



**San Ramon Climate Action Plan
2015 Annual Report
Prepared for the 2014 Reporting Period**



OVERVIEW

The San Ramon Climate Action Plan (CAP) was adopted in 2011 as the primary strategy for ensuring that the build-out of the General Plan will not conflict with the implementation of Assembly Bill 32 – the Global Warming Solutions Act of 2006. Assembly Bill (AB) 32, among other things, requires California to reduce statewide greenhouse gas (GHG) emissions to 1990 levels by the year 2020. To accomplish this goal locally, the CAP outlines a course of action for the City to reduce greenhouse gas emissions 15 percent below 2008 levels by the year 2020 thereby meeting the AB 32 standard. To monitor progress in achieving the CAP objectives, the CAP Annual Status Report is intended to provide an overview of the general activities within the purview of the CAP and is a supplemental document to the General Plan Annual Report. In addition to an overview and progress update, this report includes a series of Community Benchmarks related to Land Use Energy and Conservation to provide additional insight into current activities and how the City has changed overtime.

Climate Action Plan Strategy

The CAP's focus is on emission sources within the City's regulatory authority as well as reliance on the statewide reduction strategies. The CAP strategy is based upon the land use, transportation, and conservation policies that are part of the General Plan. Conceptually, the design and density of future growth can produce a more compact and integrated land use pattern. This connectivity can reduce the amount of vehicles on the road, make centralized transit more viable and when coupled with improved energy efficiency measures can result in fewer GHG emissions locally.

MEASURING PROGRESS

The CAP a performance based strategy that anticipates that policies and strategy updates may be required to be consistent with new data, current practiced and evolving regulations. Measuring progress toward the AB 32 reduction targets is key to ensure that the CAP is an effective tool in obtaining GHG reductions. This regular review allows the City to see what policies are working, which are not and correct course as necessary to achieve GHG reduction targets.

This current 2015 Annual Report (2014 reporting period) builds on this prior information to provide both an incremental and cumulative assessment of the CAP progress. As part of the 2014 General Plan 2035 update, the City initiated a greenhouse gas inventory update, which

when coupled with other progress indicator forms the basis for the current annual report assessment.

2014 Greenhouse Gas Inventory Update Report

The 2014 Greenhouse Gas Inventory Update Report provides a new greenhouse gas baseline and future year projections to account for current regulations, changes to reflect growth to date and future year growth forecasts. The inventory projections were extended to 2035 to match the General Plan Update year, which is also a Senate Bill (SB) 375 target year. The inventory update includes the following changes from the previous version:

- Updated California emission inventory and targets
- Updated statewide reduction targets for California to reflect revised growth data and projections
- A new baseline emission inventory for San Ramon for 2014 based on growth that has occurred since the CAP was adopted
- Updated future year Business As Usual (BAU) inventory for San Ramon for 2020 and 2035
- Updated future year inventory with regulations and local reductions for San Ramon for 2020 and 2035
- Quantifies the benefits of adopted regulations toward achieving CAP targets

A copy of the full 2014 Greenhouse Gas Inventory Update Report has been provided as Appendix A.

San Ramon Greenhouse Gas Emissions

Greenhouse gas inventories consider a wide range of human activities. Estimating the amount of greenhouse gases generated by these activities requires using a multiplicity of data sources and a diverse set of methodologies. Emissions inventories are organized by source categories or sectors. The State of California organizes its emission inventory by the following sectors: transportation, electricity, commercial and residential, industry, recycling and waste, high global warming potential gases, and agriculture. The San Ramon inventory provides emission estimates for all of the sectors except for agriculture and industry. San Ramon has very limited agriculture and industrial sources and the emissions from energy use from these sources are included in the commercial sector.

Figure 1 provides San Ramon's 2014 community GHG inventory by sector. The Motor Vehicles Sector (57%) is the single largest GHG generator locally, followed by Natural Gas (16%) and Electricity (12%) The inventory provides a new baseline to identify emission reduction opportunities and to model future year emission targets.

Figure 1: San Ramon Community Greenhouse Gas Emissions Inventory 2014

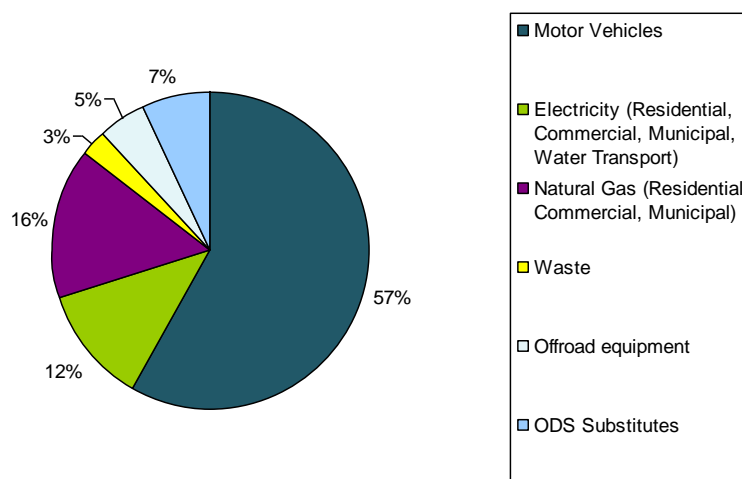


Table 1 provides several GHG data points that compare the 2008 baseline and with information from the 2014 Greenhouse Gas Inventory Update Report. The data shows that as the population has increased 16% from 2008 to 2014, total GHG has been reduced by 7.6% citywide. As such, the per capita GHG emissions have been reduced by 20.4% and the emissions per service population per year has dropped 19.7%, despite a 14.5% increase in employment. Overall reductions demonstrated in 2014 can be primarily attributed to the statewide programs; however, based on the analysis San Ramon is on track to meet the 2020 year reduction targets.

Table 1: GHG Summary 2008-2014

Inventory	2008 ⁴	2010 ³	2014 ³	Percent Change 2008-2014
Total GHG ¹	652,615	588,990	603,246	-7.6%
City Population	66,413	72,148	77,270	16.4%
Emission Per Capita/Yr ¹	9.8	8.2	7.8	-20.4%
Employment	40,152	43,880	45,994	14.5%
Service Population ²	106,565	116,028	123,264	15.7%
Emissions/Service Pop./Yr. ¹	6.1	5.1	4.9	-19.7%

¹MTCO₂e/year
² Employment plus Population
³ San Ramon Climate Action Plan Greenhouse Gas Inventory Update Report (2014)
⁴ Climate Action Plan (2011)

2014 HIGHLIGHTS AND ACCOMPLISHMENTS

The following sections are highlights and accomplishments related to the CAP strategies for Land Use, Transportation Energy, Regional Coordination and Climate Adaptation. Many of the local activities relate to ongoing programs that are consistent with the General Plan. Some local activities are clearly quantifiable (i.e. energy use) while others are more difficult to measure because of the long term and incremental nature of policy decisions (i.e. lands use density/ infill development). The strategies and many of the progress indicators are on-going in that they are tied to new development or the continued implementation of the General Plan 2030. The following section includes a summary of the CAP strategies followed by a brief discussion regarding 2014 activities.

LAND USE STRATEGIES	
LU-1	Increase the average development density of new development by 10 % by 2020.
LU-2	Encourage mixed-use development in new development and redevelopment areas.
LU-3	Increase transit orientation in new development and redevelopment areas near current and planned transit facilities.
LU-4	Increase pedestrian orientation in new development and redevelopment areas.
LU-5	Provide additional workforce housing opportunities in the City to improve the jobs housing balance and to reduce commute distances.
LU-6	Promote compact development by protecting open space and hillsides and encouraging infill and redevelopment of underutilized parcels in urbanized areas.

Discussion:

During the reporting period, Planning/Community Development continues to review Development Plans and Specific Plans based on General Plan and CAP guidance. Phase 1 of the revised City Center Project was approved, which represents a continuing effort to pursue centralized, compact mixed-use, transit-oriented development, consistent with the General Plan, CAP and established City Center Priority Development Area (PDA).

City Center Plaza District 2014



Other significant development activities included final approval of the the Faria Ranch Project in the Northwest Specific Plan Area for development of 740 housing units including a 28% commitment to affordable housing, dedication of 350 acre for open space and additional open space funding.

Additional Policy related activities included the initiation a General Plan update for the Housing Element and other related Elements necessary for internal consistency. Included in the update is a refinement of housing programs, housing opportunity sites within the City and an increase in the density range for Mixed Use development from 12.7 to 14 units per acre. There have been extensive hearing on the Update in 2014 and final adoption is expected in spring of 2015.

The Community Benchmark section for Land Use includes additional information. While not a comprehensive summary of all CAP related activities, these Benchmarks provide additional information regarding Citywide trends for:

- Land use and Zoning Profile of the City
- Residential and Nonresidential development
- Citywide Residential Density
- Approved Residential Subdivision and Parcel Maps
- Jobs Housing Balance

TRANSPORTATION STRATEGIES	
T-1	Provide transit facilities and services that improve transit mode share.
T-2	Provide pedestrian connections in new and existing development to improve pedestrian mobility and accessibility.
T-3	Provide a safe and well-connected system of bicycle paths, lanes, and trails to increase bicycle use.
T-4	Use traffic calming measures to improve traffic flow, pedestrian orientation, and bicycle use.
T-5	Increase the use of low and zero emission vehicles.
T-6	Improve the effectiveness of existing Transportation Demand Management Programs and ensure that new developments with large employee concentrations implement TDM Programs.
T-7	Require projects to provide facilities that make travel by bicycle and transit more convenient.
T-8	Encourage the use of parking facility designs and parking management to reduce vehicle trips.
T-9	Provide vehicle support infrastructure to encourage use of low- and zero-emission vehicles

Discussion

Planning/Community Development continues to review Development Plans and pursue opportunities to improve transit mode share, promote bicycle facilities and overall connectivity through coordination with the Transportation Services Division. TDM policies and program for existing development and requirements for new development continue to stress education and outreach as well as development of alternative transportation infrastructure, complete streets and traffic calming features when appropriate.

Transit incentives are available to new homeowners, and employers/employees who re-locate to San Ramon. In 2014, the regional commuter benefit program requirements of Senate Bill 1339 (Yee, 2012) took effect. The program requires employers with 50 or more full-time employees in the Bay Area to offer their employees commuter benefits to promote the use of alternative commute modes such as transit, ridesharing, and bicycling. Additionally, the Bishop Ranch TDM program continues to be effective in promoting alternative transportation program for

the employment hub of the City. In 2014, Bishop Ranch launched its BRITE Bikes Program. The bike-share program within the Bishop Ranch office park allows tenants to reserve and utilize one of 100 bikes that are stationed around the business park. The program provided an alternative to vehicle use for short trips and provides additional opportunities for recreation and exercise. In addition, Transportation Services Division provides school site bike/pedestrian safety assemblies and bike rodeos to promote safe cycling/walking.

The City continues to review new development applications and promote transportation policy for the construction of alternative transportation infrastructure. Planning/Community Development continues to issue residential and commercial electrical permits for electric vehicle charging stations and is in the process of reviewing a development application for a hydrogen fueling station adjacent to the existing Toyota Facility. The proposed facility is being funded in-part by the CEC as part of their Alternative and Renewable Fuel and Vehicle Technology Program intended to support the development of zero emission vehicle infrastructure state wide. Public hearings on the facility are expected in 2015.

The design development process for the Iron Horse Trail pedestrian/bicycle overcrossings at Bollinger Canyon Road and Crow Canyon Road continues to move forward. During the reporting period there has been a public outreach campaign, community design charrettes and online surveys to solicit input into the overcrossing designs. The overcrossings, once constructed, will improve bicycle transit and connectivity to minimize potential conflicts with vehicles and reduce vehicle delays currently associated with at grade crossings.

The Community Benchmark section for Transportation and Circulation includes additional information. While not a comprehensive summary of all CAP related activities, these Benchmarks provide additional information regarding Citywide trends for:

- New Lane Miles of Roads Built
- Vehicle Miles Traveled
- Alternative Transportation Use
- City Vehicle Fleet Mix
- City Electric Vehicle Charging Stations

ENERGY STRATEGIES	
E-1	Increase the use of energy conservation features, renewable sources of energy, and low-emission equipment in new and existing development projects within the City.
E-2	Reduce energy use from the transport and treatment of water (20% reduction goal for new development).
E-3	Improve the City's recycling and source reduction programs to make continued progress in minimizing waste. (Show reduction in per capita waste rate. Increase purchasing of recycled content materials.)

Discussion:

New development that are subject to the entitlement process are required to demonstrate energy conservation in excess of Building Code T-24 standards as well as reductions in water usage based on CAP standards. The City continues to promote policies for solar ready roofs and reductions in impervious surfaces for stormwater management and to minimize heat island effect. As part of the 2014 General Plan Update, revised policies calling for the development of specific requirements for EV charging station and reclaimed water infrastructure have been proposed and it is anticipated that they will be adopted in spring 2015 .

During the 2014 reporting period, the City opted in to a Citywide Property Assessed Clean Energy (PACE) Program that allows for the financing of select clean energy upgrades based on property specific loan underwriting and repayment of the loan through the property tax. PACE program are another tool to promote clean energy upgrades. Two additional PACE providers were added in early 2015 as alternative choices and it is anticipated that additional PACE providers may be added in the future to add to the competition for consumers.

Per capita solid waste disposal showed a slight increase for the 2013 reporting period; however, they remain well below the State established reduction targets. Please note there is a one year lag in the solid waste reporting data shown in the Benchmark section.

The Community Benchmark section for Conservation includes additional information. While not a comprehensive summary of all CAP related activities, these Benchmarks provide additional information regarding Citywide trends for:

- Energy Use Trends
- Solar Power Permits issued
- City Energy Reduction Projects

- Reclaimed Water Usage
- Model Water Efficient Landscape Ordinance
- Solid Waste Reduction

CLIMATE ADAPTATION STRATEGIES	
ADPT-1	New projects shall assess the significance of increased wildfires, decreased water supply, changes in agriculture, increased flooding, and any other potential impacts from climate change in California Environmental Quality Act documents.
ADPT-2	Create an outreach and/or rebate program that encourages businesses and residents to construct graywater and rainwater collection systems on their properties. A minimum of one City employee should have appropriate training regarding these systems to help interested parties develop systems
ADPT-3	Developers shall provide an assessment of a project’s potential impacts on the local and sub-regional storm drainage systems, so that the City can determine appropriate mitigation to ensure that system capacity and peak flow restrictions are not exceeded.
ADPT-4	To reduce flood peaks, reduce sedimentation, temporarily store floodwaters, recharge aquifers and restore environmental flows, flood management should be integrated with watershed management on open space, agricultural, wildlife areas, and other low-density lands.
ADPT-5	Low-impact development techniques should be used in new development to infiltrate and store runoff.

Discussion

All new development projects are assessed based on the requirements of CEQA. For those project requiring supplemental CEQA review, documentation and analysis, the impacts of climate adaptation are considered and addressed through project specific mitigation measures as well as to the requirements of the CAP, which is also triggered by the CEQA review.

New development is required to provide a stormwater control plan that addresses the potential impacts to the stormdrain system. Integration of stormwater features for dual-purposed uses such as recreation, open space, or habitat is preferred and considered as part of the design review process. Low-impact development techniques are associated with stormwater

management strategies for new development and are required for all new development proposals subject to the Regional Water Quality Control Board permit requirements.

Planning/Community Development has done the code research and has identified staff with the necessary skills and training to assist interested parties in the permitting of graywater systems. EBMUD has developed a graywater fact sheet that is available at the City Permit Center. Development of a web-based outreach program is still pending.

The City continues to work with the San Ramon Valley Fire Protection District to assess and address wild-fire risks in the urban-wildland areas, as well as participating in the Community Rating System through City programs and outreach that minimizes impacts and risks to properties located in Flood Zones.

REGIONAL COORDINATION STRATEGIES	
R-1	Participate in regional programs and initiatives that reduce greenhouse gas emissions.

Discussion:

Planning Services continues to monitor and participate (as needed) in the One Bay Area regional planning process intended to address the Sustainable Communities Strategy requirements of SB 375, which seeks to align land use and transportation. Additionally, City staff monitors and participate in the Contra Cost County Climate Leader Program and forums. The City is listed on the Solar Road Map website and has provided information in support of the American Solar Transformation Initiative and

COMMUNITY BENCHMARKS

The CAP was adopted in late 2011 and several years have passed since the 2008 CAP GHG inventory and baseline were initially established. As such, the following summaries look at specific measures for Land Use, Transportation and Conservation related to the General Plan and CAP policies for the period from 2009-2014 with an emphasis on the 2014 reporting period. Subsequent reports will continue to focus on the incremental increase for subject year(s), as well as the data trends over the long-term. Long-term trends are a better gauge of the CAP program’s success because of the slow and incremental nature of development and land use change; however, it is important to conduct regular assessments to ensure that the

CAP program is serving its intended purpose and the City is making progress toward GHG reduction targets.

LAND USE

Land use is the key and most basic component of the CAP strategy. The physical relationship between land uses directly impacts transportation, the use of resources and even certain individual behaviors. The General Plan 2030 recognizes this relationship through the development of specific policies in the various General Plan Elements that are interrelated. The CAP document utilizes these interrelated policies to effect long-term change toward meeting GHG reduction targets in a way that is consistent with the community vision and values. The following benchmarks represent a snapshot in time in an effort to track and document land use changes over time toward meeting the goals and policies of the CAP.

Land Use and Zoning

The City's size, population and employment continue to grow as new development is proposed. The more recent physical expansion of the City has primarily been through the annexation of Dougherty Valley. The land use profile of each annexation varies in the amount of Residential, Non Residential, Mixed-Use and Open Space. In recent years, annexations have been primarily residential in nature, which has resulted in a corresponding reduction in the overall Non-Residential and Open Space percentages as the City has grown in overall area. This trend is likely to continue with future Dougherty Valley annexations likely consisting of primarily residential lands. The following table is a summary of the basic land use classifications, land area and overall percentage of the City for the reporting period.

Year	Residential Zoning		Non Residential Zoning ²		Mixed-Use Zoning		Open Space Zoning		Total City Area Sq. Miles ¹
	Sq. Miles	% of City	Sq. Miles	% of City	Sq. Miles	% of City	Sq. Miles	% of City	
2009	7.85	45.90%	3.11	18.17%	0.61	3.58%	5.53	32.35%	18.42
2010	No Change								18.42
2011	7.96	46.25%	3.11	21.60%	0.61	3.55%	5.53	32.14%	18.56
2012	8.01	46.31%	2.84	16.42%	0.91	5.28%	5.53	31.99%	18.62

2013	No Change								<u>18.62</u>
2014³	8.08	46.63%	2.92	16.77%	0.91 ³	5.27%	5.48 ⁴	30.52%	18.66 ¹
¹ Roadway area is part of total City area, but not the zoning classifications. ² Parks and Golf Courses are classified as non-residential development for this analysis. ³ Based on General Plan 2035 land use analysis (2014). ⁴ Reduction due to a portion of open space converted to Park which is classified per footnote 2									

In 2014, the City annexed approximately 23 acres in Dougherty Valley. As a result, the City Added 0.04 square miles for a total of 18.66 square miles in the City limits. In addition to the annexation, the current analysis shows a reduction of open space that reflects a reclassification of East Bay Regional Park District parkland from open space to the non-residential zoning category consistent with the balance of the analysis.

New Residential and Non-Residential Construction

New Residential and Non-Residential construction is a measure of new development added to the City and is an indicator of the type of growth that is occurring. Within the reporting period, the primary source of new development added to the City has been through annexation. While these units are already constructed and occupied, the transfer of these developments to the City represents a change to the overall profile of the City. The table below represents Residential and Non-Residential growth through new construction and annexation:

Year	New Construction		Annexation	
	Residential units	Non-Residential	Residential	Non-Residential
2009	<i>13 units</i>	<i>0</i>	<i>445 units</i>	<i>0</i>
2010	<i>0</i>	<i>0</i>	<i>311 units</i>	<i>0</i>
2011	<i>105 units (Valley Vista Project)</i>	<i>0</i>	<i>327 units</i>	<i>0</i>
2012	<i>0</i>	<i>2,960 sf (ABC Pet Clinic)</i>	<i>382 units</i>	<i>0</i>
2013	<i>3 units</i>	<i>0</i>	<i>147 units</i>	<i>0</i>
2014	<i>53 (Primarily Park Central)</i>	<i>0</i>	<i>151 units</i>	<i>10,025 sf (Amador Rancho Center)</i>
Total	174 units	2,960 sf	1,763 units	10,025 sf

Non-annexation Residential and Non-Residential growth has been modest over the reporting period representing 53 residential units, 1 of which is a second units and there are no new non-residential structures constructed (completed) in the City within the reporting period. Residential development in the annexed areas of Dougherty Valley represents 151 residential units added to the City. The new Amador Rancho Community Center (approximately 10,000 sf) represents the non residential square footage annexed within the reporting period.

Residential Density Citywide

The CAP has a policy of increasing average density for new development by 10% by 2020. The following table is a projection of residential units compared to existing and projected City size.

Year	Residential Units	City Size (Sq. Miles)	Units per Square Mile (Ave.)	% Change from 2009
2009	24,781 units	18.42	1,345	
2013	27,434 units ¹	18.62	1,473	9.5%
2014	27,696 units ²	18.66	1,484	10.3%
2035	34,690 units ²	20.24 ³	1,714	27.4%
^{1.} DOF 2014 ^{2.} General Plan 2035 plus new units added for 2014 ^{3.} Estimate based on the annexation of residential areas identified in the General Plan 2035				

Based on the General Plan 2035 projections there will be an estimated 1,714 residential units per square mile in the year 2035 as compared to 1,345 residential units per square mile in 2009 (27.4 % increase). In 2014, there is an estimated 1,484 residential units per square mile, which represents a 10.3% increase over the 2009 General Plan baseline. This increase in residential density reflects that the City is not expanding as it has in the past and suggests that the new development is infill in nature and within the existing City limits. The 10.3 % increase in residential density Citywide is consistent with CAP Strategy LU-1.

New Residential Subdivisions and Parcel Maps Approved

Approved subdivision and parcel maps represent development that is in process and has a likelihood of construction. The following table represents the residential Parcel and Final Maps approved within the reporting period:

Year	Final Maps	Residential Parcel Maps	New Lots/Units approved	Average Density
2009	--	Swenson	3 single family unit	1.09 du/acre
2010	--	--	--	--
2011	--	--	--	--
2012	St. James	--	125 residential units	39 du/acre
2013	0	0	0	--
2014	0	0	0	0

There were no residential subdivisions or parcel maps approved in the 2014 reporting period. A tentative map for 48 new residential units was approved in 2012 (Acre Mixed Use Development); however, the final map has yet to be approved and as such is not recorded for the current reporting period. Likewise, the Faria Preserve project's Vesting Tentative Map for 740 housing units was approved in 2014, which will be added to the City Housing stock in the years to come.

Jobs/Housing balance

A City's jobs to employed residents would be 1.0 if the number of jobs in the City equaled the number of employed residents, which also corresponds to the amount of housing within the community. In theory, such a relationship could eliminate the need for commuting and would signify a balanced community, although in practice, there are many variations in where people chose to live and work. A ratio greater than 1.0 indicates a net in-commute (jobs rich); less than 1.0 indicates a net out-commute (housing rich). Bishop Ranch is one of the more significant employment centers in the Bay Area, which has resulted in San Ramon being a job-rich community. The following table is an estimate of the ratio of jobs to employed residents from 2000 to 2014 based on the General 2035 projections:

Year	Estimated Jobs/Employment¹	Estimated Employed Residents/Housing	Estimated Jobs/Housing-Employed Residents Ratio
2000	40,030	26,561	1.51
2010	44,350	32,820	1.35
2014	45,994	36,630	1.26

¹ General Plan 2035 projection
² Estimate of Planning Area employment and employed residents extrapolated from ABAG Jurisdictional Source: ABAG Projections (P2013) and 2012 5 yr. ACS data.

The City's estimated jobs to employed residents ratio has been moving closer to a balanced condition of 1 to 1 over the past 14 years. Between 2000 and 2010, the jobs to employed resident ratio is estimated to have decreased from 1.55 to 1.35. This reduction is largely attributable to the accelerated pace of housing development in the City (primarily Dougherty Valley) when compared to the relatively stable or slower job growth over the same period. The jobs to employed residents has potential to reduce vehicle miles traveled because fewer residents would be required to seek work outside the City. The assumption is that there is a correlation between the employment needs of the residents and the availability of local jobs. While not necessarily the case in all situations, a lower jobs to employed residents ratio makes it more likely that resident can find work in the communities they live.

The 2014 jobs to employed residents ratio has been revised based on the General Plan 2035 estimate showing continued improvement in the ratio to 1.26. Given the development remaining citywide, the General Plan 2035 estimates, based on current growth projections, that the jobs to employed residents ratio will stabilize at 1.22.

TRANSPORTATION AND CIRCULATION

While the strategies associated with Transportation and Circulation are directly related to land use, there are additional measure that can demonstrate progress toward GHG reductions targets such as trends in new lane miles constructed, vehicle miles traveled and transportation demand programs.

New Lane Miles of Roads Built

New lane miles of roads constructed is an indicator of infrastructure expansion as well as overall growth. Construction of new roadways typically corresponds to new development construction; however, there are exceptions for improved roadway circulation associated with existing development and congestion management. The following table represents the lane miles constructed and that have been accepted by the City:

Year	Residential Lane Miles	Collector Lane miles	Arterial Lane Miles	Total
2009	26.4	0	0.72	27.12
2010	9.8	0	0	9.8
2011	6.0	2.8	0	8.8
2012	4.3	0	0	4.3
2013	8.62	0	0	8.62
2014	1.19	0	0	1.19
Total	56.31	2.8	0.72	59.83

During the 2014 reporting period, the City added (accepted) 1.19 residential lane miles with no increase in collector roads or arterials. All of the new lane miles added to the City resulted from annexations in the Dougherty Valley which would account for the emphasis on residential streets as well as the fact that the majority of the larger roadway infrastructure is already in place. Since 2008, the City has added 59.83 lanes miles in all roadway categories primarily as the result of the annexation of Dougherty Valley development. The addition of new roadway miles will continue to drop as the City reaches build-out of the anticipated roadway network.

Vehicle Miles Traveled (VMT)

Per capita Vehicle Miles Traveled (VMT) can be an indicator of community balance as well as the land use, housing and transit options and preferences. A lower per capita VMT suggests less commuting and that more housing, transit, jobs, and community needs (shopping, entertainment, etc.) are being met locally. The Metropolitan Transportation Commission (MTC) has developed a methodology that establishes an estimated per capita VMT standard based on simulations from the regional transportation model. While the modeling can provide insight into the regional transit patterns, it becomes less effective as a predictor of vehicle use and behavior when applied at the local level.

