% by 2050. Figure 1 shows the City's emissions gap between the BAU, ABAU, and state emissions targets through 2050. Reductions resulting from the State policies included in the ABAU forecast count toward Santa Clara's overall emissions reductions. The City should adopt measures in their CAP that close the gap in emissions between ABAU and State target emissions, 580,180 $MTCO_2e$ by 2050.

Figure 1. Graph showing the City's Emissions Gap between BAU, ABAU, and State Emissions Targets



Option 3: Demonstrate leadership by setting a target in excess of State guidance. For example, carbon neutrality by 2035. This is a realistic goal for some cities that have access to 100% carbon-free and/or renewable electricity. Thus, the implications for Santa Clara would be to aggressively transition SVP to procuring carbon-free energy, which would be difficult due to existing energy generation infrastructure, contracts, and pricing structures.

Option 4: Set a target that is less than the State's emissions reduction goals. For example, 50% reduction in baseline GHG levels by 2050. There is currently no requirement that the City match the State's climate goals and there are currently no repercussions for not meeting these targets. Although setting a lower target is an option available to the City, there are some drawbacks and it is not recommended. If the City were to set GHG reduction targets less than those adopted by the State, the CAP would not be eligible for CEQA streamlining so responsibility would fall on individual projects to demonstrate that their mitigated impacts are in alignment with State GHG standards, which can be very burdensome, including for City projects.

In addition to thinking about these reduction targets as total reductions in the community's overall emissions, to acknowledge Santa Clara's projected growth in population and jobs through 2050, these forecasts and targets can be expressed as per capita and per service population estimates. Table 4 presents the BAU, ABAU, and State targets in terms of Santa Clara's projected population and service population.

Table 3. Forecasted Per Capita and Per Service Population Annual Community GHG Emissions 2020-2050 (in MTCO2e)

		2020	2025	2030	2035	2040	2045	2050	Percent Change (2008-2050)
Business-as-Usual	Per Capita	27.14	26.45	27.60	26.73	25.74	24.85	24.03	45%
	Per Service Population	12.98	12.58	12.77	12.62	12.44	12.27	12.10	4%
Adjusted Business-as-Usual	Per Capita	13.86	12.16	11.45	10.02	8.35	5.57	5.44	-67%
	Per Service Population	6.63	5.78	5.30	4.73	4.04	2.75	2.74	-76%
SB 32	Per Capita	9.20	8.48	7.85	6.14	4.67	3.34	2.13	-87%
	Per Service Population	4.40	4.04	3.63	2.90	2.26	1.65	1.07	-91%
B-55-18	Per Capita	13.86	10.86	7.85	4.91	2.34	-	-	-100%
	Per Service Population	6.63	5.17	3.63	2.32	1.13	-	-	-100%

The consultant team is recommending that the City adopt Option 1, the State's emissions reduction targets set forth in Executive Order B-55-18, which best positions it to adapt to future State climate guidance and regulations. As the CAP update process continues and climate action measures are identified, the consultant team will determine whether it would be helpful for the City to incorporate sector or measure specific goals (i.e. incorporate specific mode split goals from the City's Bicycle Plan) into the CAP.

Recommended Topics for Discussion

1. Land use changes and addressing the jobs-housing balance
2. Energy decarbonization – SVP power mix, renewable generation, advanced energy strategies (i.e. microgrids, battery storage, distributed energy resources, etc.)
3. Leadership – how can the City lead by example?

Sources

Association of Bay Area Governments: http://projections.planbayarea.org/

California Air Resources Board EMFAC: https://arb.ca.gov/emfac/2014/

California Air Resources Board 2017 Scoping Plan:
https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017_es.pdf

California Department of Finance: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/

California Energy Commission:
https://efiling.energy.ca.gov/GetDocument.aspx?tn=205065&DocumentContentId=21592

California OPR CEQA Guidelines: http://opr.ca.gov/docs/OPR_C8_final.pdf

City of Santa Clara 2008 and 2016 Community Inventories

PG&E Energy Code Ace:
https://energycodeace.com/download/35132/file_path/fieldList/Whats%20New.2019%20Residential%20Code
https://energycodeace.com/download/35133/file_path/fieldList/Whats%20New.2019%20Nonresidential%20Code

Silicon Valley Power 2018 IRP: https://www.siliconvalleypower.com/home/showdocument?id=62481

US Census Bureau American Factfinder:
https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP04&prodType=table

US Census Bureau On the Map: https://onthemap.ces.census.gov/