The dynamic and variable nature of traffic models, land use and individual behavior affect the ability of local policies to influence VMT rates and is difficult to quantify. The modeling does; however, provide a snapshot estimate of local VMT trips based on the demographic profile. The 2014 Greenhouse Gas Inventory Update Report update now estimates commercial and non-commercial vehicles to provide a per capita number that is specific to San Ramon:

VMT	2008	2010	2014	2015	2020
Passenger Vehicles	1,359,394	1,517,448	1,543,590	1,550,125	1,580,247
Commercial Vehicles	208,691	232,955	230,604	230,016	227,077
Total	1,568,085	1,750,402	1,774,193	15.31	1,807,342
Per Capita	23.61	24.26 (+0.65)	22.96 (-1.3)	22.80 (-0.16)	22.03(-0.77)

The per capita VMT has gone down by and estimated 0.81 miles between 2008 and 2015. The slight reduction could be a result of additional employment and housing opportunities locally. Establishing jobs and employment opportunities locally, that are consistent with the education, income and employment needs of San Ramon residents, is the key to reducing commute distances and VMT. Providing these jobs and employment balance is consistent with the land use and economic development policy goals associated with build-out of the General Plan.

The community VMT measures discussed above highlight the interrelated nature of transit, land use connectivity, job growth and housing which are all fundamental components of the General Plan and CAP. The use of VMT as a measure of local climate goals will continue to evolve as a benchmark in future reports.

Alternative Transportation Use

Transportation is the largest GHG generator in the City. Transportation Demand Management a(TDM) policies coupled with land use strategies are designed to promote alternative transportation use to reduce automobile traffic in order to improve air quality and reduce traffic congestion. These TDM measures include public transit, telecommuting, compressed work-weeks, carpooling, vanpooling, walking, bicycling, and other incentives as alternatives to individuals driving alone. Through the reduction of automobile traffic and congestion there is an estimated decrease in average Vehicle Miles Traveled (VMT) for the community which results in a corresponding reduction in GHG generation for the community.

The following is a summary of the TDM reports for 2006, 2009 and 2013 employee commuter surveys, The 2013 report was finalized in 2014 represents the most current TDM data available.

Year	City of San Ramon		
	Surveyed Employees Driving Alone ²	Surveyed Employees Taking Alternative Transportation ³	Flex schedule/ Telecommute other
2006	68.8%	20.7%	10.5%
2009	68.5%	23.3%	8.2%
2013	70%	24%	6.0%

¹ Based on 2006, 2009 and 2013 transportation surveys conducted by 511 Southwest Contra Costa County
² Includes motorcycles
³ Does not include Telecommute or flex work schedules

The Tri-Annual reports for San Ramon also includes the data for the Bishop Ranch TDM program. The study surveys indicates a slight increase in those that drive alone (1.5%), as well as a modest increase in the use of alternative transportation (0.7%). The survey data indicates that the use of flex schedule and telecommuting has gone down by 2.2% among those employees surveyed. There are many factors that can account for these changes including the business requirements and policies of the of the companies surveyed as well as shift in employment patterns following the recession of 2008.

City Vehicle Fleet Vehicle Mix

The following table represents the current mix of the City owned vehicle. Approximately 74% of the standards City vehicles are traditional gasoline fueled vehicles, 8% are diesel and the 21% balance are alternative fuel vehicles such as Gas-Electric Hybrid, Clean Natural Gas or Bio Diesel vehicles. Motorcycles account for 5% of the total and are conventional gas motors.

Year	Gasoline	Hybrid	CNG	Diesel	Bio Diesel	Motorcycles	Totals
2012	78	5	13	14 ¹	-	-	110 ²
2013	72	5	13	11	10	-	111 ²
2014	109	5	4	11	10	8	147
Current%	74%	3%	3%	8%	7%	5%	100%

¹ Diesel vehicles are utilizing bio-diesel fuels
² Police Patrol only, no support vehicles

The majority of vehicle fleet activity is associated with the Police Department. Police Services continues to purchase new and retire vehicles based on their service conditions. This results in a modern vehicle fleet with the most up to date emission equipment and improved gas millage. Additionally, the purchasing policy anticipates a new hybrid vehicle for 2015 and other non-emergency vehicles are being replaced with vehicles that have more efficient 4 and 6 cylinder motors. In past Annual Reports, only the patrol vehicles have been reported; however, the current numbers include both patrol and support vehicles.

While the specific GHG reductions associated with vehicle selection are not associated with the local GHG reductions, they are accounted for as part of the statewide reduction strategies for vehicles on the road. To this end, the continued fleet updates and purchase, alternative fuel vehicles by the City represents local efforts to support the statewide reduction targets of AB 32.

City EV Charging Station

In 2013, the City completed installation of two Electric Vehicle (EV) charging stations, one at City Hall and one at the City Permit Center. The following table represents the use, energy consumption; gasoline saved and estimated Greenhouse Gas reductions:

City Owned EV charging Station Summary				
Year	# of Users (visits)	Energy Use (kWh)	Gasoline Saved (gal)	GHG (MT)
2013¹	234	2,526	317	1.1
2014	359	2,920	367	1.2

Source: ChargePoint data set for 2014
¹Represents partial year data beginning February 15, 2013

During 2014, the City owned charging stations had 359 registered visits. The charging of electric vehicles at these City facilities used 2,920-kilowatt hours of electricity, which offset an estimated 367 gallons of gasoline. The corresponding net reduction for greenhouse gas is estimated at approximately 1.2 metric tons. As with vehicle choice, GHG reductions, associated with the charging station are accounted for as part of the statewide reduction strategies, but represents a local City efforts to support the statewide reduction targets of AB 32 and promotes the use of alternative fuel vehicles locally. Transportation Services continues to seek grant funding for the installation of electric vehicle infrastructure.

CONSERVATION

Conservation includes a variety of activities including specific energy reduction improvements associated with new and existing development, alternative energy production, solid waste reduction, and water conservation measures. Conservation efforts translate into energy savings through the re-use of resources thereby eliminating the need for new resources and the associated energy use that comes with that resource production and transport. Additionally, resource conservation results in the reduction in the transfer and disposal of resources, which is also quantifiable as energy savings.

Energy Use Trends

In San Ramon, energy use is the second largest generator of GHG behind transportation. The following table represents the energy use trend (percent increase or decrease) for the Residential and Non-Residential sectors of the City year over year based on available PG&E Data. The following table has been updated with 2013 energy use data; however, the energy information for the 2014 reporting period was not available at the time of this report and will be addressed in future CAP reports.

<u>Energy Use Trends</u>						
Year	Residential Usage (Yearly/Household)			Non-Residential Usage (Total Yearly)		
	Electricity	Natural Gas	CO2 Emissions	Electricity	Natural Gas	CO2 Emissions
2009	0.5%	3.7%	-2.6%	-5%	-3%	-11%
2010	-2.6%	2.1%	-9.5%	-3%	-1%	-17%
2011	-0.9%	6.4%	-0.4%	-2%	1%	-8%
2012	-0.3%	-7.9%	-0.7%	-2%	-2%	5%
2013¹	-0.2%	4.0%	6.2%	1%	6%	10%
Total	-3.5%	8.3%	-7%	-11.0%	1%	-21%

Source: PG&E Green Communities Website-San Ramon data set

¹Data for 2014 is not currently available

PG&E provides energy use data for the prior reporting year resulting in a one year lag in information. The 2013 data shows 4% increase in the per-household residential gas use and 3.5% reduction in electricity use when compared to the year. Non-Residential electricity use has trended down by approximately 11.0% while the corresponding gas use has increased by 1%. Energy related CO2 emissions show a reduction of 7% for the residential sector and 21% for the Non-Residential sector. Many factors can affect the energy use trends such as weather (heating and cooling), price of commodities (natural gas), alternative energy (solar) and more efficient energy use such as equipment upgrades and more stringent energy requirements for new and existing development. The relatively higher reductions in CO2 emissions, when compared to the energy use trends, may be in part due to the increase in natural gas use and the related end use (i.e. heating) and source to site (transmission) efficiencies.

Solar Power Permits

The City issues building permits for solar power installation on both residential and commercial applications. As a clean energy source, solar panels supplement local power supplies and reduce the use of energy from the local electrical service provider. Local energy production has multiple benefits in that solar is often a cleaner energy source (less GHG generation) than what is obtained from the commercial provider and that the energy and costs associated with transmission is reduced. The following table represents local solar permits for residential and commercial installations that have been completed as well as those that are issued and still pending final completion during the review period.

Year	Permits Issued	Residential (KW)		Commercial (KW)		Total (KW)
		Built	Pending	Built	Pending	
2011 ¹	77	64.6	--	--	--	64.6
2012	166	400.3	218.6	--	69	687.9
2013	321	1,262.5	304.1			1,566.6
2014	423	1,858.4	346.2	--	--	2,204.6
Total	987	3,585.8	868.9	--	69	4,523.7

¹ The 2011 data represents 3 months data only (Oct – Dec)

Note: The table does not include school site installations that are part of Special Districts and not subject to local permit procedures.

During the 2014 reporting period, the City issued 423 building permits for photovoltaic (PV) systems as compared to 321 building permits in 2013 (31.8% increase). City issued solar permits represent a total of 2004.6 KW of residential solar power installations of which 1858.4 KW have been completed. There were no permits issued commercial solar power installations in 2014.

The City is on the American Solar Transformation Initiative website (Solar Roadmap) which is intended to highlight local solar resources. In addition, the City has authorized three Property Accessed Clean Energy (PACE) programs to operate within the City. Pace Program will enable property owners to finance permanently fixed renewable energy, energy and water efficiency improvements and electric vehicle charging infrastructure on their properties. The program will be up and running in 2015 and are expected to provide another source financing to encourage clean energy development locally.

City Energy Reduction Projects

City owned and operated streetlights and public facility lighting represent a significant amount of the City's energy use. The conversion of conventional light fixtures to low energy LED technology is a proven way to reduce cost, energy use, and GHG emissions associated with energy production. During the 2012-2013 reporting period, the City converted approximately 3,946 light fixtures to LED technology. The conversion represents an annual energy savings of 1,208,691 kWh which is a 56.0% improvement over the prior energy use for those lighting sources. There have been no additional LED conversions under this program in 2014.

Reclaimed Water Usage

The use of reclaimed water provides many benefits. The energy use associated with the treatment and pumping of water is the primary GHG generator associated with both potable and non-potable water use. The benefit of reclaimed water is that it significantly reduces water demand and storage requirements by offsetting the need to utilize treated potable water when it is not required. Application of reclaimed water is typical for water features and landscape areas such as greenbelts, golf courses and roadway medians. An additional benefit of reclaimed water is that it is typically not transmitted as far and is not treated to a potable water standard, which results in additional energy savings. The following table represents the reclaimed water use for the reporting period for both East Bay Municipal Water District (EBMUD) and Dublin San Ramon Services District (DSRSD):

Year	EBMUD Meters (MG)	DSRSD Meters (MG)	Total Recycled Water Usage in San Ramon (MG)	Percent change from prior year
2008	201	302	503	Baseline
2009	111 ¹	313	424	-14.7% ¹
2010	158	277	435	2.3%
2011	192	285	477	9.7%
2012	218	312	530	11.1%
2013	244	358	602	13.6%
2014	246	340	586	-2.7%
Totals	1,370	2,187	3,557	
Source: DSRSD RW Standard Water Audit Spreadsheet, Stan Kolodzie 2/9/2015				
¹ EBMUD reclaimed water system problems				

Use of reclaimed water has generally increased since 2008; however, a certain amount of variation in water use that can be attributed to year-to-year weather patterns and the need to irrigate specific landscape areas. The volume of recycled water used in San Ramon for 2014 went down approximately 2.7% from 2013. This reduction in recycled water use is related to the DSRSD portion of the reclaimed water system (Dougherty Valley). This reduction can be attributed to several possible factors including overall drought reduction measures; a decrease in the use of construction related reclaimed water, as well as, reduced water needs for established landscaping. As the Dougherty Valley reaches build-out and the landscape matures it would be expected that the overall reclaimed water demand would stabilize.

Model Water Efficient Landscape Ordinance

The Model Water efficient Landscape Ordinance (MWELo) is a set of landscape requirements, developed by the California Department of Water Resources, which is applicable to most large new and rehabilitated landscapes. The Ordinance contains a methodology for establishing a water budget approach based on a Maximum Applied Water Allowance. The estimated total water usage for a proposed project is based on the water needs of the plant materials and may not exceed the Maximum Applied Water Allowance. MWELo calculations are required for new and significantly renovated commercial landscapes that require issuance of building permits or similar entitlements. As with the use of reclaimed water, water conservation translates into energy savings and a corresponding reduction in GHGs.

The following table represents the average MWELO reductions for projects in the City for 2011 through 2014 for which permits were issued. MWELO data was not tracked for the 2009 and 2010 reporting period:

Year	Landscape Acres	Maximum Applied Water Allowance (Gal/Yr)	Estimated Total Water Use (Gal/Yr)	Estimated Water Savings (Gal/Yr)	Percent Reduction from Water Allowance
2011	4.01	3,453,980	2,656,531	797,449	23.09%
2012	2.39	2,875,241	1,471,966	1,403,275	48.81%
2013	0.94	814,535	436,113	378,422	46.46%
2014	2.51	2,091,419	1,548,295	543,124	25.96%
Total	8.91	9,235,175	6,112,905	3,122,270	33.81%

During 2014 the City issued permits for 2.51 acres of landscape area the was subject to the MWELO standards. Based on the design, the approved landscapes represent a 25.96% reduction from the Maximum Applied Water Allowance.

Based on the water budget calculations 2011-14, those projects represent a savings of 2.1 million gallons of water (33.81% reduction) when compared to the allowable water use under the MWELO standards. While not representative of landscape water use in the City as a whole, these landscape projects collectively exceeded the 20% target for water reduction consistent with CAP Strategy E-2.

Staff has identified improving the MWELO project tracking and reporting process as an ongoing action item for the upcoming reporting period; however, applicability of the MWELO standards and the tracking of water savings thereby are dependent on landscape renovations that are subject permits and the reporting requirements. Any new proposal would be expected to be highly water efficient given the drought conditions in California and it would be expected that there would be a reduction in future water dependant landscape investment.

Solid Waste Reduction

Solid waste generated by residents, employees, and visitors in the City are sent to a landfill outside of the City, where the trash produces GHG emissions from both the transport and decomposition process. Increasing waste diversion from landfills and recycling materials will significantly reduce greenhouse gas emissions. Furthermore, reuse of composted organic materials provides additional benefits by diverting more waste from the landfill and turning

them into marketable products will reduce greenhouse gas emissions associated with the manufacture of new products and the methane (CH₄) emissions that would be produced from that waste in landfills. The following table represents per capita waste disposal for City residents and employees over the reporting period:

Year	Total Disposal/ Population (Lbs Per Day)	Total Disposal/ Employment (Lbs Per Day)	Total Landfill Waste (Tons)
2008	3.6	6.3	40,413
2009	3.3	6.3	38,097
2010	2.8	6.2	36,325
2011	2.7	5.6	36,032
2012	2.4	4.8	32,364
2013¹	2.6	5.2	35,620
50% Diversion Rate Target	5.7 pounds per resident per day to meet State standards	8.2 pounds per employee per day to meet State standards	
Source: Jurisdiction Diversion/Disposal Rate Summary (www.calrecycle.ca.gov)			
¹ New 2014 data is not yet available			

The per capita amount of waste that San Ramon has been disposing of in landfills decreased over the reporting period from 40,413 tons in 2008 to 35,620 in 2013. While the per capita disposal rate in 2013 increased from 2.4 to 2.6 pounds, it was still well below the State reduction target of 5.7 pounds per person. Likewise, the waste generation rate associated with commercial development increased from 4.8 to 5.2 pounds per employee per day, but still below the State standard of 8.2 pounds per employee. The increase in residential and commercial waste generation is likely a reflection of an improved economy and uptake in commercial development locally. The City will continue to monitor waste reduction locally and track progress toward a “theoretical” zero waste community.

While not specific to the City Vasco Road Landfills has a Gas-To-Energy (LGTE) project. Landfill gas is a natural byproduct of decomposing waste. The project involve extracting gas from the landfill, processing the extracted gas, and then distributing the processed gas to a generator where it is converted into energy that supplies the local electric grid. The new facility is anticipated to provide up to 4.3 megawatts of electricity from recaptured gas to supplement the existing power grid.

CONCLUSION AND FUTURE ACTIONS

The CAP strategies, compliance activities and tracking continue to evolve as the City learns more and finds better ways to achieve and document GHG reduction goals. While the CAP strategy relies heavily on new development as a means to achieve GHG reduction goals, the City continues to pursue opportunities to capture GHG reductions associated with existing development and City programs.

The Greenhouse Gas Inventory Update Report demonstrates that the City of San Ramon is on track towards achieving 2020 emission targets included in the CAP and consistency with targets adopted by the State in the ARB Scoping Plan. The CAP inventories developed for 2035 show that reductions will continue to accrue with adopted regulations; however, the City will need to look to additional measure in the future to meet the 2050 target of an 80% below 1990 levels GHG as outlined in Executive Order beyond 2020, to ensure compliance with the 2035 and 2050 horizon year target.

Future Actions

- Continue to review new development application for compliance with the policies of the CAP
- Look for additional opportunities to promote local generation of renewable energy such as solar, other energy efficiency improvements and water conservation.
- Continue to evaluate local programs that promote energy efficiency and alternative energy development such as Property Assessed Clean Energy (PACE), American Solar Transformation Initiative and Community Choice Aggregation.
- Update CAP to include new baseline data developed as part of the General Plan 2035 Greenhouse Gas Inventory Update Report.
- Refine local development standards for Electric Vehicle infrastructure.
- Refine local development standards for use of reclaimed water for construction and standards for installation of non-potable water infrastructure (purple pipe) for landscape use.
- Update the CAP to reflect changes in state regulations and necessary CAP program revisions including refining reduction targets for 2035 and 2050.

Appendix A

2014 Greenhouse Gas Inventory Update Report



City of San Ramon – Climate Action Plan Greenhouse Gas Inventory Update Report

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ACRONYMS AND ABBREVIATIONS

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
AB	Assembly Bill
ARB	California Air Resources Board
CalEEMod	California Emissions Estimator Model
CAP	Climate Action Plan
CEQA	California Environmental Quality Act
CO_2	carbon dioxide
District	Bay Area Air Quality Management District
EPA	United States Environmental Protection Agency
GHG	Greenhouse Gas
MMTCO ₂ e	million metric tons of carbon dioxide equivalent
MTCO ₂ e	metric tons of carbon dioxide equivalent
SB	Senate Bill

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SECTION 1: EXECUTIVE SUMMARY

1.1 - Purpose and Methods

The following is an update of the greenhouse gas baseline and future year inventories to account for regulations that are now in effect, changes to reflect growth to date and future year growth forecasts. The inventory was extended to 2035 to match the General Plan Update year, which is also a Senate Bill (SB) 375 target year. The inventory is used to determine progress to date and the amount of reductions required to achieve consistency with state targets in 2020 and 2035. No analysis was performed for 2050 because no applicable state targets have been adopted for that year. The report focuses on changes and progress that has occurred since the Climate Action Plan (CAP) was prepared.

1.2 - Project Summary

The San Ramon General Plan Update addresses anticipated growth through 2035. The Plan includes assumptions regarding the amount of development anticipated to occur prior to 2035 within existing land use designations. Estimates of future development were prepared to provide a framework for analysis. The development statistics for the Plan are provided in Section 3.2. The analysis is based on growth at rates predicted for City of San Ramon in the General Plan Update of 1 percent.

1.3 - Summary of Inventory Update

The inventory update includes the following changes from the previous version:

- Updated California emission inventory and targets
- Updated statewide reduction targets for California to reflect revised growth data and projections
- A new baseline emission inventory for San Ramon for 2014 based on growth that has occurred since the CAP was adopted
- Updated future year business as usual (BAU) inventory for San Ramon for 2020 and 2035
- Updated future year inventory with regulations and local reductions for San Ramon for 2020 and 2035
- Quantifies the benefits of adopted regulations toward achieving CAP targets

The inventory includes a new source category for transmission and distribution (T&D) losses that occur from the time electricity leaves the power plant and arrives at the end user. An alternative modeling approach was used to estimate off-road equipment emissions based on San Ramon's share of the inventory developed for the Bay Area. Reductions for regulations not included in the emission model were estimated using reduction estimates from the California Air Resources Board (ARB).

1.4 - Inventory Results

The inventory update demonstrates that the City of San Ramon is on track towards achieving 2020 emission targets included in the CAP that were designed to show consistency with targets adopted by the State in the ARB Scoping Plan. Inventories developed for 2035 show that reductions will continue to accrue with adopted regulations. However, the State has not adopted targets beyond 2020; therefore, the results are provided for information only. State regulations on motor vehicles only apply through model year 2025 and new rounds of regulations on energy generation and efficiency are likely to be developed in the next decade.

SECTION 2: GREENHOUSE GAS INVENTORY

Greenhouse gas emissions are a global problem; however, solutions are found at the local, regional, state, national, and international levels. Emissions from a multitude of sources across the globe contribute to the problem making it the ultimate cumulative impact. On the other hand, actions down to the individual level to reduce greenhouse gas emissions also produce a cumulative benefit. Although the contribution of individuals is small in relation to the magnitude of the problem, they add up in both positive and negative terms. Actions by San Ramon or even by California will not solve the problem, but leadership provided by California and cities such as San Ramon can demonstrate that greenhouse gas reductions are consistent with a vibrant economy can help to create a more livable community.

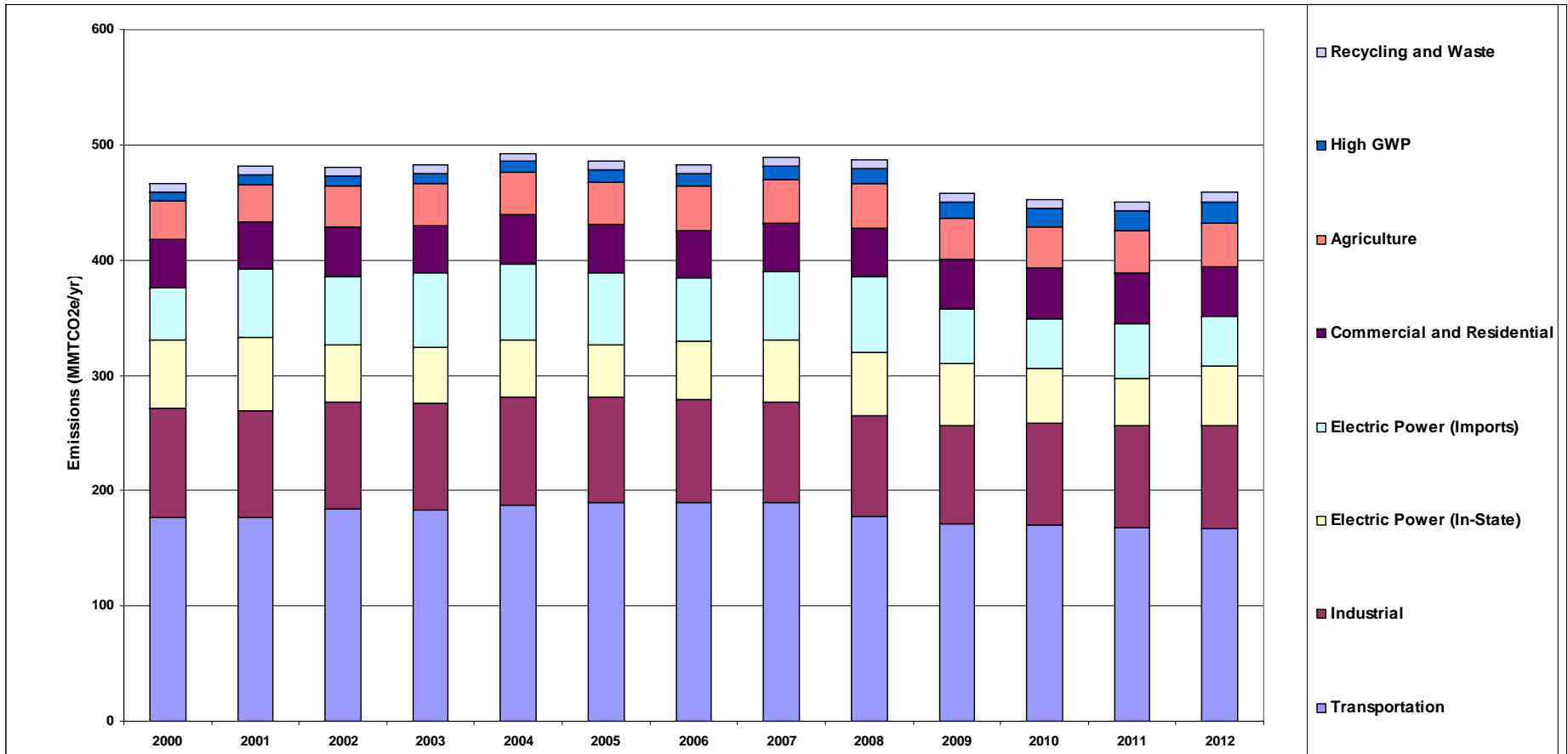
Greenhouse gas inventories consider a wide range of human activities. Estimating the amount of greenhouse gases generated by these activities requires using a multiplicity of data sources and a diverse set of methodologies. Emission inventories are, by nature, the reflection of the best available data and the most applicable methods at the time of their compilation. As data grow and understanding develops, the inventory can be updated and improved. This inventory update utilizes the latest available data and emission factors that improve the accuracy and completeness of the inventory compared with previous versions.

Emissions inventories are organized by source categories or sectors. The State of California organizes its emission inventory by the following sectors: transportation, electricity, commercial and residential, industry, recycling and waste, high global warming potential gases, and agriculture. This inventory provides emission estimates for all of the sectors except for agriculture and industry. San Ramon has very limited agriculture and industrial sources and the emissions from energy use from these sources are included in the commercial sector. The inventory is based on the emissions of a number of greenhouse gases. Although carbon dioxide (CO₂) is the largest contributor to climate change, Assembly Bill (AB) 32 also defines the following as greenhouse gases: methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFC), and perfluorocarbons (PFC). The emissions of each gas are standardized by the global warming potential compared with CO₂ and is referred to as CO₂ equivalents or CO₂e.

2.1.1 - Emissions Inventories

Emissions worldwide were approximately 34.5 billion metric tons of CO₂e in 2012 (Trends in Global CO₂ Emissions 2013 Report [PBL 2013]). The United States Environmental Protection Agency (EPA) estimates emissions in the United States were 6.5 billion metric tons of CO₂e in 2012 (EPA 2014). California's inventory was 458.68 MMCO₂e in 2012. (ARB 2014 California GHG Inventory for 2000–2012). California emits 7.0 percent of United States GHG emissions and 0.13 percent of global GHG emissions. California greenhouse gas emission trends from 2000 to 2012 are shown in Figure 1.

Figure 1: California Greenhouse Gas Emissions Trends 2000 to 2012



Source: ARB 2014b

AB 32 requires California to reduce its emission inventory to 1990 levels by 2020. The State has made substantial progress toward meeting this goal as shown in Figure 1. In addition, the State has achieved the goal of Executive Order S-05-03 to reduce emissions to 2000 levels by 2010. A statewide emission reduction mandate beyond 2020 does not currently exist; however, Executive Order S-05-03 also includes an ultimate target of reducing emissions in 2050 to 80 percent below 1990 levels. Reductions of that magnitude would require the transformation of the State's energy sources and the widespread implementation of zero emission technologies that are not currently developed or commercially available. For this reason, the Emission Inventory Update does not include a 2050 inventory.

2.2 - Regulatory Environment

The goal of regulatory efforts on climate change is to reduce the emission inventory of the jurisdictions subject to the regulation from global to local levels. Actions at all levels of government are underway to reduce greenhouse gas emissions. The efforts expended in this endeavor vary widely from place to place and the results in slowing the growth in emissions or reducing emissions are far from uniform.

2.2.1 - International

Climate change is a global issue involving greenhouse gas emissions from sources all around the world; therefore, many countries have come together to advance efforts to reduce greenhouse gases. Recent initiatives from the major international organizations are described below.

Intergovernmental Panel on Climate Change. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

United Nations Framework Convention on Climate Change (Convention). On March 21, 1994, the United States joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The United Nations Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw,

Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

Intergovernmental Panel on Climate Change Fifth Assessment Synthesis Report. The Intergovernmental Panel (IPCC) on Climate Change issued its latest Synthesis Report in 2014 for three of its Working Groups. Major statements from the report are provided below:

- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems. Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.
- Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change. Substantial emissions reductions over the next few decades can reduce climate risks in the 21st century and beyond, increase prospects for effective adaptation, reduce the costs and challenges of mitigation in the longer term, and contribute to climate-resilient pathways for sustainable development.
- Many adaptation and mitigation options can help address climate change, but no single option is sufficient by itself. Effective implementation depends on policies and cooperation at all scales, and can be enhanced through integrated responses that link adaptation and mitigation with other societal objectives (IPCC 2014).

2.2.2 - National

Prior to the last decade, there were no concrete federal regulations of greenhouse gases or major planning for climate change adaptation. The following summarize the most important recent actions taken by the federal government regarding greenhouse gases, and fuel efficiency.

Clean Vehicles. Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On May 7, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States. A petition for writ of certiorari to the United States Court of Appeals for the District of Columbia Circuit Court was denied by the Supreme Court on October 15, 2013.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level

solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012 (EPA 2012c). The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of carbon dioxide (CO₂) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce greenhouse gas emissions and improve fuel efficiency of *heavy-duty trucks and buses on September 15, 2011, effective November 14, 2011*. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20-percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles and a 15-percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the agencies are proposing engine and vehicle standards starting in the 2014 model year, which would achieve up to a 10-percent reduction in fuel consumption and carbon dioxide emissions by 2018 model year.

New Source Review. The EPA issued a final rule on May 13, 2010 that establishes thresholds for greenhouse gases that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule “tailors” the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for greenhouse gas emissions until at least April 30, 2016. The EPA estimates that facilities responsible for nearly 70 percent of the national greenhouse gas emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation’s largest greenhouse gas emitters—power plants, refineries, and cement production facilities.

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units. As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatt would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour, based on the performance of widely used natural gas combined cycle technology.

Cap and Trade. Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. There is no federal

greenhouse gas cap-and-trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap and trade.

The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce regional greenhouse gas emissions to 15 percent below 2005 levels by 2020. The partners are California, British Columbia, Manitoba, Ontario, and Quebec. Implementation of this cap and trade program is expected in 2015.

2.2.3 - California

Legislative Actions to Reduce Greenhouse Gases

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce greenhouse gases of any state in the nation. Some legislation such as the landmark AB 32 California Global Warming Solutions Act of 2006 was specifically enacted to address greenhouse gas emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide greenhouse gas reductions. This section describes the implementation status of the legislation and progress toward achieving the legislated reduction targets.

AB 32. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. “Greenhouse gases” as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of greenhouse gases. The California Air Resources Board (ARB) is the state agency charged with monitoring and regulating sources of greenhouse gases.

The ARB approved the 1990 greenhouse gas emissions level of 427 MMTCO₂e on December 6, 2007 (ARB 2007). Therefore, emissions generated in California in 2020 were required to be equal to or less than 427 MMTCO₂e. Emissions in 2020 in a “business as usual” scenario are estimated to be 596 MMTCO₂e, which did not account for reductions from AB 32 regulations (California Air Resources Board 2008). At that level, a 28 percent reduction was required to achieve the 427 million MTCO₂e 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 million MTCO₂e. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels (ARB 2010). The ARB also prepared updated emission inventories for 2000 through 2012 to show progress achieved to date (ARB 2014a). Executive Order S-3-05 includes a target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 million MTCO₂e
- 2000: 463 million MTCO₂e (an average 8-percent reduction needed to achieve 1990 base)
- 2010: 450 million MTCO₂e (an average 5-percent reduction needed to achieve 1990 base)

- 2020: 545 million MTCO₂e BAU (an average 21.7-percent reduction needed to achieve 1990 base)

ARB Scoping Plan. The ARB’s Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State’s emissions to 1990 levels by the year 2020 to comply with AB 32 (ARB 2008). The Scoping Plan identifies recommended measures for multiple greenhouse gas emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 greenhouse gas target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California’s clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State’s long-term commitment to AB 32 implementation.

The Scoping Plan differentiates between “capped” and “uncapped” strategies. Capped strategies are subject to the cap-and-trade program, which became effective January 1, 2102. The Scoping Plan states that the inclusion of these emissions within the cap-and trade program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. Uncapped strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional greenhouse gas emission reductions.¹

Scoping Plan Update. The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California’s climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 greenhouse gas limit, but

¹ On March 17, 2011, the San Francisco Superior Court issued a final decision in *Association of Irrigated Residents v. California Air Resources Board* (Case No. CPF-09-509562). While the Court upheld the validity of the ARB Scoping Plan for the implementation of AB 32, the Court enjoined ARB from further rulemaking under AB 32 until ARB amends its CEQA environmental review of the Scoping Plan to address the flaws identified by the Court. On May 23, 2011, ARB filed an appeal. On June 24, 2011, the Court of Appeal granted ARB’s petition staying the trial court’s order pending consideration of the appeal. In the interest of informed decision-making, on June 13, 2011, ARB released the expanded alternatives analysis in a draft Supplement to the AB 32 Scoping Plan Functional Equivalent Document. The ARB Board approved the Scoping Plan and the CEQA document on August 24, 2011.

also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California’s climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (ARB 2014b).

The ARB has no legislative mandate to set a target beyond the 2020 target from AB 32 or to adopt additional regulations to achieve a post-2020 target. The Update estimates that reductions averaging 5.2 percent per year would be required after 2020 to achieve the 2050 goal. With no estimate of future reduction commitments from the State, identifying a feasible strategy including plans and measures to be adopted by local agencies is not possible. Implementation of the City’s General Plan Update and CAP will help support both the short term and long term objectives of the Update. However, there is no way of determining whether the City would need to take additional actions beyond its existing programs and the land use and transportation strategies contained in the General Plan Update and CAP until such a time as new state targets and a new Scoping Plan with mandatory measures is adopted.

SB 375. Passing the Senate on August 30, 2008, SB 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of greenhouse gas emissions, which emits over 40 percent of the total greenhouse gas emissions in California. SB 375 states, “Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32.” SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing greenhouse gas emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings determinations for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the greenhouse gas emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

The Association of Bay Area Governments (ABAG) adopted the Plan Bay Area that includes the 2040 Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) on July 18, 2013 (ABAG 2013). The RTP describes the strategy to achieve the SB 375 targets for the Bay Area. A

technical evaluation of the strategy prepared by the ARB in April 2014 identifies a 4.1 percent reduction in emission per capita by 2020 and 8.7 percent per capita by 2035 (ARB 2014). The SCS includes a full range of land use and transportation strategies to guide future growth in the region in ways that reduce greenhouse gas emissions.

AB 1493 Pavley Regulations and Fuel Efficiency Standards. California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. After a series of lawsuits, the regulations prevailed in federal court are currently being implemented.

The first phase of the standards is implemented during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22-percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30-percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and greenhouse gas emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce greenhouse gases from new cars by 34 percent from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

SB 1368. In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the Governor. SB 1368 directed the California Public Utilities Commission to adopt a performance standard for greenhouse gas emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. The California Energy Commission (CEC) has adopted regulations that establish a standard for baseload generation owned by, or under long-term contracts to publicly owned utilities of 1,100 pounds of CO₂ per megawatt-hour (MWh). Thus, SB 1368 will result in dramatically lower greenhouse gas emissions associated with California's energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the performance standard for

greenhouse gas emissions required by SB 1368. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007.

SB 1078 - Renewable Electricity Standards. On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Governor Schwarzenegger also directed the ARB (Executive Order S-21-09) to adopt a regulation by July 31, 2010, requiring the state's load serving entities to meet a 33 percent renewable energy target by 2020. The ARB Board approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23.

Executive Orders Related to Greenhouse Gas Emissions

California's Executive Branch has taken several actions to reduce greenhouse gases through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

Executive Order S-13-08. Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the "... first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-3-05. Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for greenhouse gas emissions:

- By 2010, reduce greenhouse gas emissions to 2000 levels.
- By 2020, reduce greenhouse gas emissions to 1990 levels.
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Executive Order S-01-07 - Low Carbon Fuel Standard. The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the

“life-cycle carbon intensity” of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an “early action” item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009. The Low Carbon Fuel Standard was challenged in court; however, the court tailored its remedy to protect the public interest by allowing the Low Carbon Fuel Standard regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy.

California Regulations and Building Codes

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California’s energy consumption relatively flat even with rapid population growth. The State has adopted and implemented major updates to energy regulations since the last inventory was prepared.

Title 24. California Code of Regulations Title 24 Part 6: California’s Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California’s energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions. The newest version of Title 24 was adopted by the CEC on May 31, 2012 and was scheduled to become effective on January 1, 2014. On December 11, 2013, the CEC extended the compliance date to July 1, 2014 to allow more time for the building industry and local building departments to prepare (CEC 2014).

Title 20. California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulate the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. Twenty-three categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the State and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012). The CEC adopted the 2014 Appliance Efficiency Regulations in April 2014.

California Green Building Standards Code is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect January 1, 2011. It does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

The California Green Building Standards Code (California Code of Regulations Title 24, Part 11 code) requires:

- Short-term bicycle parking. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.1.2).
- Designated parking. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (5.410.1).
- Construction waste. A minimum 50-percent diversion of construction and demolition waste from landfills, increasing voluntarily to 65 and 80 percent for new homes and 80-percent for commercial projects. (5.408.1, A5.408.3.1 [nonresidential], A5.408.3.1 [residential]). All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled (5.408.3).
- Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:
 1. The installation of water-conserving fixtures or
 2. Using nonpotable water systems (5.303.4).
- Water use savings. 20-percent mandatory reduction in indoor water use with voluntary goal standards for 30, 35 and 40-percent reductions (5.303.2, A5303.2.3 [nonresidential]).
- Water meters. Separate water meters for buildings in excess of 50,000 square feet or buildings projected to consume more than 1,000 gallons per day (5.303.1).
- Irrigation efficiency. Moisture-sensing irrigation systems for larger landscaped areas (5.304.3).
- Materials pollution control. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring and particleboard (5.404).
- Building commissioning. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies (5.410.2).

SECTION 3: GREENHOUSE GAS INVENTORY METHODS AND ASSUMPTIONS

3.1 - Inventory Guidance and Protocols

The greenhouse gas inventory follows the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 to the extent possible considering modeling tools and local data available to prepare the inventory. Protocols and procedures recommended by the Bay Area Air Quality Management District (BAAQMD) and other agencies and organizations such as the California Air Pollution Control Officers Association are also used.

Greenhouse gas emissions are estimated by using emission factors and a level of activity. Emission factors are the emission rate of a pollutant given the activity over time, for example, grams of CO₂ per mile. The ARB has published emission factors for on-road mobile vehicles/trucks in the EMFAC mobile source emissions model and emission factors for off-road equipment and vehicles in the OFFROAD emissions model. An air emissions model (or calculator) combines the emission factors and the various levels of activity and outputs the emissions for the various pieces of equipment.

3.2 - Modeling Approach and Assumptions

The General Plan 2035 Update includes no new land use designations that would increase the buildout potential of the Plan area, but extends the plan horizon by five years to 2035. The General Plan Update provides estimates of population and employment growth within the city limits and the Plan Area that are used as the basis of the baseline and future year inventories. Per capita emission rates were estimated for most emission source categories. The per capita rates are then applied to the population estimates for each future year.

Emissions were estimated with emission factors and protocols from ARB and other agencies. Using Community Inventory Protocol guidelines, the process used to perform this greenhouse gas inventory is as follows:

1. Set organizational boundaries.
2. Set operational boundaries.
3. Identify sources of emissions.
4. Collect data on emissions for a representative period of time.
5. Calculate greenhouse gas emissions from data using data-specific emission factors.
6. Create an inventory of CO₂e emissions that is complete and transparent.

The analysis uses population and land use data for the area within the city limits of San Ramon and the Planning Area for the General Plan Update and is provided in Table 1.

Table 1: Population and Land Use Growth Assumptions

Land Use	2010	2014	2020	2035
Population (City Limits)	72,148	77,270	82,057	94,024
Population (Plan Area)	—	78,820	83,778	96,174
Employment (City Limits)	43,880	45,994	49,329	57,667
Residential Units (City Limits)	—	16,465,691	17,941,416	21,630,730
Residential Units (Planning Area)	—	27,492	29,549	34,690
Non-Residential Square Footage	—	16,465,691	17,941,416	21,630,730
California Population	37,309,382	38,340,074	37,309,382	38,340,074
Notes: Baseline represents existing development in 2014. Growth is the incremental increase from baseline. ksf = thousand square feet Source: San Ramon General Plan Update Land Use Element for land use and population estimates. ABAG 2012 Jobs Housing Connection Strategy for 2010 Jobs. DOF Report E-4 for California Population.				

Motor Vehicles

Emissions from transportation are based on vehicle miles traveled (VMT) data generated by the Metropolitan Transportation Commission (MTC) specifically for San Ramon. The VMT data for non-commercial passenger vehicles was reported by trips entirely within the City, trips partially in the City, and trip entirely outside the City. VMT for trips partially within the City were divided in half to account only for the portion of travel that is the responsibility of the City. In addition, trips entirely outside the City, also referred to as through trips, were not included in the total. Table 2 provides VMT for non-commercial passenger travel. Table 3 provides VMT for commercial vehicles (trucks). The VMT estimates are based on the activity within the city limits. The VMT was adjusted for the Planning Area analysis to account for the larger population in that area.

Table 2: Non-Commercial Passenger Vehicle Miles Traveled

Year	Non-Commercial Passenger Vehicle Miles Traveled Per Day		
	Entirely Within the City	Partially Within the City	Total
2010	251,590	1,265,857	1,517,448
2015	268,277	1,281,848	1,550,125
2020	269,345	1,310,902	1,580,247
2035	286,584	1,408,734	1,695,318
Note: Vehicle Miles Traveled adjusted to account for traffic analysis zones (TAZ) with boundaries that include other communities. Source: MTC 2014.			

Table 3: San Ramon Commercial Vehicle Miles Traveled

Land Use	2010	2015	2020	2035
Vehicle Miles Traveled per day	232,955	230,016	227,077	272,089
Note: Vehicle Miles Traveled estimates are for the city limits. Estimates for the Planning Area based on the higher potential population within the Planning Area are provided in Appendix A to this report. Source: MTC 2014.				

Motor vehicle emissions are estimated using emission factors from ARB’s EMFAC 2011 emission model. Aggregated emission factors for each vehicle classification are generated using ARB’s web-based data tool. The fraction of VMT produced by each vehicle class is multiplied by the VMT generated during each modeling year. EMFAC provides emission factors with and without the benefit of Pavley I vehicle regulations and the Low Carbon Fuel Standard.

Electricity and Natural Gas

Electricity Emission Factor

Pacific Gas & Electric provides third party verified greenhouse gas emission factors for power delivered to its customers. Historical data from 2003 to 2011 and forecasted data from 2012 to 2020 are provided in Table 4.

Table 4: PG&E Emission Factor Summary

Year	Emission Factor		
	Pounds CO ₂ /MWh	Metric tons CO ₂ /MWh	Source
2003	620	0.281	PG&E’s third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)2 (2003-2008) or The Climate Registry (TCR) (2009-2011)
2004	566	0.257	
2005	489	0.222	
2006	456	0.207	
2007	636	0.288	
2008	641	0.291	
2009	575	0.261	
2010	445	0.202	
2011	393	0.178	
2012	453	0.205	
2013	431	0.196	
2014	412	0.187	
2015	391	0.177	

Table 4 (cont.): PG&E Emission Factor Summary

Year	Emission Factor		
	Pounds CO ₂ /MWh	Metric tons CO ₂ /MWh	Source
2016	370	0.168	CPUC GHG Calculator, which provides an independent forecast of PG&E's emission factors as part of a model on how the electricity sector would reduce emissions under AB 324
2017	349	0.158	
2018	328	0.149	
2019	307	0.139	
2020	290	0.131	

Source: Greenhouse Gas Emission Factors: Guidance for PG&E Customers, April 2013.

Electricity and Natural Gas Usage Data

Electricity-related emissions refers to the emissions from power plants that generate electricity used in the City. Electricity is used for lighting, electronics, and appliances. Natural gas emissions refer to the emissions generated when natural gas is burned. Natural gas is used for space heating, clothes dryers, water heaters, and natural gas kitchen stoves.

PG&E provided electricity and natural gas usage data for use in developing the emission inventory and future year projections. Table 5 list the energy consumption data with projection used for future years. Consumption for the Planning Area was assumed to be proportional to the difference in population in the city limits and the Planning Area.

Table 5: San Ramon Electricity and Natural Gas Consumption

Land Use	2010	2014	2020	2035
Residential Electricity (KWh/yr)	183,486,874	183,043,283	194,382,769	222,731,483
Commercial Electricity (KWh/yr)	202,127,265	197,949,782	210,212,722	240,870,070
Residential Natural Gas (Therms)	12,337,947	12,705,919	13,493,048	15,460,869
Commercial Natural Gas (Therms)	6,004,588	6,396,255	6,792,502	7,783,118

Sources:
2010 from PG&E Community Data Report, 2014.
2014, 2020, 2035 are projections from 2013 assuming growth is proportional to population growth.

Offroad Equipment

Emissions generated by offroad equipment were estimated using the BAAQMD's Bay Area Greenhouse Gas Emissions Inventory updated February 2010. The emissions for San Ramon were assumed to be proportional to its share of Bay Area population. Later-year estimates were based on population forecasts for each year.

Solid Waste

Solid waste generated by residents, employees, and visitors in the City are sent to a landfill outside of the City, where the trash produces greenhouse gas emissions through decomposition processes. The majority of the City's waste (the franchised portion) goes to the Vasco Road Landfill in Alameda County. The Vasco Road Landfill has a methane collection system but does not produce electricity with the captured methane. Alameda County estimates the Vasco Road Landfill's methane capture rate at 75 percent. Prior to 2010, San Ramon sent about 8,000 tons per year to landfills to be used as Alternative Daily Cover (ADC). While this counts as diversion by the State, it is buried in the landfill and produces methane. Currently, the City sends all green waste (mixed with food scraps) to be composted. Most of the City's ADC was formerly used at the Altamont Landfill in Alameda County. Altamont has a methane recovery system, and it captures 75 percent of the methane and uses it to create electricity, which is sold to the PG&E grid.

Emissions from solid waste were based on waste data from CalRecycle disposal reports for San Ramon. Future years were projected based on population projections. Emission rates per ton of waste were obtained from the CalEEMod 2011 Waste Component.

High Global Warming Potential Gases

Ozone-depleting substances (ODS) substitutes can be released into the atmosphere when they leak out of refrigeration and air conditioning equipment contained in stationary and mobile applications. ODS substitutes are also used in solvent cleaning, foam production, sterilization, fire suppressants, and aerosols. Emissions of ODS substitutes consisted of 2.9 percent of California's greenhouse gas inventory in 2008 and are anticipated to increase to 7.5 percent by 2020. The large increase is due to the growing use of ODS substitutes to replace ODS gases.

Emissions estimates of ODS used primarily as refrigerants are based on the High Global Warming Potential Greenhouse Gas Forecast 2008–2020 for California developed by ARB. Emissions for San Ramon were assumed to be proportional to the City's share of California's population.

Water Transport and Treatment

Emissions from water transport and treatment are estimated with water usage per capita from the San Ramon General Plan Update and energy requirements for this purpose from the CEC.

Transportation and Distribution Losses

Emission factors per megawatt-hour of electricity from the electrical utilities reflect the power generated at the generating source and do not include losses of power that occur during transmission to the end user. Average losses in the Western Region are estimated at 6.84 percent. The losses are added to the emission inventory to provide a more accurate estimate of the emissions from the end user perspective.

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SECTION 4: GREENHOUSE GAS INVENTORY

4.1 - San Ramon Inventory Update

This assessment presents the estimated greenhouse gas emissions generated in the City of San Ramon for calendar year 2010 and 2014, as well as the projected San Ramon emissions for calendar years 2020 and 2035. See Appendix A for supporting documentation for the emission inventories.

This assessment includes emissions attributable to all land within San Ramon’s city limits and its Planning Area. For CEQA purposes, emissions with the entire Planning Area must be analyzed. Therefore, the San Ramon Planning Area is considered the organizational boundary for the assessment although technically not under the current jurisdiction of the City. The assessment includes emission inventories for five main sectors of emission sources: electricity, natural gas, solid waste, refrigerants (ODS), and transportation sources.

Emissions in 2010 were calculated using data from calendar year 2010. Data for 2014 was interpolated from 2013 data and 2015 projections. Year 2035 projections assume that overall buildout outlined in the San Ramon General Plan 2035 Update would occur. Year 2035 projections also assume a BAU trajectory for generation and emission of greenhouse gases in the City. Year 2020 BAU projections are interpolated from the nearest available data years for each sector.

4.1.1 - Business as Usual Emissions Inventory Results

The BAU emissions for each analysis year for each sector are presented in Table 6 for the city limits and Table 7 for the Planning Area. BAU analyses represent the emissions that would occur without regulations accounting for future growth in emission sources.

Table 6: City of San Ramon BAU Emissions Projections 2010 to 2035 (City Limits)

Sector	Emissions (MTCO ₂ e/year)			
	2010	2014	2020	2035
Motor vehicles	349,246	371,308	350,366	386,183
Electricity - residential	49,860	45,588	52,820	60,524
Electricity—commercial	47,240	44,401	51,445	58,948
Electricity - City/County/District	7,685	4,900	5,677	6,505
Electricity - T&D Losses	6,716	6,155	7,132	8,172
Natural gas—residential	65,646	67,604	71,792	82,263
Natural gas—commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,525	23,094	24,525	28,102

Table 6 (cont.): City of San Ramon BAU Emissions Projections 2010 to 2035 (City Limits)

Sector	Emissions (MTCO ₂ e/year)			
	2010	2014	2020	2035
Water Transport	6,320	6,204	7,188	8,236
Offroad equipment	28,908	30,628	30,628	47,844
Ozone depleting substance (ODS) substitutes	26,763	45,709	56,520	64,762
Total	636,857	679,623	694,234	792,950

Source: FCS 2014

Table 7: City of San Ramon Baseline and BAU Emissions Projections 2010 to 2035 (Planning Area)

Sector	Emissions (MTCO ₂ e/year)			
	2010	2014	2020	2035
Motor vehicles	354,351	375,807	355,931	392,691
Electricity - residential	50,850	46,502	53,873	61,738
Electricity—commercial	47,240	44,401	51,445	58,948
Electricity - City/County/District	7,685	4,900	5,677	6,505
Electricity - T&D Losses	7,235	6,553	7,592	8,700
Natural gas—residential	66,963	68,960	73,232	83,912
Natural gas—commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,856	16,711	17,762	20,390
Water Transport	6,438	6,320	7,329	8,413
Offroad equipment	29,488	31,243	31,243	48,938
Ozone depleting substance (ODS) substitutes	27,300	46,626	57,705	66,243
Total	646,355	682,054	697,930	797,890

Source: FCS 2014.

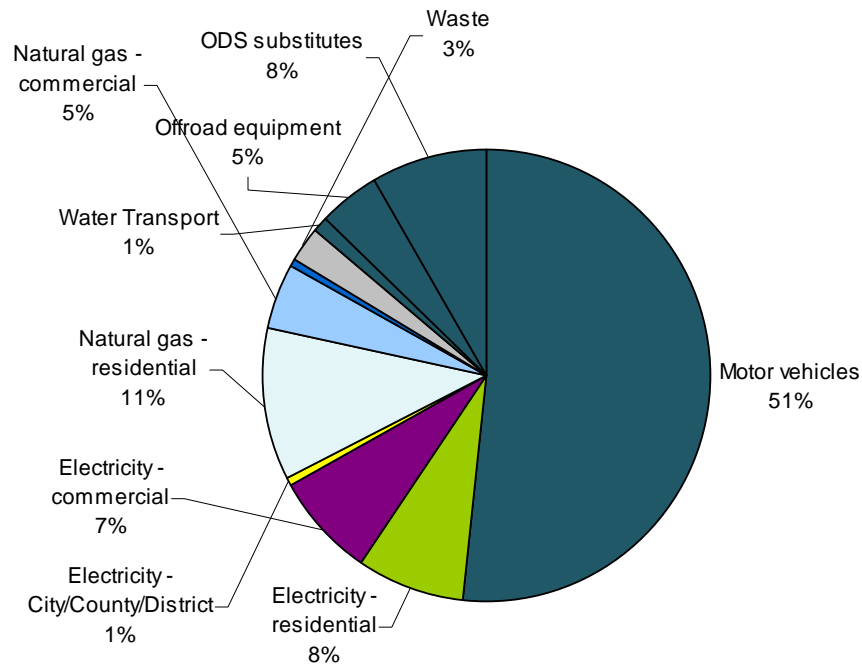
As shown in Table 8, motor vehicle emissions comprise over 50 percent of the City of San Ramon's 2020 emissions inventory. The second largest sector is electricity with about 17 percent of the emissions inventory. Figure 2 shows the results of the BAU inventory in chart format.

Table 8: City of San Ramon 2020 BAU Emissions Detail (Planning Area)

Community Sector	2020 Emissions (MTCO ₂ e)	Percentage of Inventory
Motor vehicles	355,931	51.00%
Electricity - residential	53,873	7.72%
Electricity—commercial	51,445	7.37%
Electricity - City/County/District	5,677	0.81%
Electricity - T&D Losses	7,592	1.09%
Natural gas—residential	73,232	10.49%
Natural gas—commercial	33,856	4.85%
Natural gas - City/County/District	2,285	0.33%
Waste	17,762	2.54%
Water Transport	7,329	1.05%
Offroad equipment	31,243	4.48%
Ozone depleting substance (ODS) substitutes	57,705	8.27%
Total Business as Usual Emissions	697,930	100%

Source: Appendix A.

Figure 2: San Ramon 2020 BAU Inventory Sector Percentages



4.1.2 - Emissions Inventory Adjusted for Regulatory Reductions

After estimating BAU emissions for each year, the next step is to estimate emission reductions that will be achieved from state regulations and programs that apply to the City of San Ramon inventory. California has adopted regulations that address all inventory sectors identified in the ARB Scoping Plan. Regulations on motor vehicles and energy generation and use are updated periodically. This inventory update includes regulations that have been updated or revised since the original CAP inventory was prepared in 2010. The analysis also demonstrates consistency with the ARB Scoping Plan 2020 reduction target. Reductions from statewide measures for 2020 and 2035 are provided in Table 9.

Table 9: Reductions from Statewide Measures (Planning Area)

Sector	State Measures	Emissions (MTCO ₂ e/year)	
		2020	2035
Motor Vehicles	Pavley and Low Carbon Fuel Standard	76,919	88,274
	Low Emission Vehicle Program III	6,754	64,097
	Tire Tread Program	474	523
	Tire Pressure Program	869	959
	Low Friction Oil	3,476	3,835
	HD Aerodynamic/MHD Hybridization	2,247	2,492
<i>Subtotal</i>		<i>90,738</i>	<i>151,107</i>
Electricity - Residential	Renewable Portfolio Standards	27,425	31,433
	Title 24 Energy Efficiency Standards	894	2,397
Electricity - Commercial	Renewable Portfolio Standards	26,192	30,012
	Title 24 Energy Efficiency Standards	760	647
	City/County/District RPS	2,890	3,312
	City/County/District Title 24	0	0
<i>Subtotal</i>		<i>58,162</i>	<i>67,800</i>
Electricity – T&D Losses	T&D Losses	3,978	4,638
Electricity – Water Transport and Treatment	Green Building Code and Model Water Conservation Ord.	1,466	1,683
Natural Gas –Residential	Title 24 Energy Efficiency Standards	452	2,826
Natural Gas - Commercial	Title 24 Energy Efficiency Standards	620	1,074
Natural Gas – City/County/District	Title 24 Energy Efficiency Standards	0	32
<i>Subtotal</i>		<i>1,072</i>	<i>3,932</i>
Waste	Waste Diversion Mandate	3,478	3,903

Table 9 (cont.): Reductions from Statewide Measures (Planning Area)

Sector	State Measures	Emissions (MTCO ₂ e/year)	
		2020	2035
Refrigerants (Ozone depleting substance substitutes)	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	28,853	33,122
Total		187,746	275,257

Source: FCS 2014 Appendix A

The Adjusted BAU inventory applies emission reductions achieved by regulations, programs, and measures that are implemented by other agencies for each source category. This inventory identifies the base from which reductions are needed, if any, from local strategies and measures to demonstrate consistency with the targets contained in AB 32. In this case, implementation of state regulations will reduce the City’s inventory sufficiently to achieve the 2020 target without additional local measures. However, city programs and measures will provide additional reductions that will provide a lower base from which to achieve targets for later years when adopted. Table 10 and Table 11 show the emission inventories for the city limits and the Planning Area, respectively, after the application of state regulatory measures.

Table 10: City of San Ramon Adjusted BAU Emissions (City Limits)

Sector	2010	2014	2020	2035
Motor vehicles	331,821	349,501	261,234	235,075
Electricity - residential	37,285	34,545	25,017	27,335
Electricity—commercial	36,314	33,645	24,710	28,291
Electricity - City/County/District	4,007	3,713	2,727	3,129
Electricity - T&D Losses	5,034	5,640	3,588	4,011
Natural gas—residential	65,646	67,604	71,421	79,782
Natural gas—commercial	29,602	31,881	33,568	37,985
Natural gas - City/County/District	2,347	2,152	2,266	2,564
Waste	16,525	16,382	21,119	24,199
Water Transport	4,738	4,701	5,750	6,589
Offroad equipment	28,908	30,628	30,628	47,844
Ozone depleting substance (ODS) substitutes	26,763	22,854	28,260	32,381
Total	588,990	603,246	510,287	529,195

Table 11: City of San Ramon Adjusted BAU Emissions (Planning Area)

Sector	2010	2014	2020	2035
Motor vehicles	336,593	353,677	279,012	304,417
Electricity - residential	38,125	35,238	25,554	27,908
Electricity—commercial	35,412	33,645	24,493	28,288
Electricity - City/County/District	5,761	3,713	2,787	3,193
Electricity - T&D Losses	5,424	4,966	3,614	4,062
Natural gas—residential	66,963	68,960	72,781	81,086
Natural gas—commercial	29,602	31,881	33,235	37,719
Natural gas - City/County/District	2,347	2,152	2,285	2,587
Waste	16,856	16,711	14,284	16,487
Water Transport	4,826	4,789	3,597	4,130
Offroad equipment	29,488	31,243	31,243	48,938
Ozone depleting substance (ODS) substitutes	27,300	23,313	28,853	33,122
Total	598,695	610,286	507,918	520,023

4.1.3 - 2020 Target Analysis

Table 12 shows the percentage reduction from each inventory source category and from the total 2020 BAU inventory with the application of state regulations. The results demonstrate that the regulations alone are sufficient to reduce the BAU inventory by 26.54 percent, which exceeds the amount required to be consistent with AB 32 Scoping Plan targets (21.65 percent). With the addition of emission reductions from local measures, the reduction from BAU is 28.16 percent.

Table 12: City of San Ramon 2020 BAU and Adjusted BAU Emissions Inventory (City Limits)

Inventory	2020 BAU Emissions (MTCO ₂ e/year)	2020 with Regulations (MTCO ₂ e/year)	Percent Reduction
Motor vehicles	350,366	261,234	25.44%
Electricity - residential	52,820	25,017	52.64%
Electricity - commercial	51,445	24,710	51.97%
Electricity – City/County/District	5,677	2,727	51.97%
Electricity – T&D Losses	7,132	3,588	52.29%
Natural gas - residential	71,792	71,421	0.52%
Natural gas - commercial	33,856	33,568	0.85%

Table 12 (cont.): City of San Ramon 2020 BAU and Adjusted BAU Emissions Inventory (City Limits)

Inventory	2020 BAU Emissions (MTCO ₂ e/year)	2020 with Regulations (MTCO ₂ e/year)	Percent Reduction
Natural gas – City/County/District	2,285	2,266	0.85%
Waste	24,525	21,119	13.89%
Water Transport	7,188	5,750	20.00%
Offroad equipment	30,628	30,628	0.00%
ODS substitutes (refrigerants)	56,520	28,260	50.00%
Total	694,234	510,287	26.54%
Emissions with Reductions from Local Measures	—	489,737	28.16%
Target based on Consistency with AB 32 Targets	—	543,932	21.65%
Target based on Service Population	—	4.14	—
City Emissions per Service Population	—	3.80	—
Meets Target in 2020?	—	Yes	Yes
Source: FirstCarbon Solutions, 2014 (Appendix A).			

The emission reductions predicted for the Planning Area are provided in Table 13. The reductions in the Planning Area are very close to reductions in the city limits since the same regulations apply to sources in both analysis areas.

Table 13: City of San Ramon 2020 BAU and Adjusted BAU Emissions Inventory (Planning Area)

Inventory	2020 BAU Emissions (MTCO ₂ e/year)	2020 with Regulations (MTCO ₂ e/year)	Percent Reduction
Motor vehicles	355,931	265,193	25.49%
Electricity - residential	53,873	25,554	52.57%
Electricity - commercial	51,445	24,493	52.39%
Electricity – City/County/District	5,677	2,787	50.91%
Electricity – T&D Losses	7,592	3,614	52.40%
Natural gas - residential	73,232	72,781	0.62%
Natural gas - commercial	33,856	33,235	1.83%
Natural gas – City/County/District	2,285	2,285	0.00%

Table 13 (cont.): City of San Ramon 2020 BAU and Adjusted BAU Emissions Inventory (Planning Area)

Inventory	2020 BAU Emissions (MTCO ₂ e/year)	2020 with Regulations (MTCO ₂ e/year)	Percent Reduction
Waste	17,762	14,284	19.58%
Water Transport	7,329	5,863	20.00%
Offroad equipment	31,243	31,243	0.00%
ODS substitutes (refrigerants)	57,705	28,853	50.00%
Total	697,930	510,184	26.90%
Emissions with Reductions from Local Measures	12,308	495,609	28.99%
Target based on Consistency with AB 32 Targets	—	478,734	21.65%
Emissions per Service Population	5.19	3.72	—
Emission Target per Service Population	—	4.11	—
Meets Target in 2020?	—	—	Yes

Source: FirstCarbon Solutions, 2035 CAP Update Emission Inventory Spreadsheets (Appendix A).

4.1.4 - 2035 Target Analysis

Current regulations will provide substantial emission reductions by 2035. In addition, local measures committed to by the City would provide additional reductions. AB 32 only authorizes the ARB to pursue regulations to achieve the State's 2020 target. New state legislation will be required for ARB to pursue a comprehensive greenhouse gas reduction program for targets in later years. Individual regulations and updates on greenhouse gas sources may continue to be adopted where regulatory authority exists that will continue progress in reducing emissions. Although the State has not adopted a target for 2035, the Scoping Plan Update indicates that reductions averaging 5.2 percent per year would be required to achieve a trajectory that would lead to an 80 percent reduction below 1990 levels by 2050. Based on this trajectory, reductions of approximately 40 percent from 2020 levels would be needed by 2035 to stay on course for achieving the 2050 level. Table 14 shows the amount of reductions that would be required to achieve a 40 percent reduction from BAU by 2035.

Table 14: City of San Ramon 2035 Informational Target Emissions Inventory

Inventory	Community Emissions (MTCO ₂ e)	Per Service Population Emissions (MTCO ₂ e/SP)
2035 Informational Target	478,734	3.23
Percent Reduction from BAU in 2035		40%
2035 Inventory with Regulations	520,033	3.38
2035 Local Reductions	23,385	—

Table 14 (cont.): City of San Ramon 2035 Informational Target Emissions Inventory

Inventory	Community Emissions (MTCO ₂ e)	Per Service Population Emissions (MTCO ₂ e/SP)
2035 Local Reductions	23,385	—
2035 Inventory with Local Reductions	496,647	3.11
Additional Reductions to Reach Informational 2035 Target	17,914	0.116
Source: FirstCarbon Solutions, 2035 CAP Update Emission Inventory Spreadsheets (Appendix A).		

As shown in Table 14, additional regulations and measures will be needed prior to 2035 in order to reach a 40 percent emission reduction. Adoption of new California motor vehicle emission standards for vehicles built in 2026 and later well before 2035 can reasonably be assumed. In addition, Title 24 energy efficiency standards for buildings will likely be updated several times prior to 2035, providing additional reductions from the energy sector. The California Long Term Energy Efficiency Strategic Plan ultimately expects new construction to achieve zero net energy consumption by 2030 with onsite energy production and highly efficient buildings and appliances. The State could also increase the Renewable Energy Portfolio Standard for public utilities to levels higher than the current 33 percent mandate in 2020. Compliance with SB 375 reduction targets for light duty vehicles will provide continued reductions in emissions from that source (8.7 percent) through SB 375’s 2035 milestone year. The City’s share of the Bay Area’s SB 375 requirement has not been determined; however, the City’s land use and transportation strategy are consistent with achieving reductions consistent with SB 375 targets. Finally, emission reductions from voluntary energy efficiency retrofits have not been quantified, due to uncertainty regarding future funding and participation levels. Overall, it is highly likely that City of San Ramon would exceed a 40 percent reduction from BAU by 2035. It must be noted that the State has not adopted a target for 2035; therefore, the target presented here is provided for information only and does not represent a firm commitment by the City. Future inventory and CAP updates will be needed once the State sets new targets. No schedule for adopting new targets has been issued.

4.1.5 - Benefits of Local Measures

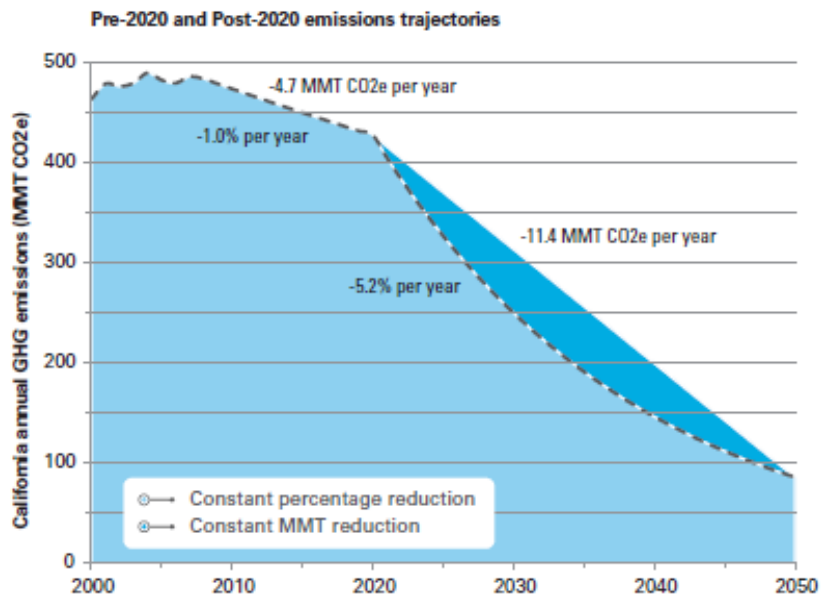
The City prepared the San Ramon Climate Action Plan 2014 Annual Report to document progress toward implementation of the CAP. The CAP includes strategies to reduce greenhouse gas emissions under the City’s regulatory authority or influence. The primary means to achieve reductions are through land use related measures such as increased density (e.g., multi-story buildings, multi-family housing, and small lot single family), pedestrian and transit-oriented development, support for alternative transportation modes, and measures that reduce energy consumption through improved energy efficiency in buildings, water conservation, and waste reduction. Voluntary programs will also provide reductions from existing homes and businesses that install energy saving retrofits and solar photovoltaic systems. Reductions from energy efficiency, water conservation, and waste reduction are included in the overall emission estimates provided herein and not individually calculated. Highlights of the Annual Report include:

- Since 2009, the citywide residential density per square mile has increased by approximately 9.5%.
- The City approved the Acre Development infill Mixed Use Townhome Live-Work project.
- Planning for the transit and pedestrian-friendly City Center Project and the North Camino Specific Plan continue to move through the process.
- The City continues to review new Development Plans to promote bicycle facilities and overall connectivity. Bicycle parking and end of trip facilities are promoted as part of individual development proposals and Conditions of Approval.
- In 2013, the City received a \$247,325 grant for the installation of flashing beacons, in-pavement flashers, and new traffic signal hardware to upgrade five high-priority pedestrian crossing locations.
- In 2013, the City completed installation of electric vehicle (EV) charging stations at the City Permit Center and City Hall. A City EV Charging Station Section has been added to the Benchmark Section of this report to track use and GHG savings associated with these facilities.
- The City currently has a fleet of 111 vehicles. Approximately 25 percent of the City's vehicles are gasoline/electric hybrids, CNG, or biodiesel.
- In 2013, Bishop Ranch installed 40 new bike racks, and two additional bike racks were installed at the Fire District offices on Bollinger Canyon Road.
- Employees in Bishop Ranch have increased alternative transportation use by 10 percent since 2009. Employees in Southwest Contra Costa County have increased alternative transportation use by 3.3 percent.
- Implementation of the City's Adaptive Traffic Signal System will result in reduced emissions from idling and starts and stops because traffic is kept free flowing with the system.
- New development subject to the entitlement process is required to demonstrate a 20 percent reduction in water use through implementation of drought tolerant landscaping, efficient fixtures, and use of reclaimed water.
- Per capita solid waste disposal continues to decrease year after year, dropping from 3.6 pounds per resident per day in 2008 to 2.4 pounds per resident per day in 2012. The Commercial has also dropped 6.3 pounds per employee per day in 2008 to 4.8 pounds per resident per day in 2012.
- The City has issued 1,727 building permits for residential solar projects and 69 pending commercial projects since 2011 that would generate 2,319 kilowatts of electricity.
- The City converted approximately 3,946 light fixtures to LED technology. The conversion represents an annual energy savings of 1,208,691 kilowatt-hours, a 56.0 percent improvement over the prior energy use for those lighting sources.
- The use of reclaimed water use has increased by approximately 13.6 percent over the 2013 reporting period.

4.1.6 - Targets after 2035

The First Update to Climate Change Scoping Plan (Update) indicates that substantial reductions will be required between 2020 and 2050 to reach the goal of 80 percent below 1990 emissions by 2050. The Update states that this will require accelerating progress through the continuation of existing policies and implementation of new policies that help to scale market adoption of the cleanest, most energy-efficient technologies. Emissions will need to decline several times faster between 2020 and 2050 to reach the 2050 emission limit. It will require new approaches to energy production and utilization. The amount and rate of reduction required, extracted from the Update, is shown in Figure 3.

Figure 3: California’s Path to a 2050 Target



Source: ARB 2014b.

The Update lists potential new strategies for each emission sector to move toward the 2050 level. The State anticipates continued increases in energy efficiency that will ultimately result in “net zero” energy consumption in new development and increases in the number of zero emission vehicles operated in the State. Continued expansion of renewable fuels throughout the economy and ultimately replacing natural gas for heating with zero emission alternatives where feasible will be needed.

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SECTION 5: REFERENCES

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Appendix A: Greenhouse Gas Modeling Results

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San Ramon General Plan Growth Projections

	2008	2010	2014	2020	2035	Percent Inc	Ave Annual Increase
Population							
Population in City Limits	66,413	72,148	77,270	82,057	94,024	21.68	1.03
Increase			10,857		16,754		
Population in Planning Area		73,595	78,820	83,778	96,174	22.02	1.05
Increase					17,354		
Employment	2008	2010	2014	2020	2035		
Jobs		43,880	45,994	49,329	57,667	25.38	1.21
Increase 2014 to 2035					11,673		
Service Population		117,475	124,814	133,107	153,841		
Non-Res Square Footage	2008		2014	2020	2035		
			16,465,691	17,941,416	21,630,730	31.37	1.49
					5,165,039		
Residential Units	2008		2014	2020	2035		
Units in City Limits	24,781		27,492	29,549	34,690	26.18	1.25
Increase					7,198		
Units in Planning Area			29,993		35,385	17.98	0.86
Increase					5,392		

Data from San Ramon General Plan Land Use Element
 Jobs for 2010 from ABAG 2012 Jobs Housing Connection Report

California Population	2010	2014	2015	2020	2035
	37,309,382	38,340,074	38,801,063	37,309,382	38,340,074

Solid Waste Projections

City Limits

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Planning Area

	2008	2010	2013	2014	2020	2035
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048
Population Planning Area		73,595		78,820	83,778	96,174
Instate Waste (tons)		37,053		36,734	39,045	44,822

Commercial Vehicle Share of CO2 Emissions Inventory and VMT

Year	LEHD Share	CO2 in tons per day	VMT in VMT per day	County VMT	CO2
2005					
City	Share	in tons per da	in VMT per day		
San Ramon	0.127	246	203,110	1,598,104	1937
2010					
City	Share	in tons per da	in VMT per day		
San Ramon	0.153	280	232,955	1,523,927	1832
2020					
City	Share	in tons per da	in VMT per day		
San Ramon	0.136	262	227,077	1,674,878	1932
2035					
City	Share	in tons per da	in VMT per day		
San Ramon	0.136	325	272,089	2,006,875	2398

Source: MTC 2014 estimate

Non-Commercial Passenger Vehicle Miles Traveled

	2008	2010	2015	2020	2035
VMT City Limits	1,355,665	1,517,448	1,550,125	1,580,247	1,695,318

Source: MTC 2014 estimate for San Ramon adjusted to include trips entirely within San Ramon and half of trips partially in San Ramon

Total Commercial and Non-Commercial VMT City Limits

	2008	2010	2014	2015	2020	2035
Passenger Vehicle VMT	1,359,394	1,517,448	1,543,590	1,550,125	1,580,247	1,695,318
Commercial VMT	208,691	232,955	230,604	230,016	227,077	272,089
Total	1,568,085	1,750,402	1,774,193	1,780,141	1,807,324	1,967,406
Population	66,413	72,148	77,270	78,068	82,057	94,024
VMT per capita	23.61	24.26	22.96	22.80	22.03	20.92

2015 commercial VMT was interpolated from 2010 and 2020 data.

2014 data interpolated between 2010 and 2015 data for non-commercial passenger VMT

82,883,205

2008 VMT per capita was estimated as the average of 2010 and 2014.

Total Commercial and Non-Commercial VMT Planning Area

	2008	2010	2014	2020	2035
Passenger Vehicle VMT	1,359,394	1,547,887	1,574,553	1,613,398	1,734,084
Commercial VMT	208,691	232,955	230,604	227,077	272,089
Total	1,568,085	1,780,842	1,805,157	1,840,475	2,006,172
Population	66,413	73,595	77,270	82,057	94,024
VMT per capita	23.61	24.20	23.36	22.43	21.34

	2010	2014	2020	2035
Population City Limits	72,148	77,270	82,057	94,024
Population Planning Area	73,595	78,820	83,778	96,174
Adjustment Factor	1.020059532	1.02005953	1.02097849	1.0228665

VMT for passenger vehicles adjusted upward proportional to population projected for the planning area.

Commercial VMT remains constant since commercial development in planning area will be very limited.

City

Energy Projections

Residential Electricity City Limits

	2008	2010	2013	2014	2020	2035
Non Gov	187,456,989	183,452,817	181,028,189	183,020,165	194,358,218	222,703,351
County			0	0	0	0
City	32,396	34,057	22,867	23,119	24,551	28,131
District			0	0	0	0
Total	187,489,385	183,486,874	181,051,056	183,043,283	194,382,769	222,731,483

Planning Area Growth Factor:

0.02005683

Residential Electricity Planning Area

	2008	2010	2013	2014	2020	2035
Non Gov	191,216,782	187,132,299	184,659,041	186,690,969	198,256,428	227,170,075
County			0	0	0	0
City	33,046	34,740	23,326	23,582	25,043	28,696
District			0	0	0	0
Total	191,249,828	187,167,039	184,682,366	186,714,551	198,281,471	227,198,770

Commercial Electricity

	2008	2010	2013	2014	2020	2035
Non Gov	189,525,956	173,846,782	176,336,769	178,277,122	189,321,345	216,931,902
County	438,601	312,326	63,795	64,497	68,493	78,481
City	14,152,736	14,376,422	9,572,940	9,678,278	10,277,844	11,776,762
District	14,734,498	13,591,735	9,821,810	9,929,886	10,545,040	12,082,925
Total Gov	29,325,835	28,280,483	19,458,545	19,672,661	20,891,377	23,938,168
Total All	218,851,791	202,127,265	195,795,314	197,949,782	210,212,722	240,870,070

Population 66,413 72148 76429 77,270 82,057 94,024

DOF Report E-4 Population Estimates for Cities, Counties, and State 2011-2014 with 2010 Benchmark

Residential Natural Gas City Limits

	2008	2010	2013	2014	2020	2035
Non Gov	11,646,743	12,337,947	12,567,629	12,705,919	13,493,048	15,460,869
County	0	0	0	0	0	0
City	0	0	0	0	0	0
District	0	0	0	0	0	0
Total	11,646,743	12,337,947	12,567,629	12,705,919	13,493,048	15,460,869

Residential Natural Gas Planning Area

	2008	2010	2013	2014	2020	2035
Non Gov	11,880,340	12,585,407	12,819,696	12,960,760	13,763,675	15,770,965
County	0	0	0	0	0	0
City	0	0	0	0	0	0
District	0	0	0	0	0	0
Total	11,880,340	12,585,407	12,819,696	12,960,760	13,763,675	15,770,965

Commercial Natural Gas

	2008	2010	2013	2014	2020	2035
Non Gov	5,734,453	5,563,512	5,926,611	5,991,826	6,363,018	7,290,998
County	891	3,496	0	0	0	0
City	177,583	142,387	179,248	181,220	192,447	220,513
District	300,979	295,193	220,780	223,209	237,037	271,607
Total Gov	479,453	441,076	400,028	404,430	429,484	492,120
Total All	6,213,906	6,004,588	6,326,639	6,396,255	6,792,502	7,783,118

Population 66,413 72148 76429 77,270 82,057 94,024

DOF Report E-4 Population Estimates for Cities, Counties, and State 2011-2014 with 2010 Benchmark
2008, 2010, and 2013 from PG&E Community Data Report 2014
2014, 2020, 2035 are projections from 2013 assuming growth is proportional to population growth.

BAU Energy Factor

	2003	2004	2005	3-Yr Average
	0.62	0.566	0.599	0.595

PG&E Thrid Party Verified Emission Rates.

San Ramon Offroad Equipment Emissions Estimate

City Limits

	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Planning Area

	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0	0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		0	29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

ODS

	2008	2010	2013	2014	2020	2035
High GWP	13.89	15.66	23.92	25.66	36.11	
ODS		13.84	21.14	22.68	31.91	

High GWP from California GHG Forecast 2008-2020

2035 based on population growth from 2020 to 2035

ODS for 2010 from Scoping Plan inventory. Later years based on fraction of high GWP for ODS

AB 32 Emission Reduction Targets

	With Pavley/ RPS	Without Pavley/ RPS
1990 Baseline	431	
2000 Emissions	466.32	
2010 Emissions	449.59	
2012 Emissions	453.06	
2020 BAU Forecast	509	547
2020 Target	431	431
Reductions From BAU Req'd	78	116
Percent	15.32	21.21
Reductions Req'd from 2010	18.59	
Percent	4.13	

Source: California GHG Inventory for 2000-2012 by Scoping Plan Category, March 24, 2014

2020 Target from: GHG Emission Forecast for 2020: Data Sources, Methods, and Assumptions AB 32 Baseline Forecast, October 28, 2010.

ARB First Update to the Climate Change Scoping Plan, May 2014

	MMTCO ₂ e/ Year
2050 Target 80% Below 1990	
1990 Emissions Baseline	431
2035 Interim Target (5.2%/yr)	
2050 Target (MMTCO ₂ e)	86.2

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2034	2035
Emissions with 5.2% Annual Reduction	431	408.59	387.34	367.20	348.11	330.00	312.84	296.58	281.15	266.53	252.67	239.54	227.08	215.27	204.08
											178.33				226.92
											0.413749				0.526504

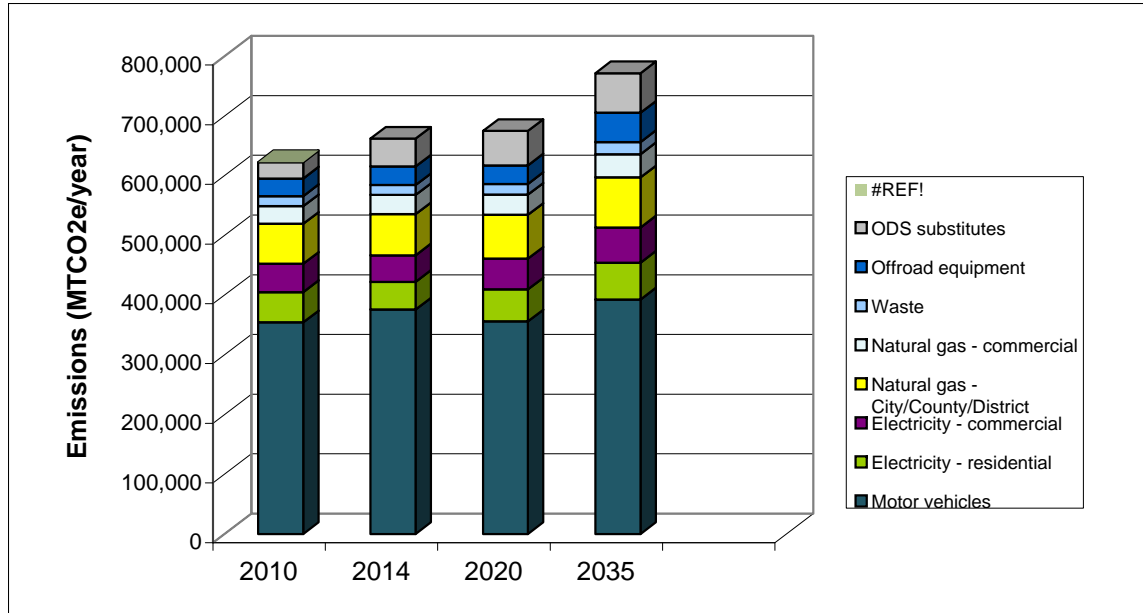
Planning Area Modeling Results

Community Greenhouse Gas Business as Usual Inventory

Summary

Prepared by First Carbon Solutions

Source	2010	2014	2020	2035
Motor vehicles	354,351	375,807	355,931	392,691
Electricity - residential	50,850	46,502	53,873	61,738
Electricity - commercial	47,240	44,401	51,445	58,948
Electricity - City/County/District	7,685	4,900	5,677	6,505
Electricity - T&D Losses	7,235	6,553	7,592	8,700
Natural Gas - residential	66,963	68,960	73,232	83,912
Natural gas - commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,856	16,711	17,762	20,390
Water Transport/Treatment Electricity	6,438	6,320	7,329	8,413
Offroad equipment	29,488	31,243	31,243	48,938
ODS substitutes	27,300	46,626	57,705	66,243
Total	646,355	682,054	697,930	797,890



Emission Reductions from Local Measures

Reductions without Local Measures

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	355,931.2	279,012	265,193.1	90,738.1
Reduction			90,738.1	25.49%

Reductions from Land Use Strategy 2020

	Reduction Percentage	Emissions MTCO ₂ e
2020 Lt Duty Vehicle Emissions without Local Measures		204,231.5
SB 375 Land Use Strategy	4.10%	8,373
Emissions after reduction		195,858

Source: ARB, 2014

Technical Evaluation of Greenhouse Gas Emissions Reduction Quantification for the ABAG and MTC SB 375 SCS, April 2014

2035 Emission Emissions without Local Measures

Mobile Source Emissions	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Motor Vehicles	392,691.0	304,417	232,511.4	160,179.6
Reduction		88,274.2		40.79%

Reductions from Land Use Strategy 2035

	Reduction Percentage	Emissions MTCO2e
2035 Light Duty Emissions without Local Measures		215,365.6
SB 375 Land Use Strategy	8.70%	18,737
Lt Duty Emissions after reduction		196,629

Source: ARB 2014. Technical Evaluation of MTC SB375 Strategy
MTC estimates that strategies implementing SB 375 will reduce per capita VMT by 8.7% by 2035

Water Use	Population	Water Use (gal/day)	Mgal/Day	Mgal/year	20% Reduction	25% Reduction
Per capita water use 2009 (gal)		163				
Population 2010	73,595	11,995,985	12.00	4,378.5		
Population 2020	83,778	13,655,814	13.66	4,984.4	996.9	
Population 2035	96,174	15,676,362	15.68	5,721.9		1,430.5

Electric Intensity Factors	kWh/mgal	2020 Energy Savings (kWh)	2035 Energy Savings (kWh)
Supply	2,117	2,110,383	3,028,301
Treatment	111	110,653	158,782
Distribution	1,272	1,268,024	1,819,555
Wastewater Treatment	1,911	1,905,027	2,733,624
Total		3,489,060	5,006,638

Emission Reductions from Water Use	PG&E Emissions Rate (MTCO2/MWh)	Emission Reductions (MTCO2e)
2020 Reductions	0.131	457.1
2035 Reductions	0.131	655.9

Project Reduction Potential From Land Use and Transportation Measures				Global Max Suburban Center (percent)
Land Use and Transportation		Reduction Range (percent)	Global Maximum Suburban (percent)	
Compact Development	LUT-1, LUT-2	1.5 to 30		
Mixed Use Development	LUT-3	9 to 30		
Pedestrian Orientation	LUT-4, TST-2	6.7 to 20		
Bicycle Infrastructure	LUT-8, TST-5	Not quantified		
Transit Service Enhancements	TST-3, TST-4	0.02 to 8.2		
TDM Programs at Commercial	TRT-1, TRT-2, TRT-3	1 to 21		
TDM Measures at Comm	TRT-4 through TRT-11, TRT-14, TRT-15	0.3 to 21		
Maximum Combined Reduction			15	20

Source: Reductions from CAPCOA 2010

Energy Related		
Exceed Title 24		1-100
Water Conservation		1-20
Solid Waste Reduction		
Alternative Energy Gen		0-100
Programs for Existing Sources		
Infrastructure benefiting Existing Development		
Improve Traffic Flow	RPT-2	0-45

This information represents the range of reductions that can be achieved by individual projects implementing the General Plan

Source: CAPCOA 2010 Table 6.2

Solid Waste

Reductions from Diversion and Recycling **Per Capita (lbs/day)**

2008 Waste Generation (tons)	40,413	3.6
2010 Waste Generation (tons)	36,325	2.8
Emissions MTCO ₂ e	16,525	
Emission Rate (MTCO ₂ e/ton/yr)	0.45492	
2010 Target (50% Diversion) lbs/day		5.7
2020 Target (75% Diversion) tons		3.1
2020 Waste at 75% Diversion (tons/yr)	43,575	2.85

	Population	Per capita Emission (lbs/day)	Waste Gen (lbs/day)	Waste Gen (tons/year)	Waste Emissions MTCO₂e
2014 BAU	78,820	3.6	283,752	51,785	23,558
2014 Actual (2012 report)	78,820	2.4	189,168	34,523	15,705
Emission Reduction MTCO ₂ e					7,853
2020 BAU	83,778	3.6	301,601	55,042	25,040
2020 with Mandate	83,778	3.1	259,712	47,397	21,562
Emission Reduction MTCO ₂ e					3,478
2035 BAU	96,174	3.6	346,226	63,186	28,744
2035 with Mandate	96,174	3.1	298,139	54,410	24,752
Emission Reduction MTCO ₂ e					3,992

Local Reduction Summary				
Sector			2020 (MTCO2e)	2035 MTCO2e
Motor Vehicles	Land Use and Transportation Str		8,373	18,737
Electricity	Water Conservation		457	656
Waste	75% Waste Diversion Target		3,478	3,992
Total all Sectors			12,308	23,385

Per Capita Emission Per Service Population				
2020 BAU		697,930		5.243358177
2020 Adj BAU		507,918		3.815848349
2020 Local Reductions		12,308		
2020 w/all Reductions		495,609	5.92	3.723379634
Percent Reduction from BAU		28.99%		28.99%
2020 Target Emissions		546,828		
2020 Target Service Population				4.108171132

Per Capita Emissions				
2035 BAU		797,890		5.186459798
2035 Adj BAU		520,033		3.380326155
2035 Local Reductions		23,385		
2035 w/all Reductions		496,648	5.16	3.228318773
Percent Reduction from BAU		37.75%		
2035 Interim Target		478,734	4.98	3.111875879
Additional Reductions Needed		17,914	0.19	0.116442895

	2010	2014	2020	2035
Service Population (Population + Jobs)	117,475	124,814	133,107	153,841

Reductions from State Measures**Targets based on State Reductions for AB 32**

State Inventory 2010 MTCO _{2e}	451.6
New State Inventory 2020 BAU MTCO _{2e}	545.0
State Inventory 2020 Reduced MTCO _{2e}	507.0
AB 32 target - 1990 EI MTCO _{2e}	427.0
Reductions Required from BAU MTCO _{2e}	118.0
Percent Reduction Rqd BAU	21.7
Reduction from 2010	24.6
Percent Reduction from 2010	5.4

2020 Emission Reduction Calculations				
	Emissions	Population	Per Capita	Reduction
San Ramon 2010 Inventory	646,355	73,595	8.78	
San Ramon 2020 BAU Inventory	697,930	83,778	8.33	
San Ramon 2020 Target	546,479	83,778	6.52	21.70%
Reduction Required from BAU	151,451			
Reductions Achieved	187,746			
Emissions with Reductions	510,184		6.09	26.90%

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	355,931	279,012	265,193.1	90,738
Reduction		76,919.2	13,818.9	25.49%

Light Duty Reductions in 2020	CO2 tons/year	MTCO2e/year
Light Duty Passenger Cars and Trucks	225,122.9	204,231.5
LEV III 2020 Reduction 3% and Vehicle Efficiency	6,753.7	
Vehicle Efficiency Measures	7,065.2	
Total Inventory 2020	211,304.0	191,695.0

ARB estimate of LEV Reductions from 2016 to 2020 is 3% of fleet

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2020 Reductions	
California Reductions in MMT CO2e	0.93	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0041	
San Ramon 2020 BAU Transportation EI in MTCO2e	355,931.2	
Reduction in HD emissions MTCO2e	1,469.2	

Med/HDT Hybridization	2020 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
San Ramon 2020 BAU Transportation EI in MTCO2e	350,365.8	
Reduction in HD emissions MTCO2e	777.6	2,246.8

Light Duty Vehicle Efficiency Measures	2020 Reductions	San Ramon Reduction MTCO2e
Tire Pressure Regulation	0.55	868.9
Tire Tread Standard	0.3	473.9
Low Friction Oil	2.2	3,475.6
Total	3.05	4,818.4
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.013537506	
San Ramon 2020 BAU Transportation EI in MTCO2e	355,931.2	
Reduction from Vehicle Efficiency Measures in MTCO2e	4,818.4	
Total Reductions all Measures	7,065.2	

Mobile Reductions Summary

	MTCO ₂ e/ year
LEV III	6,753.7
Vehicle Efficiency	7,065.2
	13,818.9

Energy Emissions

	2020 EI MTCO ₂ e	2020 w/RPS	RPS Reduction
2020 Electricity Residential	53,873	26,448	27,425
2020 Electricity Commercial	51,445	25,253	26,192
Electricity - City/County/Distri	5,677	2,787	2,890
Total	110,995	54,487	56,508

Reductions based on independent third-party estimate of PG&E emission rate to comply with AB 32.

	2020 MTCO ₂ e	T24 Reductions	2020 w/T24
2020 Natural Gas Residential	73,232	452	72,781
2020 Natural Gas Commercial	33,856	620	33,235
Natural gas - City/County/Dis	2,285	0	2,285
	107,088	1,072	106,016

PG&E Portfolio

	Percent
2010 Percentage	17.7
2020 Mandate Percentage	33
Reduction	15.3

Included in Emission Factor from PG&E in spreadsheets

Title 24 Reductions 2008 and 2013 Updates

	2020 BAU MTCO2e	2010 BAU MTCO2e	Increase 2010 to 2020	Emission Reduction
Electricity Residential	53,873	50,850	3,023	894
Electricity Commercial	51,445	47,240	4,205	760
Electricity - City/County/Distri	5,677	7,685	0	0
Total	110,995	105,775	5,220	1,654
Natural Gas Residential	73,232	66,963	6,269	452
Natural Gas Commercial	33,856	29,602	4,254	620
Natural gas - City/County/Dis	2,285	2,347	0	0
Title 24 Totals	109,373	98,912	10,461	1,072
				2,726

Commercial reductions include 3 years reductions at 2008 standard and 7 years at 2013 standard.

2008 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	662	0.227	150
Multi-Family	0.270	245	0.197	48
Total 2020 Residential Electricity Reductions				199

Housing fractions from the San Ramon Housing Element

2008 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	1,373	0.1	137
Multi-Family	0.270	508	0.07	36
Total 2020 Residential Natural Gas Reductions				173

2008 Standards provide reductions from 2010-2013
Reductions from CEC 2008

2013 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	1,545	0.364	562
Multi-Family	0.270	571	0.233	133
Total 2020 Residential Electricity Reductions				695

2013 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	3,204	0.065	208
Multi-Family	0.270	1,185	0.038	45
Total 2020 Residential Natural Gas Reductions				253

Emission Reductions from CEC 2012 Impact Analysis of 2013 T24 Standards
Reductions based on development from 2014-2020.

	2020 Adj EI MTCO _{2e}	Title 24 Reductions	2020 EI W/T24	2020 BAU	Reduction from BAU
2020 Electricity Residential	26,448	894	25,554	53,873	28,319
2020 Electricity Commercial	25,253	760	24,493	51,445	26,952
2020 Electricity City/County/L	2,787	0	2,787	5,677	2,890
Total	51,701	1,654	50,047		58,162
2020 Nat Gas Residential	73,232	452	72,781	73,232	452
2020 Nat Gas Commercial	33,856	620	33,235	33,856	620
2020 Nat Gas City/County/Di	2,285	0	2,285	2,285	0
Total	107,088	1,072	106,016		1,072

Ozone Depleting Substances

	MTCO _{2e}
2020 BAU Emissions	57,705
ARB Refrigerant Management Program Reduction 50%	0.5
2020 Reduction	28,853

Emission reductions estimates from ARB Appendix B. California Facilities and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

<i>Emissions (MTCO_{2e}/year)</i>	2020 BAU	Reductions in 2020	Adj BAU 2020	Percent Reduction
Motor vehicles	355,931	90,738	265,193	25.49%
Electricity - residential	53,873	28,319	25,554	52.57%
Electricity - commercial	51,445	26,952	24,493	52.39%
Electricity - City/County/District	5,677	2,890	2,787	50.91%
Electricity - T&D Losses	7,592	3,978	3,614	52.40%
Natural gas - residential	73,232	452	72,781	0.62%
Natural gas - commercial	33,856	620	33,235	1.83%
Natural gas - City/County/District	2,285	0	2,285	0.00%
Waste	17,762	3,478	14,284	19.58%
Water Transport	7,329	1,466	5,863	20.00%
Offroad equipment	31,243	0	31,243	0.00%
ODS substitutes	57,705	28,853	28,853	50.00%
Total	697,930	187,746	510,184	26.90%

BAU assumes 2005 emission rates to eliminate the effect of controls

Source Group	State Measures	Emissions (MTCO ₂ e/year)
		2020
Motor vehicles	Pavley and Low Carbon Fuel Standard	76,919
	Low Emission Vehicle Program III	6,754
	Tire Tread Program	474
	Tire Pressure Program	869
	Low Friction Oil	3,476
	Aerodynamic Efficiency/Hybridization	2,247
	Subtotal	90,738
Electricity - residential	Renewable Portfolio Standards	27,425
	Title 24 Energy Efficiency Standards	894
Electricity – commercial	Renewable Portfolio Standards	26,192
	Title 24 Energy Efficiency Standards	760
	City/County/District RPS	2,890
	City/County/District Title 24	0
	Subtotal	58,162
Electricity - T&D Losses	T&D Losses	3,978
Electricity - Water Transport	Green Building Code and Mode Water Conservation Ord.	1,466
Natural Gas-Residential	Title 24 Energy Efficiency Standards	452
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	620
Natural gas - City/County/District		0
	Subtotal	1,072
Waste	Waste	3,478
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	28,853
Total		187,746
Source: First Carbon Solutions		

Emission Summary BAU and Regulations All Years

Business as Usual Modeling Results

	2010 Baseline	2014 BAU	2020 BAU	2035 BAU
Motor vehicles	354,351	375,807	355,931	392,691
Electricity - residential	50,850	46,502	53,873	61,738
Electricity - commercial	47,240	44,401	51,445	58,948
Electricity - City/County/District	7,685	4,900	5,677	6,505
Electricity - T&D Losses	7,235	6,553	7,592	8,700
Natural gas - residential	66,963	68,960	73,232	83,912
Natural gas - commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,856	16,711	17,762	20,390
Water Transport	6,438	6,320	7,329	8,413
Offroad equipment	29,488	31,243	31,243	48,938
ODS substitutes	27,300	46,626	57,705	66,243
Total	<u>646,355</u>	<u>682,054</u>	<u>697,930</u>	<u>797,890</u>

Per Capita Emissions 8.958735504 8.311953261 8.50542823 8.48602657

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2014 Adj	2020 Adj	2035 Adj
Motor vehicles	358,335	379,219	279,012	304,417
Electricity - residential	38,125	35,238	26,448	30,305
Electricity - commercial	35,412	33,645	25,253	28,936
Electricity - City/County/District	5,761	3,713	2,787	3,193
Electricity - T&D Losses	5,424	4,966	3,614	4,062
Natural gas - residential	66,963	68,960	73,232	83,912
Natural gas - commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,856	16,711	17,762	20,390
Water Transport	4,826	4,789	3,597	4,130
Offroad equipment	29,488	31,243	31,243	48,938
ODS substitutes	27,300	46,626	57,705	66,243
Total	<u>620,438</u>	<u>659,141</u>	<u>556,794</u>	<u>635,939</u>

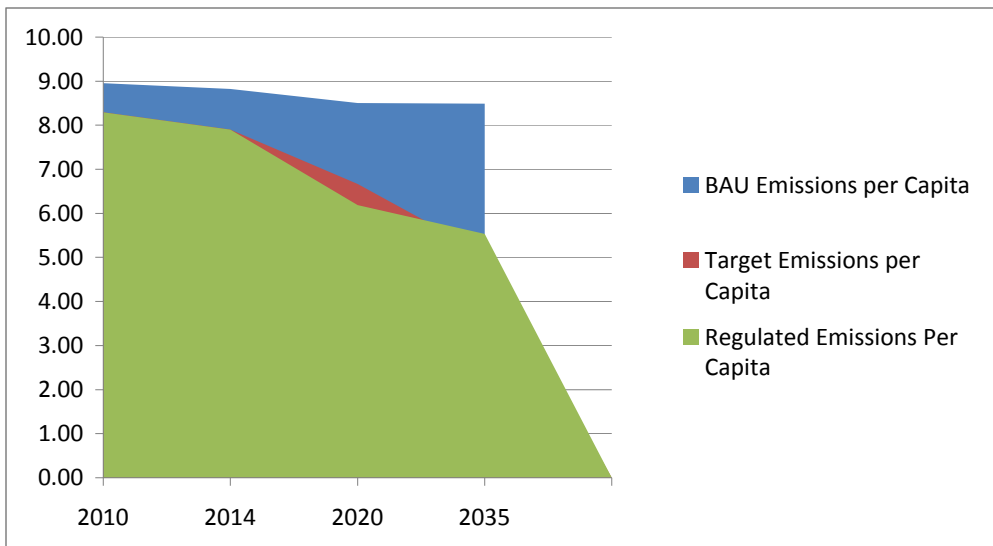
Adjusted BAU with Off Model Reductions from Title 24 and LEV III

	2010 Ajd	2014 Adj	2020 Adj	2035 Adj
Motor vehicles	336,593	353,677	265,193	232,511
Electricity - residential	38,125	35,238	25,554	27,908
Electricity - commercial	35,412	33,645	24,493	28,288
Electricity - City/County/District	5,761	3,713	2,787	3,193
Electricity - T&D Losses	5,424	4,966	3,614	4,062
Natural gas - residential	66,963	68,960	72,781	81,086
Natural gas - commercial	29,602	31,881	33,235	37,719
Natural gas - City/County/District	2,347	2,152	2,285	2,587
Waste	16,856	16,711	14,284	16,487
Water Transport	4,826	4,789	3,597	4,130
Offroad equipment	29,488	31,243	31,243	48,938
ODS substitutes	27,300	23,313	28,853	33,122
Total	<u>598,695</u>	<u>610,286</u>	<u>507,918</u>	<u>520,033</u>

Per Capita Emissions 8.29 7.90 6.19 5.53

Target Inventories

	2010	2014	2020	2035
BAU Inventory	646,355	682,054	697,930	797,890
Target Inventories			546,828 ND	
Inventories with Regulations			507,918	520,033
Reduction Fraction				0.345
Population in City Limits	72,178	77,270	82,057	94,024
Employment in City Limits	43,880	45,994	49,329	57,667
Service Population	116,058	123,264	131,386	151,691
	2010	2014	2020	2035
BAU Emissions per Capita	8.96	8.83	8.51	8.49
Target Emissions per Capita	8.29	7.90	6.67	5.09
Regulated Emissions Per Capita	8.29	7.90	6.19	5.53
	2010	2014	2020	2035
BAU Emissions per Service Pop	5.57	5.53	5.31	5.26
Target Emissions per Service Pop			4.16	3.16
Regulated Emissions Per Servic	5.16	4.95	3.87	3.43
Population in Planning Area		78,820	83,778	96,174
City/Planning Area Adj Factor		1.020059532	1.02097323	1.0228665



2020 Target 21.6 percent below 2020 BAU
 2035 Target 40 percent below 2020 Target (1990 levels)

2035 Emission Reduction Estimates

	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Mobile Source Emissions				
Motor Vehicles	392,691.0	304,416.9	232,511.4	160,179.6
Reduction		88,274.2	71,905.4	40.79%

LEV III Reduction Estimates

Gasoline Vehicles	Fleet VMT Fractions in 2035	CO2e tons/year	MTCO2e/year
Light Duty Passenger Cars and Trucks		237,396.0	215,366
LEV III 2035 Reduction 27%		64,096.9	
Total Inventory 2035		173,299.1	157,217

	MTCO2e/ year
LEV III Reduction	64,096.9
Pavley I and LCFS Reduction	88,274.2
Efficiency Measures	7,808.5
Total Reductions for Motor Vehicles	160,179.6

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement 2035 Reductions

California Reductions in MMT CO2e	0.93
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0041
San Ramon 2035 BAU Transportation EI in MTCO2e	392,691.0
Reduction in HD emissions MTCO2e	1,621.0

Med/HDT Hybridization 2035 Reductions

California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
San Ramon 2035 BAU Transportation EI in MTCO2e	392,691.0	
Reduction in HD emissions MTCO2e	871.5	2,492.4

		San Ramon Reduction MTCO2e
Light Duty Vehicle Efficiency Measures	2035 Reductions	

Tire Pressure Regulation MMTCO2e	0.55	958.6
Tire Tread Standard MMTCO2e	0.3	522.9
Low Friction Oil MMTCO2e	2.2	3,834.5
Total (MMTCO2e)	3.05	5,316.1
California 2020 BAU EI Transportation MMTCO2e	225.3	
Percent Reduction in Transportation	0.013537506	
San Ramon 2035 BAU Transportation EI in MTCO2e	392,691.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	5,316.1	
Total Reductions all Measures	7,808.5	

Reduction based on ARB Scoping Plan reductions from Efficiency Measures

Energy Emissions

	2035 EI MTCO ₂ e	2035 w/RPS	RPS Reduction	T24 Reduction	Total Reduction
Electricity					
2035 Electricity Residential	61,738	30,305	31,433	2,397	33,829
2035 Electricity Commercial	58,948	28,936	30,012	647	30,659
2035 City/County/District	6,505	3,193	3,312	0	3,312
Total	127,190	62,434	64,756		67,800

Reduction estimates from inventory spreadsheets and CEC Title 24 Report for 2008 and 2013

Natural Gas

	2035 MTCO ₂ e	T24 Reductions	2035 w/T24
2035 Natural Gas Residential	83,912	2,826	81,086
2035 Natural Gas Commercial	38,793	1,074	37,719
2035 NG City/County District	2,618	32	2,587
Total	122,706	3,932	122,674

Reduction estimates from inventory spreadsheets and CEC Title 24 Reports for 2008 and 2013

Title 24 Reductions

	2010 MTCO ₂ e	2035 BAU MTCO ₂ e	Increase 2010 to 2035	Emission Reduction	Residential	Commercial
Electricity Residential	50,850	61,738	10,887	2,397	2,397	
Electricity Commercial	47,240	58,948	11,708	647		647
Electricity City/County/District	7,685	6,505	-1,180	0		0
Total	105,775	127,190	21,415	3,044		
Natural Gas Residential	66,963	83,912	16,949	2,826	2,826	
Natural Gas Commercial	29,602	38,793	9,191	1,074		1,074
NG City/County/District	2,347	2,618	272	32		32
Title 24 Totals	98,912	125,324	26,412	3,932		
				6,976	5,223	1,753

2008 Title 24 San Ramon Residential Development Projections Electricity

Fraction	Emissions by LU Reduction Fraction MTCO ₂ e			
Single Family	0.730	954	0.227	216
Multi-Family	0.270	353	0.197	69
Total 2020 Residential Electricity Reductions				286

2008 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by		Reduction Fraction	MTCO2e
		LU			
Single Family	0.730	1,485		0.1	148
Multi-Family	0.270	549		0.07	38
Total 2020 Residential Natural Gas Reductions					187

2008 Standards provide reductions from 2010-2013
 Reductions from CEC 2008

2013 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU		Reduction Fraction	MTCO2e
Single Family	0.730	6,994		0.25	1,749
Multi-Family	0.270	2,587		0.14	362
Total 2035 Residential Electricity Reductions					2,111

2013 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by		Reduction Fraction	MTCO2e
		LU			
Single Family	0.730	10,888		0.2	2,178
Multi-Family	0.270	4,027		0.09	362
Total 2035 Residential Natural Gas Reductions					2,540

Emission Reductions from CEC 2012
 Reductions based on development from 2014-2035.

	Title 24		
	2035 EI MTCO2e w/RPS	Reductions	2035 EI W/T24
2035 Electricity Residential	30,305	2,397	27,908
2035 Electricity Commercial	28,936	647	28,288
Total	59,241	3,044	56,197

Ozone Depleting Substances

	MTCO ₂ e
2035 BAU Emissions	66,243
ARB Refrigerant Management Program Reduction 50%	0.5
2035 Reduction	33,122

Emission reductions estimates from ARB Appendix B. California Facilities and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

Emission Reduction Summary

	<i>Emissions (MTCO₂e/year)</i>			Percent Reduction
	2035 BAU	Reductions in 2035	Adj BAU 2035	
Motor vehicles	392,691	160,180	232,511	40.79%
Electricity - residential	61,738	33,829	27,908	54.80%
Electricity - commercial	58,948	30,659	28,288	52.01%
Electricity City/County/District	6,505	3,312	3,193	50.91%
Electricity - T&D Losses	8,700	4,638	4,062	53.31%
Natural gas - residential	83,912	2,826	81,086	3.37%
Natural gas - commercial	38,793	1,074	37,719	2.77%
NG City/County/District	2,618	32	2,587	1.21%
Waste	20,390	3,903	16,487	19.14%
Electricity - Water Transport	8,413	1,683	6,731	20.00%
Offroad equipment	48,938	0	48,938	0.00%
ODS substitutes	66,243	33,122	33,122	50.00%
<u>Total</u>	797,890	275,257	522,633	34.50%

Source Group	State Measures	Emissions (MTCO ₂ e/year)
		2020
Motor vehicles	Pavley and Low Carbon Fuel Standard	88,274
	Low Emission Vehicle Program III	64,097
	Tire Tread Program	523
	Tire Pressure Program	959
	Low Friction Oil	3,835
	Aerodynamic Efficiency/Hybridization	2,492
	Subtotal	160,180
Electricity - residential	Renewable Portfolio Standards	31,433
	Title 24 Energy Efficiency Standards	2,397
Electricity – commercial	Renewable Portfolio Standards	30,012
	Title 24 Energy Efficiency Standards	647
	City/County/District RPS	3,312
	City/County/District Title 24	0
	Subtotal	67,800
Electricity - T&D Losses	T&D Losses	4,638
Electricity - Water Transport	Green Building Code and Model Water Conservation Ord.	1,683
Natural Gas-Residential	Title 24 Energy Efficiency Standards	2,826
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	1,074
Natural gas - City/County/District		32
	Subtotal	3,932
Waste	Waste	3,903

11/12/2014

Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	33,122
Total		275,257

Transportation and Distribution Losses

Business as Usual Modeling Results

	2010 BAU	2014 BAU	2020 BAU	2035 BAU
Electricity - residential	50,850	46,502	53,873	61,738
Electricity - commercial	47,240	44,401	51,445	58,948
Electricity - City/County/E	7,685	4,900	5,677	6,505
Total E	105,775	95,802	110,995	127,190
T&D Loss	7,235	6,553	7,592	8,700

Adjusted Business as Usual Modeling RPS

	2010 Ajd	2014 Adj	2020 Adj	2035 Adj
Electricity - residential	38,125	35,238	25,554	27,908
Electricity - commercial	35,412	33,645	24,493	28,288
Electricity - City/County/E	5,761	3,713	2,787	3,193
Total E	79,297	72,596	52,833	59,390
T&D Loss	5,424	4,966	3,614	4,062
Reduction from BAU	1,811	1,587	3,978	4,638

T&D Loss for Western Region in 2010 is 6.84%

No rates were found for future years, so assumed constant rate.

T&D losses are expected to decline with increases in local production from solar or other distributed generation.

Community Greenhouse Gas Inventory BAU

Summary

Year: 2010

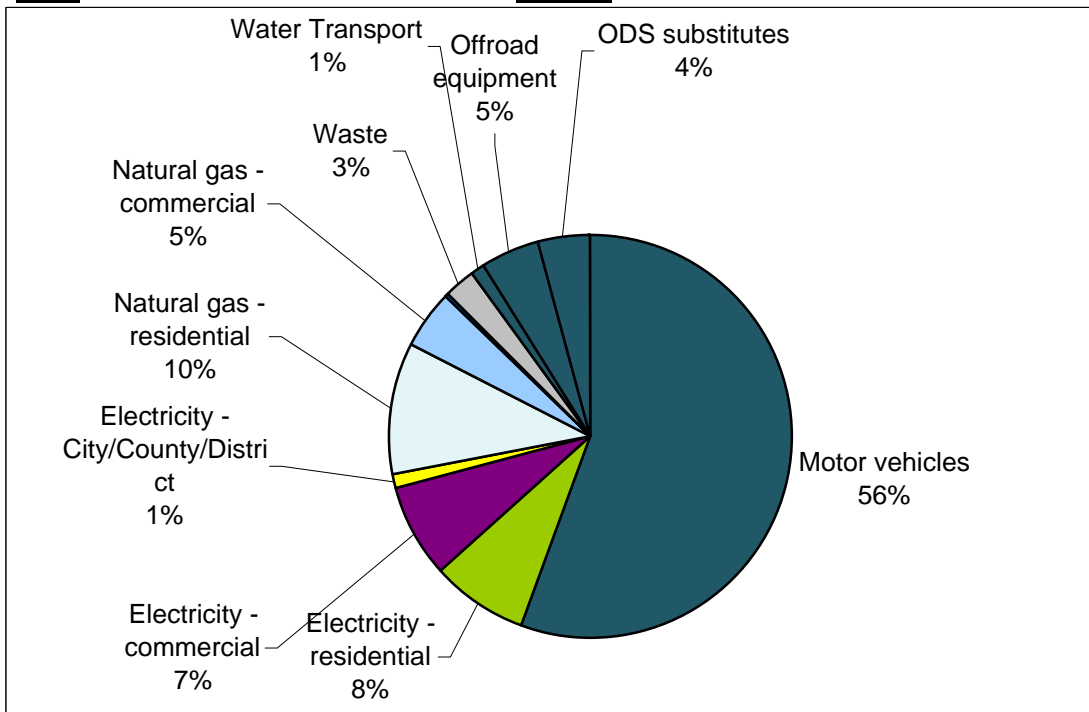
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	73,595	City of San Ramon/ DOF
Employment	43,880	City of San Ramon

County Information		
Population	1,052,211	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e
Motor vehicles	354,351
Electricity - residential	50,850
Electricity - commercial	47,240
Electricity - City/County/District	7,685
Natural gas - residential	66,963
Natural gas - commercial	29,602
Natural gas - City/County/District	2,347
Waste	16,856
Water Transport	6,438
Offroad equipment	29,488
ODS substitutes	27,300
Total	639,120



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 37,053

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,856
Emissions (MTCO ₂ e/person)	0.2290 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 22, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	37,053	35,620	36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,780,842 Source: MTC. 2014
Vehicle miles traveled / year 650,007,330 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	286,188.4	259,625.7
Non Passenger Vehicles	104,416.9	94,725.4
	390,605.2	354,351.1

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	265,829.1	241,156.1
Non Passenger Vehicles	103,563.9	93,951.6
	369,393.0	335,107.7

EMFAC Passenger Vehicle Emissions (SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT		CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pavley I+LCFS)	CO2_IDLEX(Pavley I+LCFS)	CO2_STREX(Pavley I+LCFS)
									Fraction	Trips						
Contra Costa	2005 Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	0	460.0964559	460.3646763	0	460.3646763	
Contra Costa	2005 Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	0	0	0	0	
Contra Costa	2005 Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	0	515.2677216	527.1606221	0	527.1606221	
Contra Costa	2005 Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	0	0	0	0	
Contra Costa	2005 Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	0	629.185079	633.3019897	0	633.3019897	
Contra Costa	2005 Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	0	0	0	0	
Contra Costa	2005 Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	0	792.1227449	570.5037165	0	792.1227449	
Contra Costa	2005 Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	0	368.5728982	0	0	
								627,174	24,468,550	1.000						
								avg miles/vehicle	39.0139465							

Emission Estimate Without Pavley and LCFS 2010

	VMT Fraction	SR VMT	CO2_RUN EX		Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day
			Miles/Day/Veh	Class				
LDA	0.573	1,547,887	886,613	332.58389	294,873,271	39,675	460.0964559	18,254,429
LDA	0.002	1,547,887	3,700	362.24944	1,340,396	39,675	0	0
LDT1	0.071	1,547,887	110,090	380.64865	41,905,569	39,675	515.2677216	20,443,361
LDT1	0.000	1,547,887	140	373.58732	52,201	39,675	0	0
LDT2	0.192	1,547,887	297,702	455.82726	135,700,857	39,675	629.185079	24,963,058
LDT2	0.000	1,547,887	141	372.27263	52,662	39,675	0	0
MDV	0.161	1,547,887	249,248	570.50372	142,197,112	39,675	792.1227449	31,427,646
MDV	0.000	1,547,887	252	368.5729	92,799	39,675	0	0
Total Passenger Vehicle Emissions								95,088,494

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,547,887 39 39675.2223

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
616,214,867	95,088,494	711,303,362	907184.7	784.1	286,188.4

Emission Estimate With Pavley and LCFS 2010

	VMT Fraction	SR VMT	CO2_RUN EX(Pavley I+LCFS)		Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
			Miles/Day/Veh	Class				
LDA	0.573	1,547,887	886,613	300.25647	266,211,351	39,675	420.4717438	16,682,310
LDA	0.002	1,547,887	3,700	313.30139	1,159,278	39,675	0	0
LDT1	0.071	1,547,887	110,090	355.63726	39,152,068	39,675	475.6096597	18,869,919
LDT1	0.000	1,547,887	140	322.38538	45,047	39,675	0	0
LDT2	0.192	1,547,887	297,702	427.79489	127,355,556	39,675	589.6482804	23,394,427
LDT2	0.000	1,547,887	141	320.17919	45,293	39,675	0	0
MDV	0.161	1,547,887	249,248	553.19031	137,881,774	39,675	751.6158054	29,820,524
MDV	0.000	1,547,887	252	333.47098	83,961	39,675	0	0
Total Passenger Vehicle Emissions								88,767,180

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,547,887 39 39675.2223

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
571,934,328	88,767,180	660,701,507	907184.7	728.3	265,829

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2010

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2010
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX (Pavley I+LCFS)	CO2_IDLEX (Pavley I+LCFS)	CO2_STREX (Pavley I+LCFS)
						(miles/hr)	(vehicles)				(trips/day)	(gms/mile)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)
Contra Costa	2010	Annual	LHD1	GAS	Aggregated	Aggregated	15,365	41.3%	686,475	32.7%	228,914	972.1094988	116.364456	819.7728342	972.1094988	116.3644561	819.7728342
Contra Costa	2010	Annual	LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	19.0%	102,207	532.3059325	141.748251	0	532.3059325	141.7482507	0
Contra Costa	2010	Annual	LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.7%	19,696	972.1095363	116.338965	1045.68254	972.1095363	116.338965	1045.68254
Contra Costa	2010	Annual	LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	4.1%	22,287	535.0134187	141.753311	0	535.0134187	141.7533106	0
Contra Costa	2010	Annual	Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	7,150	0.3%	0	1745.971421	11338.6466	0	1745.971421	11338.64661	0
Contra Costa	2010	Annual	OBUS	GAS	Aggregated	Aggregated	376	1.0%	23,638	1.1%	17,163	677.4460346	407.400915	1962.23896	677.4460346	407.4009152	1962.23896
Contra Costa	2010	Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	10,731	0.5%	0	2183.103618		0	2183.103618		0
Contra Costa	2010	Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010	Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2010	Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2010	Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010	Annual	T6 CAIRP heavy	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010	Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010	Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010	Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010	Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010	Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010	Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010	Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010	Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2010	Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010	Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010	Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010	Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010	Annual	T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	82,816	3.9%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0
Contra Costa	2010	Annual	T7 NOOS	DSL	Aggregated	Aggregated	113	0.3%	26,809	1.3%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0
Contra Costa	2010	Annual	T7 other port	DSL	Aggregated	Aggregated	58	0.2%	9,058	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0
Contra Costa	2010	Annual	T7 POAK	DSL	Aggregated	Aggregated	249	0.7%	28,206	1.3%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0
Contra Costa	2010	Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0			0			0
Contra Costa	2010	Annual	T7 Public	DSL	Aggregated	Aggregated	197	0.5%	4,891	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0
Contra Costa	2010	Annual	T7 Single	DSL	Aggregated	Aggregated	591	1.6%	44,648	2.1%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0
Contra Costa	2010	Annual	T7 single constr	DSL	Aggregated	Aggregated	204	0.5%	15,416	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0
Contra Costa	2010	Annual	T7 SWCV	DSL	Aggregated	Aggregated	266	0.7%	13,310	0.6%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0
Contra Costa	2010	Annual	T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	134,491	6.4%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0
Contra Costa	2010	Annual	T7 tractor constr	DSL	Aggregated	Aggregated	143	0.4%	11,494	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0
Contra Costa	2010	Annual	T7 utility	DSL	Aggregated	Aggregated	30	0.1%	756	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0
Contra Costa	2010	Annual	T7IS	GAS	Aggregated	Aggregated	74	0.2%	6,997	0.3%	1,485	584.6674163	0	2353.967488	584.6674163	0	2353.967488
Contra Costa	2010	Annual	UBUS	GAS	Aggregated	Aggregated	64	0.2%	8,490	0.4%	255	744.1870709	0	615.0541717	744.1870709	0	615.0541717
Contra Costa	2010	Annual	UBUS	DSL	Aggregated	Aggregated	235	0.6%	31,370	1.5%	941	2573.001593	0	0	2573.001593	0	0
Contra Costa	2010	Annual	All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	6,973	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0
							37,215	100.0%	2,099,212	1	409,952						
									MI/Veh	56.4075898							

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010 Annual	T6 CAIRP heavy	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS 2010

	VMT Fraction	San Ramon Miles/Day		Total Running		San Ramon	San Ramon	Idling	Starting	Total Starting
		Passenger	Non-Class	Emissions	Pop	Vehicle	Population	(gms/vehicle/day)	Emissions	and Idling
LHD1	0.329	232,955	76,599	972,1095	74,462,289	0.427	1,856	116.3644561	819.7728342	1,737,470.5
LHD1	0.160	232,955	37,206	532.30593	19,805,187	0.207	901	141.7482507	0	127,671.5
LHD2	0.024	232,955	5,543	972.10954	5,388,376	0.031	135	116.338965	1045.68254	156,995.0
LHD2	0.042	232,955	9,752	535.01342	5,217,644	0.054	235	141.7533106	0	33,267.5
Motor Coach	0.003	232,955	758	1745.9714	1,323,275	0.001	5	11338.64661	0	59,410.5
OBUS	0.010	232,955	2,261	677.44603	1,531,574	0.010	44	407.4009152	1962.23896	104,187.1
PTO	0.000	232,955	93	2183.1036	202,183	0.000	0	0	0	0.0
SBUS	0.002	232,955	482	742.11995	357,334	0.002	11	0	788.3524159	8,365.5
SBUS	0.001	232,955	348	1299.9836	452,764	0.037	163	3474.936051	0	565,135.9
T6 Ag	0.001	232,955	195	1214.0161	237,320	0.001	6	591.9178211	0	3,434.9
T6 Public	0.003	232,955	614	1210.2525	742,634	0.008	33	636.79636	0	20,862.0
T6 CAIRP heavy	0.000	232,955	14	1194.1438	16,389	0.000	0	666.3500758	0	145.8
T6 CAIRP small	0.000	232,955	45	1187.5142	53,224	0.000	1	693.3277468	0	440.1
T6 OOS heavy	0.000	232,955	8	1194.1438	9,396	0.000	0	666.3500758	0	83.6
T6 OOS small	0.000	232,955	26	1187.5142	30,514	0.000	0	693.3277468	0	252.3
T6 instate construction heavy	0.004	232,955	877	1206.7402	1,058,042	0.004	17	628.1342767	0	10,369.0
T6 instate construction small	0.010	232,955	2,275	1190.6752	2,708,975	0.008	35	671.5227753	0	23,716.6
T6 instate heavy	0.024	232,955	5,497	1206.7402	6,633,174	0.023	101	628.1342767	0	63,659.2
T6 instate small	0.063	232,955	14,729	1190.6752	17,537,571	0.052	224	671.5227753	0	150,718.4
T6 utility	0.000	232,955	102	1190.3417	121,640	0.001	5	669.3517103	0	3,438.9
T6TS	0.020	232,955	4,608	677.44602	3,121,611	0.023	100	251.5801036	1824.797808	207,385.9
T7 Ag	0.003	232,955	712	1780.2391	1,267,188	0.002	10	2354.915902	0	24,293.7
T7 CAIRP	0.039	232,955	9,118	1740.7084	15,871,888	0.009	39	29278.79509	0	1,154,960.8
T7 CAIRP construction	0.000	232,955	60	1740.7084	105,286	0.001	4	29278.79509	0	110,912.5
T7 NNOOS	0.044	232,955	10,257	1736.3283	17,810,352	0.009	38	37700.75308	0	1,428,508.4
T7 NOOS	0.014	232,955	3,321	1740.7084	5,780,138	0.003	14	37153.84079	0	533,737.1
T7 other port	0.004	232,955	954	1728.3376	1,647,988	0.001	6	4421.893594	0	26,692.1
T7 POAK	0.018	232,955	4,178	1732.4648	7,238,374	0.006	26	6989.078773	0	185,187.4
T7 POLA	0.000	232,955	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	232,955	536	1806.7866	968,168	0.005	21	7861.899623	0	167,790.1
T7 Single	0.024	232,955	5,530	1771.2925	9,795,313	0.017	73	2423.170701	0	177,883.5
T7 single construction	0.010	232,955	2,243	1771.2925	3,972,256	0.007	30	2423.170701	0	72,798.0
T7 SWCV	0.006	232,955	1,458	1777.5297	2,592,284	0.007	29	8016.434181	0	231,028.0
T7 tractor	0.072	232,955	16,658	1754.4508	29,225,265	0.024	105	2452.592201	0	258,347.0
T7 tractor construction	0.007	232,955	1,672	1756.0931	2,936,197	0.005	22	2452.592201	0	53,446.1
T7 utility	0.000	232,955	88	1757.3539	154,106	0.001	3	8116.295492	0	28,281.9
T7TS	0.004	232,955	965	584.86742	564,198	0.002	8	0	2353.967488	19,003.2
UBUS	0.005	232,955	1,071	744.18707	797,324	0.002	8	0	615.0541717	4,893.2
UBUS	0.015	232,955	3,543	2573.0016	9,115,551	0.006	26	0	0	0.0
All Other Buses	0.003	232,955	747	1211.582	905,410	0.003	14	615.1471436	0	8,363.7
					251,758,405	1.000	4,350			7,763,156.6

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010 Annual	T6 CAIRP heavy	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.351171	0	1190.341673	669.3511703	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

San Ramon Vehicles

VMT	Avg Miles	Vehicles
	CCC	
232,955	56	4,130

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
251,758,405	7,763,157	259,521,562	907184.7	286.07	104,416.9

Emission Estimate With Pavley and LCFS 2010

	San Ramon				San Ramon		Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day	
	VMT Fraction	Non-Passenger	Miles/Day/Veh Class	(gms/mile)	gms/day	Pop Fraction				Vehicle Population
LHD1	0.329	232,955	76,599	972.1095	74,462,290	0.427	1,856	116.364457	844.3640322	1,783,111.8
LHD1	0.160	232,955	37,206	527.39826	19,622,590	0.207	901	141.7534111	0	127,676.2
LHD2	0.024	232,955	5,543	972.10948	5,388,376	0.031	135	116.3644473	903.4854957	137,786.9
LHD2	0.042	232,955	9,752	526.44899	5,134,120	0.054	235	141.7534184	0	33,267.5
Motor Coach	0.003	232,955	758	1742.9245	1,320,965	0.001	5	11555.74508	0	60,548.0
OBUS	0.010	232,955	2,261	677.44602	1,531,574	0.010	44	407.4009318	1761.361554	95,355.0
PTO	0.000	232,955	93	2153.9465	199,483	0.000	0	0	0	0.0
SBUS	0.002	232,955	482	742.11996	357,334	0.002	11	0	634.0321464	6,727.9
SBUS	0.001	232,955	348	1294.3814	450,813	0.037	163	3568.752088	0	580,393.4
T6 Ag	0.001	232,955	195	1205.6132	235,678	0.001	6	625.7370822	0	3,631.1
T6 Public	0.003	232,955	614	1194.0186	732,673	0.008	33	684.4317604	0	22,444.1
T6 CAIRP heavy	0.000	232,955	14	1191.3973	16,352	0.000	0	707.5576385	0	154.8
T6 CAIRP small	0.000	232,955	45	1191.1399	53,386	0.000	1	729.3957062	0	463.0
T6 OOS heavy	0.000	232,955	8	1191.3973	9,375	0.000	0	707.5576385	0	88.7
T6 OOS small	0.000	232,955	26	1191.1399	30,608	0.000	0	729.3957062	0	265.4
T6 instate construction heavy	0.004	232,955	877	1194.2524	1,047,093	0.004	17	675.6399373	0	11,153.2
T6 instate construction small	0.010	232,955	2,275	1191.6408	2,711,172	0.008	35	712.8362985	0	25,175.7
T6 instate heavy	0.024	232,955	5,497	1194.028	6,563,298	0.023	101	676.1970341	0	68,530.2
T6 instate small	0.063	232,955	14,729	1191.365	17,547,731	0.052	224	713.268798	0	160,088.0
T6 utility	0.000	232,955	102	1191.5212	121,760	0.001	5	711.4520522	0	3,655.2
T6TS	0.020	232,955	4,608	677.44602	3,121,611	0.023	100	251.5801003	1568.76771	181,813.9
T7 Ag	0.003	232,955	712	1760.1082	1,252,859	0.002	10	1995.749796	0	20,588.5
T7 CAIRP	0.039	232,955	9,118	1743.2692	15,895,237	0.009	39	13046.65123	0	514,651.3
T7 CAIRP construction	0.000	232,955	60	1743.3973	105,449	0.001	4	12949.21246	0	49,053.6
T7 NNOOS	0.044	232,955	10,257	1747.5251	17,925,203	0.009	38	22647.4898	0	858,129.5
T7 NOOS	0.014	232,955	3,321	1743.2692	5,788,641	0.003	14	16172.34489	0	232,325.4
T7 other port	0.004	232,955	954	1768.9847	1,686,746	0.001	6	5236.500333	0	31,609.3
T7 POAK	0.018	232,955	4,178	1768.133	7,387,399	0.006	26	8496.302855	0	225,123.9
T7 POLA	0.000	232,955	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	232,955	536	1764.861	945,702	0.005	21	8094.221325	0	172,748.3
T7 Single	0.024	232,955	5,530	1747.6355	9,684,489	0.017	73	2252.773566	0	165,374.8
T7 single construction	0.010	232,955	2,243	1747.7551	3,919,472	0.007	30	2242.716935	0	67,376.7
T7 SWCV	0.006	232,955	1,458	1752.1365	2,555,252	0.007	29	8224.950353	0	237,037.3
T7 tractor	0.072	232,955	16,658	1746.9386	29,100,128	0.024	105	2284.89441	0	240,682.3
T7 tractor construction	0.007	232,955	1,672	1747.208	2,921,341	0.005	22	2269.412395	0	49,454.3
T7 utility	0.000	232,955	88	1746.1232	153,123	0.001	3	8299.924965	0	28,921.8
T7IS	0.004	232,955	965	584.66742	564,198	0.002	8	0	2034.123288	16,421.1
UBUS	0.005	232,955	1,071	744.18707	797,324	0.002	8	0	596.1314856	4,742.6
UBUS	0.015	232,955	3,543	2529.8306	8,962,606	0.006	26	0	0	0.0
All Other Buses	0.003	232,955	747	1194.5231	892,661	0.003	14	661.7570506	0	8,997.4
					251,176,111	1.000	4,350			6,225,568.1

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010 Annual	T6 CAIRP heavy	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

	Avg Miles	CCC	Vehicles
VMT	232,955	6,973	33,4087957

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
251,176,111	6,225,568	257,401,680	907184.7	283.7	103,564

Community Greenhouse Gas Inventory

Energy

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.595	PG&E 2010 Third party verified emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	187,132,299	2,610	55672	2.9	1.0	50,850
Commercial	173,846,782	7,503	51719	2.7	1.0	47,240
City/County/Dist	28,280,483		8413	0.4	0.2	7,685
Total	389,259,564		115,805	6.0	2.1	105,775

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,585,407	171	73,625	6.9	0.1	66,963
Commercial	5,563,512	127	32,547	3.1	0.1	29,602
City/Co/Dist	441,076		2,580	0.2	0.0	2,347
Total	18,589,995		108,751	10.2	0.2	98,912

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: PGE Third Party Verified numbers averaged for 2003-2005.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population			1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction			0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)			29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,052,211	1,019	0.1600	0.0100	930
San Ramon Planning Area	73,595	71	0	0	65
Percent San Ramon/Contra Costa County	7.0%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,052,211	920	0.360	0.08000	864
San Ramon Planning Area	73,595	64	0	0	60
Percent San Ramon/Contra Costa County	7.0%				

Total San Ramon 125

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	13.84
Population	37,309,882
Emissions (MTCO ₂ e per person)	0.37

San Ramon

Population	73,595
Emissions (MTCO ₂ e)	27,300
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2010 Assumptions

	2008	2010
Planning Area Population	66,413	73,595
Water Usage (163 gallons/day)	10,840,000	11,995,985
Water Usage (million gallons/year)	3957	4379
Energy Usage (kWh)	21,409,163	23,692,250
Energy Usage (MWh)	21,409	23,692

Year 2010 Emissions

Greenhouse Gas	Electricity	2010 Emissions (pounds/year)	2010 Emissions (tons/year)	2010 Emissions MTCO _{2e}
	Emission Factor (pounds per MWh)			
Carbon dioxide	595	14,096,889	7,048	6,394.3
Methane	0.031	734.46	0.367	7.0
Nitrous oxide	0.011	260.61	0.130	36.6
				6,438.0

Source for electricity emission factor:

California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 3.1, January 2009. Table C.2.

www.climateactionregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Source for electricity requirements:

Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.

www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2010

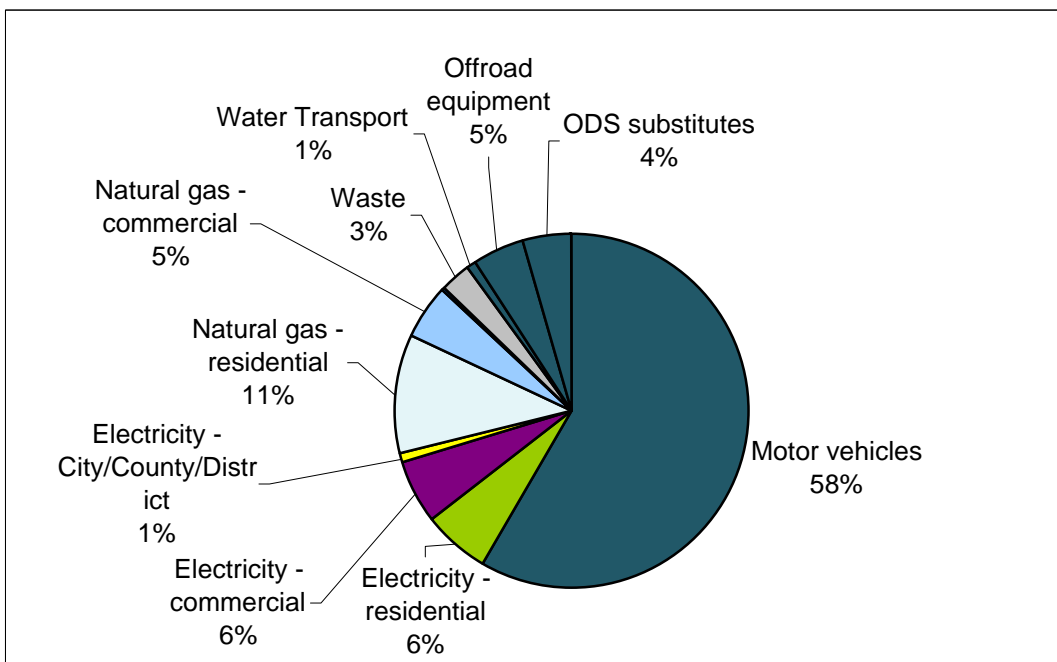
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	73,595	City of San Ramon/ DOF
Employment	43,880	City of San Ramon

County Information		
Population	1,052,211	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	358,335	336,593
Electricity - residential	38,125	38,125
Electricity - commercial	35,412	35,412
Electricity - City/County/District	5,761	5,761
Natural gas - residential	66,963	66,963
Natural gas - commercial	29,602	29,602
Natural gas - City/County/District	2,347	2,347
Waste	16,856	16,856
Water Transport	4,826	4,826
Offroad equipment	29,488	29,488
ODS substitutes	27,300	27,300
Total	615,014	593,271



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 37,053

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,856
Emissions (MTCO ₂ e/person)	0.2290 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed July 31, 2013.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	#VALUE!	35,620	36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)				0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,780,842 Source: MTC. 2014
Vehicle miles traveled / year 650,007,330 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	291,003.8	263,994.2
Non Passenger Vehicles	103,993.2	94,341.1
	394,997.0	358,335.3

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	267,465.9	242,641.0
Non Passenger Vehicles	103,563.9	93,951.6
	371,029.8	336,592.6

EMFAC Passenger Vehicle Emissions (SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2010
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pavley I+LCFS)	CO2_IDLEX(Pavley I+LCFS)	CO2_STREX(Pavley I+LCFS)
						(miles/hr)	(vehicles)	(miles/day)		(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2010 Annual	LDA	GAS	Aggregated	Aggregated	396,677	14,253,771	0.561	2,486,935	337,642,1525	0	460.0964559	336.2106685	0	458.7867601	0
Contra Costa	2010 Annual	LDA	DSL	Aggregated	Aggregated	1,765	54,439	0.002	10,084	358.2458548	0	0	356.0558594	0	0	0
Contra Costa	2010 Annual	LDT1	GAS	Aggregated	Aggregated	49,240	1,808,596	0.071	300,790	388.0191541	0	515.2677216	386.7631415	0	514.0971248	0
Contra Costa	2010 Annual	LDT1	DSL	Aggregated	Aggregated	67	1,994	0.000	354	371.8741016	0	0	370.4580719	0	0	0
Contra Costa	2010 Annual	LDT2	GAS	Aggregated	Aggregated	125,485	4,946,189	0.195	793,470	462.0094945	0	629.185079	460.0808725	0	627.2394152	0
Contra Costa	2010 Annual	LDT2	DSL	Aggregated	Aggregated	60	1,992	0.000	329	366.0720528	0	0	363.2496544	0	0	0
Contra Costa	2010 Annual	MDV	GAS	Aggregated	Aggregated	107,457	4,327,758	0.170	681,590	583.0442306	0	791.4026944	581.5509146	0	790.0249372	0
Contra Costa	2010 Annual	MDV	DSL	Aggregated	Aggregated	108	4,266	0.000	631	360.6884842	0	0	357.82839	0	0	0
							680,861	25,399,004	1.000							
							avg miles/vehicle	37.3042545								

Emission Estimate Without Pavley and LCFS 2010

	VMT Fraction	SR VMT	CO2_RUN EX	Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day	
		Miles/Day/Veh	Class (gms/mile)	gms/day			g/day	
LDA	0.573	1,547,887	886,613	336.21067	298,088,819	41,494	458.7867601	19,036,704
LDA	0.002	1,547,887	3,700	356.05586	1,317,479	41,494	0	0
LDT1	0.071	1,547,887	110,090	386.76314	42,578,714	41,494	514.0971248	21,331,729
LDT1	0.000	1,547,887	140	370.45807	51,764	41,494	0	0
LDT2	0.192	1,547,887	297,702	460.08087	136,967,168	41,494	627.2394152	26,026,408
LDT2	0.000	1,547,887	141	363.24965	51,386	41,494	0	0
MDV	0.161	1,547,887	249,248	581.55091	144,950,608	41,494	790.0249372	32,780,961
MDV	0.000	1,547,887	252	357.82839	90,094	41,494	0	0
Total Passenger Vehicle Emissions					624,096,030			99,175,803

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,547,887 37 41493.5781

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
624,096,030	99,175,803	723,271,833	907184.7	797.3	291,003.8

Emission Estimate With Pavley and LCFS 2010

	VMT Fraction	SR VMT	CO2_RUN EX(Pavley I+LCFS)	Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)	
		Miles/Day/Veh	Class (gms/mile)	gms/day				
LDA	0.573	1,547,887	886,613	300.25647	266,211,351	41,494	420.4717438	17,446,877
LDA	0.002	1,547,887	3,700	313.30139	1,159,278	41,494	0	0
LDT1	0.071	1,547,887	110,090	355.63726	39,152,068	41,494	475.6096597	19,734,747
LDT1	0.000	1,547,887	140	322.38538	45,047	41,494	0	0
LDT2	0.192	1,547,887	297,702	427.79489	127,355,556	41,494	589.6482804	24,466,617
LDT2	0.000	1,547,887	141	320.17919	45,293	41,494	0	0
MDV	0.161	1,547,887	249,248	583.19031	137,881,774	41,494	751.6158054	31,187,229
MDV	0.000	1,547,887	252	333.47098	83,961	41,494	0	0
Total Passenger Vehicle Emissions					571,934,328			92,835,470

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,547,887 37 41493.5781

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
571,934,328	92,835,470	664,769,797	907184.7	732.8	267,466

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2010

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2010
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2 RUNEX			CO2 IDLEX(CO2 STREX		
												X	CO2_IDLEX	CO2_STREX	(Pavley I+LCFS)	Pavley I+LCFS)	(Pavley I+LCFS)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)
												(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)	(gms/ vehicle/day)			
Contra Costa	2010	Annual	LHD1	GAS	Aggregated	Aggregated	17,128	44.1%	732,328	35.4%	255,179	972.1095014	116.364457	844.3640322	972.1095014	116.364457	844.3640322			
Contra Costa	2010	Annual	LHD1	DSL	Aggregated	Aggregated	8,312	21.4%	357,708	17.3%	104,553	527.3982636	141.753411	0	527.3982636	141.753411	0			
Contra Costa	2010	Annual	LHD2	GAS	Aggregated	Aggregated	1,229	3.2%	50,497	2.4%	18,306	972.109477	116.364447	903.4854957	972.109477	116.364447	903.4854957			
Contra Costa	2010	Annual	LHD2	DSL	Aggregated	Aggregated	2,134	5.5%	93,984	4.5%	26,847	526.4489869	141.753418	0	526.4489869	141.753418	0			
Contra Costa	2010	Annual	Motor Coach	DSL	Aggregated	Aggregated	42	0.1%	6,107	0.3%	0	1742.92454	11555.7451	0	1742.92454	11555.74508	0			
Contra Costa	2010	Annual	OBUS	GAS	Aggregated	Aggregated	406	1.0%	23,299	1.1%	18,553	677.446023	407.400932	1761.361554	677.446023	407.4009318	1761.361554			
Contra Costa	2010	Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	10,099	0.5%	0	2153.946538	0	0	2153.946538	0	0			
Contra Costa	2010	Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464			
Contra Costa	2010	Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0			
Contra Costa	2010	Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0			
Contra Costa	2010	Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0			
Contra Costa	2010	Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0			
Contra Costa	2010	Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0			
Contra Costa	2010	Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0			
Contra Costa	2010	Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0			
Contra Costa	2010	Annual	T6 instate const	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0			
Contra Costa	2010	Annual	T6 instate const	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0			
Contra Costa	2010	Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0			
Contra Costa	2010	Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0			
Contra Costa	2010	Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0			
Contra Costa	2010	Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771			
Contra Costa	2010	Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0			
Contra Costa	2010	Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0			
Contra Costa	2010	Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0			
Contra Costa	2010	Annual	T7 NNOOS	DSL	Aggregated	Aggregated	292	0.8%	77,900	3.8%	0	1747.525085	22647.4898	0	1747.525085	22647.4898	0			
Contra Costa	2010	Annual	T7 NOOS	DSL	Aggregated	Aggregated	106	0.3%	25,218	1.2%	0	1743.269168	16172.3449	0	1743.269168	16172.34489	0			
Contra Costa	2010	Annual	T7 other port	DSL	Aggregated	Aggregated	50	0.1%	7,764	0.4%	0	1768.984685	5236.50033	0	1768.984685	5236.500333	0			
Contra Costa	2010	Annual	T7 POAK	DSL	Aggregated	Aggregated	202	0.5%	28,001	1.4%	0	1768.133004	8496.30286	0	1768.133004	8496.302855	0			
Contra Costa	2010	Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0			
Contra Costa	2010	Annual	T7 Public	DSL	Aggregated	Aggregated	172	0.4%	4,288	0.2%	0	1764.860961	8094.22132	0	1764.860961	8094.221325	0			
Contra Costa	2010	Annual	T7 Single	DSL	Aggregated	Aggregated	548	1.4%	41,997	2.0%	0	1747.635499	2252.77357	0	1747.635499	2252.773566	0			
Contra Costa	2010	Annual	T7 single constr	DSL	Aggregated	Aggregated	246	0.6%	18,846	0.9%	0	1747.755062	2242.71693	0	1747.755062	2242.716935	0			
Contra Costa	2010	Annual	T7 SWCV	DSL	Aggregated	Aggregated	233	0.6%	11,671	0.6%	0	1752.136513	8224.95035	0	1752.136513	8224.950353	0			
Contra Costa	2010	Annual	T7 tractor	DSL	Aggregated	Aggregated	778	2.0%	126,506	6.1%	0	1746.938595	2284.89441	0	1746.938595	2284.89441	0			
Contra Costa	2010	Annual	T7 tractor const	DSL	Aggregated	Aggregated	179	0.5%	14,051	0.7%	0	1747.207974	2269.4124	0	1747.207974	2269.412395	0			
Contra Costa	2010	Annual	T7 utility	DSL	Aggregated	Aggregated	29	0.1%	713	0.0%	0	1746.123181	8299.92497	0	1746.123181	8299.924965	0			
Contra Costa	2010	Annual	TTIS	GAS	Aggregated	Aggregated	79	0.2%	7,442	0.4%	1,590	584.6674183	0	2034.123288	584.6674183	0	2034.123288			
Contra Costa	2010	Annual	UBUS	GAS	Aggregated	Aggregated	74	0.2%	9,930	0.5%	298	744.1870688	0	596.1314856	744.1870688	0	596.1314856			
Contra Costa	2010	Annual	UBUS	DSL	Aggregated	Aggregated	246	0.6%	32,836	1.6%	985	2529.83056	0	0	2529.83056	0	0			
Contra Costa	2010	Annual	All Other Buses	DSL	Aggregated	Aggregated	102	0.3%	6,039	0.3%	0	1194.52308	661.757051	0	1194.52308	661.7570506	0			
							38,865	100.0%	2,068,363		1	444,843								
									Mi/Veh	53.21920792										

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

Emission Estimate Without Pavley and LCFS 2011

VMT Fraction	San Ramon Non-Passenger	Miles/Day/Veh Class	San Ramon		San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions		
			(gms/mile)	(gms/day)				(g/veh/day)	(g/day)	
LHD1	0.329	232.955	76,599	972,1095	0.427	1,856	116.3644594	844.3640322	1,783,111.8	
LHD1	0.160	232.955	37,206	527.39826	0.207	901	141.753403	0	127,676.2	
LHD2	0.024	232.955	5,543	972.10948	0.031	135	116.3644579	903.4854957	137,786.9	
LHD2	0.042	232.955	9,752	526.44899	0.054	235	141.7534172	0	33,267.5	
Motor Coach	0.003	232.955	758	1742.9245	0.001	5	11800.58058	0	61,830.9	
OBUS	0.010	232.955	2,261	677.44602	0.010	44	407.4009186	1761.361554	95,355.0	
PTO	0.000	232.955	93	2153.9465	0.000	0	0	0	0.0	
SBUS	0.002	232.955	482	742.11996	0.002	11	0	634.0321464	6,727.9	
SBUS	0.001	232.955	348	1294.3814	0.037	163	3744.833697	0	609,029.9	
T6 Ag	0.001	232.955	195	1205.6132	0.001	6	647.5844384	0	3,757.9	
T6 Public	0.003	232.955	614	1194.0186	0.008	33	714.8753193	0	23,442.4	
T6 CAIRP heavy	0.000	232.955	14	1191.3973	0.000	0	727.8571769	0	159.2	
T6 CAIRP small	0.000	232.955	45	1191.3999	0.000	1	738.6620329	0	468.9	
T6 OOS heavy	0.000	232.955	8	1191.3973	0.000	0	727.8571769	0	91.3	
T6 OOS small	0.000	232.955	26	1191.3999	0.000	0	738.6620329	0	268.8	
T6 instate construction heavy	0.004	232.955	877	1194.2524	0.004	17	706.6936954	0	11,665.8	
T6 instate construction small	0.010	232.955	2,275	1191.6408	0.008	35	727.319448	0	25,687.2	
T6 instate heavy	0.024	232.955	5,497	1194.028	0.023	101	708.2547878	0	71,779.2	
T6 instate small	0.063	232.955	14,729	1191.365	0.052	224	728.6662323	0	163,543.9	
T6 utility	0.000	232.955	102	1191.5212	0.001	5	742.1821582	0	3,813.0	
T6TS	0.020	232.955	4,608	677.44602	0.023	100	251.5801066	1568.76771	181,813.9	
T7 Ag	0.003	232.955	712	1760.1082	0.002	10	2297.662967	0	23,703.0	
T7 CAIRP	0.039	232.955	9,118	1743.2692	0.009	39	20670.35604	0	815,383.7	
T7 CAIRP construction	0.000	232.955	60	1743.3973	0.001	4	20346.17526	0	77,074.4	
T7 NNOOS	0.044	232.955	10,257	1747.5251	0.009	38	32190.86273	0	1,219,734.7	
T7 NOOS	0.014	232.955	3,321	1743.2692	0.003	14	25645.56493	0	368,413.9	
T7 other port	0.004	232.955	954	1768.9847	0.001	6	5714.692888	0	34,495.9	
T7 POAK	0.018	232.955	4,178	1768.133	0.006	26	9479.447412	0	251,174.0	
T7 POLA	0.000	232.955	0	0	0.000	0	0	0	0.0	
T7 Public	0.002	232.955	536	1764.861	0.005	21	8323.908963	0	177,650.4	
T7 Single	0.024	232.955	5,530	1747.6355	0.017	73	2889.455626	0	212,113.2	
T7 single construction	0.010	232.955	2,243	1747.7551	0.007	30	2842.464083	0	85,394.6	
T7 SWCV	0.006	232.955	1,458	1752.1365	0.007	29	8425.749797	0	242,824.2	
T7 tractor	0.072	232.955	16,658	1746.9386	0.024	105	3023.863461	0	318,522.5	
T7 tractor construction	0.007	232.955	1,672	1747.208	0.005	22	2973.208747	0	64,791.2	
T7 utility	0.000	232.955	88	1746.1232	0.001	3	8488.477903	0	29,578.8	
T7IS	0.004	232.955	965	584.66742	0.002	8	0	2034.123288	16,421.1	
UBUS	0.005	232.955	1,071	744.18707	0.002	8	0	596.1314856	4,742.6	
UBUS	0.015	232.955	3,543	2529.8306	0.006	26	0	0	0.0	
All Other Buses	0.003	232.955	747	1194.5231	0.003	14	680.421704	0	9,251.2	
					251,176,111	1,000	4,350			7,292,546.8

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

San Ramon Vehicles

	Avg Miles
VMT	CCC
232,955	53
	4,377

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running	Start and	Total Daily				
Emiss	Idle Emiss	(g/day)	g/ton	Tons/Day	Tons/Year	
251,176,111	7,292,547	258,468,658	907184.7	284.91	103,993.2	

Emission Estimate With Pavley and LCFS 2010

	San Ramon				San Ramon	San Ramon	Idling	Starting		
	VMT	Miles/Day	Non-Passenger	Miles/Day/Veh						
Fraction	Class	(gms/mile)	gms/day	Pop	Vehicle	(gms/vehicle/day)	Emissions	g/day		
LHD1	0.329	232.955	76.599	972.1095	74,462.290	0.427	1,856	116.364457	844.3640322	1,783,111.8
LHD1	0.160	232.955	37.206	527.39826	19,622.590	0.207	901	141.7534111	0	127,676.2
LHD2	0.024	232.955	5.543	972.10948	5,388.376	0.031	135	116.3644473	903.4854957	137,786.9
LHD2	0.042	232.955	9.752	526.44899	5,134.120	0.054	235	141.7534184	0	33,267.5
Motor Coach	0.003	232.955	758	1742.9245	1,320.965	0.001	5	11555.74508	0	60,548.0
OBUS	0.010	232.955	2,261	677.44602	1,531.574	0.010	44	407.4009318	1761.361554	95,355.0
PTO	0.000	232.955	93	2153.9465	199.483	0.000	0	0	0	0.0
SBUS	0.002	232.955	482	742.11996	357.334	0.002	11	0	634.0321464	6,727.9
SBUS	0.001	232.955	348	1294.3814	450.813	0.037	163	3568.752088	0	580,393.4
T6 Ag	0.001	232.955	195	1205.6132	235.678	0.001	6	625.7370822	0	3,631.1
T6 Public	0.003	232.955	614	1194.0186	732.673	0.008	33	684.4317604	0	22,444.1
T6 CAIRP heavy	0.000	232.955	14	1191.3973	16.352	0.000	0	707.5576385	0	154.8
T6 CAIRP small	0.000	232.955	45	1191.1399	53.386	0.000	1	729.3957062	0	463.0
T6 OOS heavy	0.000	232.955	8	1191.3973	9.375	0.000	0	707.5576385	0	88.7
T6 OOS small	0.000	232.955	26	1191.1399	30.608	0.000	0	729.3957062	0	265.4
T6 instate construction heavy	0.004	232.955	877	1194.2524	1,047.093	0.004	17	675.6399373	0	11,153.2
T6 instate construction small	0.010	232.955	2,275	1191.6408	2,711.172	0.008	35	712.8362985	0	25,175.7
T6 instate heavy	0.024	232.955	5,497	1194.028	6,563.298	0.023	101	676.1970341	0	68,530.2
T6 instate small	0.063	232.955	14,729	1191.365	17,547.731	0.052	224	713.268798	0	160,088.0
T6 utility	0.000	232.955	102	1191.5212	121.760	0.001	5	711.4520522	0	3,655.2
T6TS	0.020	232.955	4,608	677.44602	3,121.611	0.023	100	251.5801003	1568.76771	181,813.9
T7 Ag	0.003	232.955	712	1760.1082	1,252.859	0.002	10	1995.749796	0	20,588.5
T7 CAIRP	0.039	232.955	9,118	1743.2692	15,895.237	0.009	39	13046.65123	0	514,651.3
T7 CAIRP construction	0.000	232.955	60	1743.3973	105,449	0.001	4	12949.21246	0	49,053.6
T7 NNOOS	0.044	232.955	10,257	1747.5251	17,925.203	0.009	38	22647.4898	0	858,129.5
T7 NOOS	0.014	232.955	3,321	1743.2692	5,788.641	0.003	14	16172.34489	0	232,325.4
T7 other port	0.004	232.955	954	1768.9847	1,686.746	0.001	6	5236.500333	0	31,609.3
T7 POAK	0.018	232.955	4,178	1768.133	7,387.399	0.006	26	8496.302855	0	225,123.9
T7 POLA	0.000	232.955	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	232.955	536	1764.861	945.702	0.005	21	8094.221325	0	172,748.3
T7 Single	0.024	232.955	5,530	1747.6355	9,664.489	0.017	73	2252.773566	0	165,374.8
T7 single construction	0.010	232.955	2,243	1747.7551	3,919.472	0.007	30	2242.716935	0	67,376.7
T7 SWCV	0.006	232.955	1,458	1752.1365	2,555.252	0.007	29	8224.950353	0	237,037.3
T7 tractor	0.072	232.955	16,658	1746.9386	29,100.128	0.024	105	2284.89441	0	240,682.3
T7 tractor construction	0.007	232.955	1,672	1747.208	2,921.341	0.005	22	2269.412395	0	49,454.3
T7 utility	0.000	232.955	88	1746.1232	153.123	0.001	3	8299.924965	0	28,921.8
TTIS	0.004	232.955	965	584.66742	564.198	0.002	8	0	2034.123288	16,421.1
UBUS	0.005	232.955	1,071	744.18707	797.324	0.002	8	0	596.1314856	4,742.6
UBUS	0.015	232.955	3,543	2529.8306	8,962.606	0.006	26	0	0	0.0
All Other Buses	0.003	232.955	747	1194.5231	892.661	0.003	14	661.7570506	0	8,997.4
					251,176,111	1.000	4,350			6,225,568.1

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

San Ramon Vehicles

	Avg Miles	
VMT	CCC	Vehicles
232,955	6,039	38.5723709

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
251,176,111	6,225,568	257,401,680	907184.7	283.7	103,564

Community Greenhouse Gas Inventory

Energy

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	PG&E 2010 Third party verified emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	187,167,039	2,610	41645	2.9	1.0	38,125
Commercial	173,846,782	7,503	38681	2.7	1.0	35,412
City/County/Dist	28,280,483		6292	0.4	0.2	5,761
Total	389,294,304		86,618	6.0	2.1	79,297

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,585,407	171	73,625	6.9	0.1	66,963
Commercial	5,563,512	127	32,547	3.1	0.1	29,602
City/Co/Dist	441,076		2,580	0.2	0.0	2,347
Total	18,589,995		108,751	10.2	0.2	98,912

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0	0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT/yr	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		0	29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,052,211	1,019	0.1600	0.0100	930
San Ramon Planning Area	73,595	71	0	0	65
Percent San Ramon/Contra Costa County	7.0%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,052,211	920	0.360	0.08000	864
San Ramon Planning Area	73,595	64	0	0	60
Percent San Ramon/Contra Costa County	7.0%				

Total San Ramon 125

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	13.84
Population	37,309,882
Emissions (MTCO ₂ e per person)	0.37

Fresno

Population	73,595
Emissions (MTCO ₂ e per person)	27,300
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2010 Assumptions

	2008	2010
Planning Area Population	66,413	73,595
Water Usage (gallons/day)	10,840,000	11,995,985
Per Capita Water Use	163	163
Water Usage (million gallons/year)	3957	4379
Energy Usage (kWh)	21,409,163	23,692,250
Energy Usage (MWh)	21,409	23,692

Year 2010 Emissions

Greenhouse Gas	Electricity Emission Factor	2010 Emissions	2010 Emissions	2010 Emissions
	(pounds per MWh)	(pounds/year)	(tons/year)	MTCO _{2e}
Carbon dioxide	445	10,543,051	5,272	4,782.3
Methane	0.031	734.46	0.367	7.0
Nitrous oxide	0.011	260.61	0.130	36.6
				4,826.0

Source for electricity emission factor:
PG&E Third Party Verified Emission Factor Report, April 2013

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.
www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2014

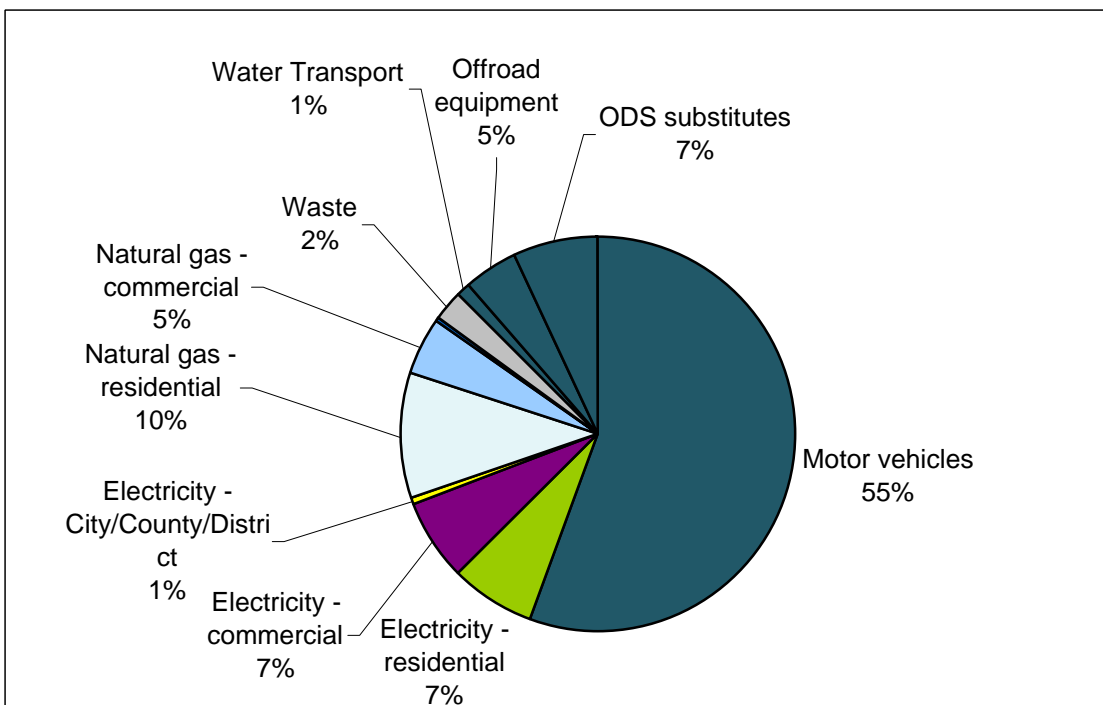
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	78,820	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,087,008	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e
Motor vehicles	375,807
Electricity - residential	46,502
Electricity - commercial	44,401
Electricity - City/County/District	4,900
Natural gas - residential	68,960
Natural gas - commercial	31,881
Natural gas - City/County/District	2,152
Waste	16,711
Water Transport	6,320
Offroad equipment	31,243
ODS substitutes	46,626
<u>Total</u>	<u>675,501</u>



Community Greenhouse Gas Inventory

Waste

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,734

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,711
Emissions (MTCO ₂ e/person)	0.2120 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 28, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		37,053		36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,805,157 Source: MTC. 2014
Vehicle miles traveled / year 658,882,305 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS BAU

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	310,862.1	282,009.3
Non Passenger Vehicles	103,394.8	93,798.1
	414,256.8	375,807.5

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	288,470.1	261,695.7
Non Passenger Vehicles	101,391.8	91,981.1
	389,861.9	353,676.8

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2014

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdIYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pavley I+LCFS)	CO2_IDLEX(Pavley I+LCFS)	CO2_STREX(Pavley I+LCFS)
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)		(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2005 Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	0	460.3646763	332.5838917	0	460.3646763	0
Contra Costa	2005 Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	0	362.249441	0	0	0
Contra Costa	2005 Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	0	527.1606221	380.6486469	0	527.1606221	0
Contra Costa	2005 Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	0	373.5873232	0	0	0
Contra Costa	2005 Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	0	633.3019897	455.8272576	0	633.3019897	0
Contra Costa	2005 Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	0	372.2726309	0	0	0
Contra Costa	2005 Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	0	792.1227449	570.5037165	0	792.1227449	0
Contra Costa	2005 Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	0	368.5728982	0	0	0
						627,174	24,468,550	1.000								
						avg miles/vehicle	39.0139465									

Emission Estimate Without Pavley and LCFS 2014

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX	Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day	
		Miles/Day	Class	(gms/mile)	(gms/day)	(gms/vehicle/day)	(g/day)	
LDA	0.573	1,574,553	901,887	332.58389	299,953,157	60,423	460.3646763	27,816,615
LDA	0.002	1,574,553	3,764	362.24944	1,363,488	60,423	0	0
LDT1	0.071	1,574,553	111,986	380.64865	42,627,492	60,423	527.1606221	31,852,626
LDT1	0.000	1,574,553	142	373.58732	53,100	60,423	0	0
LDT2	0.192	1,574,553	302,831	455.82726	138,038,624	60,423	633.3019897	38,266,006
LDT2	0.000	1,574,553	144	372.27263	53,569	60,423	0	0
MDV	0.161	1,574,553	253,542	570.50372	144,646,793	60,423	792.1227449	47,862,433
MDV	0.000	1,574,553	256	368.5729	94,397	60,423	0	0
Total Passenger Vehicle Emissions					626,830,620			145,797,680

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,574,553 39 40358.7215

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
626,830,620	145,797,680	772,628,300	907184.7	851.7	310,862.1

Emission Estimate With Pavley and LCFS 2014

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX(Pavley I+LCFS)	Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)	
		Miles/Day	Class	(gms/mile)	(gms/day)	(gms/vehicle/day)	(gms/vehicle/day)	
LDA	0.573	1,574,553	901,887	300.25647	270,797,469	60,423	420.4717438	25,406,164
LDA	0.002	1,574,553	3,764	313.30139	1,179,250	60,423	0	0
LDT1	0.071	1,574,553	111,986	355.63726	39,826,555	60,423	475.6096597	28,737,762
LDT1	0.000	1,574,553	142	322.38538	45,823	60,423	0	0
LDT2	0.192	1,574,553	302,831	427.79489	129,549,555	60,423	589.6482804	35,628,318
LDT2	0.000	1,574,553	144	320.17919	46,073	60,423	0	0
MDV	0.161	1,574,553	253,542	553.19031	140,257,112	60,423	751.6158054	45,414,882
MDV	0.000	1,574,553	256	333.47098	85,407	60,423	0	0
Total Passenger Vehicle Emissions					581,787,244			135,187,127

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,574,553 39 40358.7215

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
581,787,244	135,187,127	716,974,370	907184.7	790.3	288,470

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2014 BAU

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX			
												X	CO2_IDLEX		(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)			
												(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)					
												(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2014 Annual	LHD1	GAS	Aggregated	Aggregated	15,365	41.3%	686,475	32.7%	228,914	972.1094988	116.364456	819.7728342	972.1094988	116.3644561	819.7728342	0			
Contra Costa	2014 Annual	LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	19.0%	102,207	532.3059325	141.748251	0	532.3059325	141.7482507	0	0			
Contra Costa	2014 Annual	LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.7%	19,696	972.1095363	116.338965	1045.68254	972.1095363	116.338965	1045.68254	0			
Contra Costa	2014 Annual	LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	4.1%	22,287	535.0134187	141.753311	0	535.0134187	141.7533106	0	0			
Contra Costa	2014 Annual	Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	7,150	0.3%	0	1745.971421	11338.6466	0	1745.971421	11338.64661	0	0			
Contra Costa	2014 Annual	OBUS	GAS	Aggregated	Aggregated	376	1.0%	23,638	1.1%	17,163	677.4460346	407.400915	1962.23896	677.4460346	407.4009152	1962.23896	0			
Contra Costa	2014 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	10,731	0.5%	0	2183.103618	0	0	2183.103618	0	0	0			
Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159	0			
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0	0			
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0	0			
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0	0			
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0	0			
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0	0			
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0	0			
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0	0			
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0	0			
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0	0			
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0	0			
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0	0			
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0	0			
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808	0			
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0	0			
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	0			
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	0			
Contra Costa	2014 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	82,816	3.9%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0	0			
Contra Costa	2014 Annual	T7 NOOS	DSL	Aggregated	Aggregated	113	0.3%	26,809	1.3%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0	0			
Contra Costa	2014 Annual	T7 other port	DSL	Aggregated	Aggregated	58	0.2%	9,058	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0	0			
Contra Costa	2014 Annual	T7 POAK	DSL	Aggregated	Aggregated	249	0.7%	28,206	1.3%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0	0			
Contra Costa	2014 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0			
Contra Costa	2014 Annual	T7 Public	DSL	Aggregated	Aggregated	197	0.5%	4,891	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0	0			
Contra Costa	2014 Annual	T7 Single	DSL	Aggregated	Aggregated	591	1.6%	44,648	2.1%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	0			
Contra Costa	2014 Annual	T7 single consti	DSL	Aggregated	Aggregated	204	0.5%	15,416	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	0			
Contra Costa	2014 Annual	T7 SWCV	DSL	Aggregated	Aggregated	266	0.7%	13,310	0.6%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0	0			
Contra Costa	2014 Annual	T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	134,491	6.4%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0	0			
Contra Costa	2014 Annual	T7 tractor const	DSL	Aggregated	Aggregated	143	0.4%	11,494	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0	0			
Contra Costa	2014 Annual	T7 utility	DSL	Aggregated	Aggregated	30	0.1%	756	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0	0			
Contra Costa	2014 Annual	T7IS	GAS	Aggregated	Aggregated	74	0.2%	6,997	0.3%	1,485	584.6674163	0	2353.967488	584.6674163	0	2353.967488				
Contra Costa	2014 Annual	UBUS	GAS	Aggregated	Aggregated	64	0.2%	8,490	0.4%	255	744.1870709	0	615.0541717	744.1870709	0	615.0541717				
Contra Costa	2014 Annual	UBUS	DSL	Aggregated	Aggregated	235	0.6%	31,370	1.5%	941	2573.001593	0	0	2573.001593	0	0	0			
Contra Costa	2014 Annual	All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	6,973	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0	0			
							37,215	100.0%	2,099,212	1	409,952									
									Mi/Veh	56.4075898										

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.93605	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.35171	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS 2014

	VMT Fraction	San Ramon Miles/Day		Miles/Day/Veh Class	gms/mile	gms/day	San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day
		Passenger	Non-Passenger				Fraction	Population				
LHD1	0.329	230,604	75,826	972.1095	73,710,931	0.427	1,856	116.3644561	819.7728342	1,737,470.5		
LHD1	0.160	230,604	36,831	532.30593	19,605,343	0.207	901	141.7482507	0	127,671.5		
LHD2	0.024	230,604	5,487	972.10954	5,334,005	0.031	135	116.338965	1045.68254	156,995.0		
LHD2	0.042	230,604	9,654	535.01342	5,164,995	0.054	235	141.7533106	0	33,267.5		
Motor Coach	0.003	230,604	750	1745.9714	1,309,922	0.001	5	11338.64661	0	59,410.5		
OBUS	0.010	230,604	2,238	677.44603	1,516,119	0.010	44	407.4009152	1962.23896	104,187.1		
PTO	0.000	230,604	92	2183.1036	200,143	0.000	0	0	0	0.0		
SBUS	0.002	230,604	477	742.11995	353,729	0.002	11	0	788.3524159	8,365.5		
SBUS	0.001	230,604	345	1299.9836	448,195	0.037	163	3474.936051	0	565,135.9		
T6 Ag	0.001	230,604	194	1214.0161	234,926	0.001	6	591.9178211	0	3,434.9		
T6 Public	0.003	230,604	607	1210.2525	735,141	0.008	33	636.79636	0	20,882.0		
T6 CAIRP heavy	0.000	230,604	14	1194.1438	16,224	0.000	0	666.3500758	0	145.8		
T6 CAIRP small	0.000	230,604	44	1187.5142	52,687	0.000	1	693.3277468	0	440.1		
T6 OOS heavy	0.000	230,604	8	1194.1438	9,302	0.000	0	666.3500758	0	83.6		
T6 OOS small	0.000	230,604	25	1187.5142	30,207	0.000	0	693.3277468	0	252.3		
T6 instate construction heavy	0.004	230,604	868	1206.7402	1,047,366	0.004	17	628.1342767	0	10,369.0		
T6 instate construction small	0.010	230,604	2,252	1190.6752	2,681,640	0.008	35	671.5227753	0	23,716.6		
T6 instate heavy	0.024	230,604	5,441	1206.7402	6,566,243	0.023	101	628.1342767	0	63,659.2		
T6 instate small	0.063	230,604	14,580	1190.6752	17,360,609	0.052	224	671.5227753	0	150,718.4		
T6 utility	0.000	230,604	101	1190.3417	120,412	0.001	5	669.3517103	0	3,438.9		
T6TS	0.020	230,604	4,561	677.44602	3,090,112	0.023	100	251.5801036	1824.797808	207,385.9		
T7 Ag	0.003	230,604	705	1780.2391	1,254,402	0.002	10	2354.915902	0	24,293.7		
T7 CAIRP	0.039	230,604	9,026	1740.7084	15,711,734	0.009	39	29278.79509	0	1,154,960.8		
T7 CAIRP construction	0.000	230,604	60	1740.7084	104,223	0.001	4	29278.79509	0	110,912.5		
T7 NNOOS	0.044	230,604	10,154	1736.3283	17,630,637	0.009	38	37700.75308	0	1,428,508.4		
T7 NOOS	0.014	230,604	3,287	1740.7084	5,721,814	0.003	14	37153.84079	0	533,737.1		
T7 other port	0.004	230,604	944	1728.3376	1,631,359	0.001	6	4421.893594	0	26,692.1		
T7 POAK	0.018	230,604	4,136	1732.4648	7,165,336	0.006	26	6989.078773	0	185,187.4		
T7 POLA	0.000	230,604	0	0	0	0.000	0	0	0	0.0		
T7 Public	0.002	230,604	530	1806.7866	958,399	0.005	21	7861.899623	0	167,790.1		
T7 Single	0.024	230,604	5,474	1771.2925	9,696,474	0.017	73	2423.170701	0	177,883.5		
T7 single construction	0.010	230,604	2,220	1771.2925	3,932,174	0.007	30	2423.170701	0	72,798.0		
T7 SWCV	0.006	230,604	1,444	1777.5297	2,566,127	0.007	29	8016.434181	0	231,028.0		
T7 tractor	0.072	230,604	16,490	1754.4508	28,930,369	0.024	105	2452.592201	0	258,347.0		
T7 tractor construction	0.007	230,604	1,655	1756.0931	2,906,570	0.005	22	2452.592201	0	53,446.1		
T7 utility	0.000	230,604	87	1757.3339	152,551	0.001	3	8116.295492	0	28,281.9		
T7IS	0.004	230,604	955	584.66742	558,505	0.002	8	0	2353.967488	19,003.2		
UBUS	0.005	230,604	1,061	744.18707	789,278	0.002	8	0	615.0541717	4,893.2		
UBUS	0.015	230,604	3,507	2573.0016	9,023,571	0.006	26	0	0	0.0		
All Other Buses	0.003	230,604	740	1211.582	896,274	0.003	14	615.1471436	0	8,363.7		
					249,218,049	1.000	4,350			7,763,156.6		

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
230,604	56	4,088

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
249,218,049	7,763,157	256,981,205	907184.7	283.27	103,394.8

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate With Pavley and LCFS 2014

	VMT Fraction	San Ramon Miles/Day			San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/d ay)	Starting Emissions (g/veh/day)	g/day
		Non-Passenger	Miles/Day/Veh Class	(gms/mile)	gms/day	Fraction				
LHD1	0.329	230.604	75,826	957.52784	72,605,266	0.427	1,856	114.6189925	842.2743379	1,775,993.7
LHD1	0.160	230.604	36,831	517.05582	19,043,667	0.207	901	139.627102	0	125,761.0
LHD2	0.024	230.604	5,487	957.52787	5,253,995	0.031	135	114.618991	864.7695195	132,320.3
LHD2	0.042	230.604	9,654	516.0264	4,981,696	0.054	235	139.6271159	0	32,768.5
Motor Coach	0.003	230.604	750	1730.5227	1,298,332	0.001	5	11623.57187	0	60,903.4
OBUS	0.010	230.604	2,238	667.28433	1,493,377	0.010	44	401.2899048	1702.807416	92,511.9
PTO	0.000	230.604	92	2124.946	194,811	0.000	0	0	0	0.0
SBUS	0.002	230.604	477	730.98815	348,423	0.002	11	0	565.5514923	6,001.3
SBUS	0.001	230.604	345	1280.4586	441,464	0.037	163	3688.661192	0	599,894.5
T6 Ag	0.001	230.604	194	1180.81	228,500	0.001	6	637.8706719	0	3,701.5
T6 Public	0.003	230.604	607	1183.6362	718,973	0.008	33	704.1521895	0	23,090.8
T6 CAIRP heavy	0.000	230.604	14	1171.5463	15,917	0.000	0	716.9393193	0	156.8
T6 CAIRP small	0.000	230.604	44	1165.0714	51,691	0.000	1	727.5821024	0	461.8
T6 OOS heavy	0.000	230.604	8	1171.5463	9,126	0.000	0	716.9393193	0	89.9
T6 OOS small	0.000	230.604	25	1165.0714	29,636	0.000	0	727.5821024	0	264.8
T6 instate construction heavy	0.004	230.604	868	1179.4564	1,023,686	0.004	17	696.0932899	0	11,490.8
T6 instate construction small	0.010	230.604	2,252	1167.9583	2,630,477	0.008	35	716.4096563	0	25,301.9
T6 instate heavy	0.024	230.604	5,441	1177.8538	6,409,063	0.023	101	697.630966	0	70,702.5
T6 instate small	0.063	230.604	14,580	1166.6673	17,010,564	0.052	224	717.7362388	0	161,090.7
T6 utility	0.000	230.604	101	1177.2739	119,090	0.001	5	731.0494258	0	3,755.9
T6TS	0.020	230.604	4,561	667.28434	3,043,761	0.023	100	247.806405	1271.156632	151,712.0
T7 Ag	0.003	230.604	705	1739.4447	1,225,657	0.002	10	2263.198023	0	23,347.5
T7 CAIRP	0.039	230.604	9,026	1723.4705	15,556,143	0.009	39	20360.3007	0	803,152.9
T7 CAIRP construction	0.000	230.604	60	1724.7107	103,266	0.001	4	20040.98263	0	75,918.2
T7 NNOOS	0.044	230.604	10,154	1706.4274	17,327,024	0.009	38	31707.99979	0	1,201,438.7
T7 NOOS	0.014	230.604	3,287	1723.7778	5,666,162	0.003	14	25260.88146	0	362,887.6
T7 other port	0.004	230.604	944	1745.645	1,647,696	0.001	6	5628.972495	0	33,978.4
T7 POAK	0.018	230.604	4,136	1745.645	7,219,848	0.006	26	9337.255701	0	247,406.3
T7 POLA	0.000	230.604	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	230.604	530	1757.0538	932,019	0.005	21	8199.050329	0	174,985.6
T7 Single	0.024	230.604	5,474	1724.1055	9,438,161	0.017	73	2846.113792	0	208,931.5
T7 single construction	0.010	230.604	2,220	1724.9318	3,829,256	0.007	30	2799.827122	0	84,113.7
T7 SWCV	0.006	230.604	1,444	1737.596	2,508,477	0.007	29	8299.36355	0	239,181.8
T7 tractor	0.072	230.604	16,490	1729.3992	28,517,276	0.024	105	2978.505509	0	313,744.7
T7 tractor construction	0.007	230.604	1,655	1727.7773	2,859,703	0.005	22	2928.610616	0	63,819.3
T7 utility	0.000	230.604	87	1729.0255	150,093	0.001	3	8361.150734	0	29,135.1
T7IS	0.004	230.604	955	575.89742	550,128	0.002	8	0	1465.141483	11,827.8
UBUS	0.005	230.604	1,061	733.02426	777,439	0.002	8	0	587.1895261	4,671.5
UBUS	0.015	230.604	3,507	2481.4034	8,702,334	0.006	26	0	0	0.0
All Other Buses	0.003	230.604	740	1183.1801	875,263	0.003	14	670.2153785	0	9,112.4
					244,837,458	1.000	4,350			7,165,627.2

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 instate consl	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate consl	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
230,604	6,973	33,0716859

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
244,837,458	7,165,627	252,003,085	907184.7	277.8	101,392

Community Greenhouse Gas Inventory

Energy

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.545	PG&E 2013 emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	186,714,551	2,610	50880	2.9	1.0	46,502
Commercial	178,277,122	7,503	48581	2.8	1.0	44,401
City/County/Dist	19,672,661		5361	0.3	0.1	4,900
Total	384,664,333		104,821	6.0	2.1	95,802

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,960,760	164	75,820	7.1	0.1	68,960
Commercial	5,991,826	130	35,052	3.3	0.1	31,881
City/Co/Dist	404,430		2,366	0.2	0.0	2,152
Total	19,357,015		113,239	10.6	0.2	102,993

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: PG&E Third Party Verified Rate for 2013.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population			1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction			0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)			29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,087,008	1,019	0.1600	0.0100	930
San Ramon Planning Area	78,820	74	0	0	67
Percent San Ramon/Contra Costa County	7.3%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,087,008	920	0.360	0.08000	864
San Ramon Planning Area	78,820	67	0	0	63
Percent San Ramon/Contra Costa County	7.3%				

Total San Ramon 130

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	22.68
Population	38,340,074
Emissions (MTCO ₂ e per person)	0.59

San Ramon

Population	78,820
Emissions (MTCO ₂ e per person)	46,626
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population from: DOF Report E-2

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2014 Assumptions

	2008	2014
Planning Area Population	66,413	78,820
Water Usage (163 gallons/day)	10,840,000	12,847,660
Water Usage (million gallons/year)	3957	4689
Energy Usage (kWh)	21,409,163	25,374,321
Energy Usage (MWh)	21,409	25,374

Year 2014 Emissions

Greenhouse Gas	Electricity	2014	2014	2014
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO _{2e}
	(pounds per MWh)			
Carbon dioxide	545	13,829,005	6,915	6,272.8
Methane	0.031	786.60	0.393	7.5
Nitrous oxide	0.011	279.12	0.140	39.2
				6,319.6

Source for electricity emission factor:
PG&E 2013 Third Party Verified Emission Rates

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for 2008 and 2030 population estimates: City of San Ramon General Plan (2010). Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2014

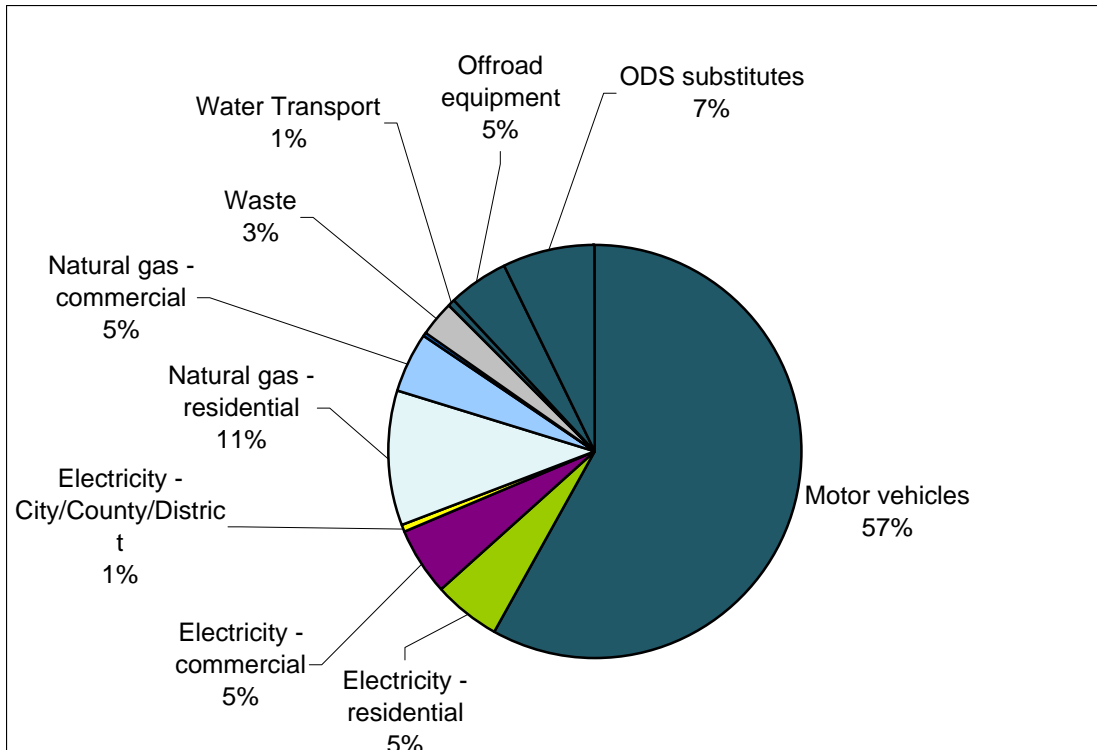
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	78,820	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,087,008	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	379,219	353,677
Electricity - residential	35,238	35,238
Electricity - commercial	33,645	33,645
Electricity - City/County/District	3,713	3,713
Natural gas - residential	68,960	68,960
Natural gas - commercial	31,881	31,881
Natural gas - City/County/District	2,152	2,152
Waste	16,711	16,711
Water Transport	4,789	4,789
Offroad equipment	31,243	31,243
ODS substitutes	46,626	46,626
Total	654,176	628,633



Community Greenhouse Gas Inventory

Waste

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,734

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,711
Emissions (MTCO ₂ e/person)	0.2120 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 28, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		37,053		36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,805,157 Source: MTC. 2014
Vehicle miles traveled / year 658,882,305 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	315,081.8	285,837.4
Non Passenger Vehicles	102,935.9	93,381.9
	418,017.6	379,219.2

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	288,470.1	261,695.7
Non Passenger Vehicles	101,391.8	91,981.1
	389,861.9	353,676.8

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2014

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2014
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdIYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pavley I+LCFS)	CO2_IDLEX(Pavley I+LCFS)	CO2_STREX(Pavley I+LCFS)	
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)		(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	
Contra Costa	2014	Annual	LDA	GAS	Aggregated	Aggregated	407,602	15,023,836	0.573	2,566,347	338.3375631	0	462.8898936	300.2564693	0	420.4717438	
Contra Costa	2014	Annual	LDA	DSL	Aggregated	Aggregated	1,814	62,701	0.002	10,692	356.5923105	0	0	313.3013911	0	0	
Contra Costa	2014	Annual	LDT1	GAS	Aggregated	Aggregated	50,198	1,865,495	0.071	305,857	389.8398291	0	513.2390757	355.6372588	0	475.6096597	
Contra Costa	2014	Annual	LDT1	DSL	Aggregated	Aggregated	69	2,368	0.000	362	364.8191684	0	0	322.3853757	0	0	
Contra Costa	2014	Annual	LDT2	GAS	Aggregated	Aggregated	128,565	5,044,626	0.192	809,629	461.7543514	0	629.2618965	427.7948941	0	589.6482804	
Contra Costa	2014	Annual	LDT2	DSL	Aggregated	Aggregated	62	2,397	0.000	357	359.0723607	0	0	320.1791932	0	0	
Contra Costa	2014	Annual	MDV	GAS	Aggregated	Aggregated	110,479	4,223,563	0.161	691,392	585.3547658	0	786.638138	553.1903087	0	751.6158054	
Contra Costa	2014	Annual	MDV	DSL	Aggregated	Aggregated	111	4,266	0.000	646	359.131059	0	0	333.4709771	0	0	
							698,899	26,229,251	1.000							0	
								37,529,3844									0
							avg miles/vehicle										

Emission Estimate Without Pavley and LCFS 2014

	VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX	Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day
		Miles/Day	Class	(gms/mile)	(gms/day)		(gms/vehicle/day)	(g/day)
LDA	0.573	1,574,553	901,887	338.33756	305,142,320	60,423	462.8898936	27,969,196
LDA	0.002	1,574,553	3,764	356.59231	1,342,194	60,423	0	0
LDT1	0.071	1,574,553	111,986	389.83983	43,656,779	60,423	513.2390757	31,011,445
LDT1	0.000	1,574,553	142	364.81917	51,854	60,423	0	0
LDT2	0.192	1,574,553	302,831	461.75435	139,833,531	60,423	629.2618965	38,021,892
LDT2	0.000	1,574,553	144	359.07236	51,670	60,423	0	0
MDV	0.161	1,574,553	253,542	585.35477	148,412,161	60,423	786.638138	47,531,036
MDV	0.000	1,574,553	256	359.13106	91,979	60,423	0	0
Total Passenger Vehicle Emissions					638,582,489			144,533,568

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,574,553 38 41955.2045

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
638,582,489	144,533,568	783,116,058	907184.7	863.2	315,081.8

Emission Estimate With Pavley and LCFS 2014

	VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX(Pavley I+LCFS)	Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS)
		Miles/Day	Class	(gms/mile)	(gms/day)		(gms/vehicle/day)	(gms/vehicle/day)
LDA	0.573	1,574,553	901,887	300.25647	270,797,469	60,423	420.4717438	25,406,164
LDA	0.002	1,574,553	3,764	313.30139	1,179,250	60,423	0	0
LDT1	0.071	1,574,553	111,986	355.63726	39,826,555	60,423	475.6096597	28,737,762
LDT1	0.000	1,574,553	142	322.38538	45,823	60,423	0	0
LDT2	0.192	1,574,553	302,831	427.79489	129,549,555	60,423	589.6482804	35,628,318
LDT2	0.000	1,574,553	144	320.17919	46,073	60,423	0	0
MDV	0.161	1,574,553	253,542	553.19031	140,257,112	60,423	751.6158054	45,414,882
MDV	0.000	1,574,553	256	333.47098	85,407	60,423	0	0
Total Passenger Vehicle Emissions					581,787,244			135,187,127

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,574,553 38 41955.2045

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
581,787,244	135,187,127	716,974,370	907184.7	790.3	288,470

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2014

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2014
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX			
												X	CO2_IDLEX		(Pavley I+LCFS)	Pavley I+LCFS	(Pavley I+LCFS)			
												(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)					
												(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2014 Annual	LHD1	GAS	Aggregated	Aggregated	17,415	42.7%	711,448	32.9%	259,452	972.1094782	116.364459	855.1008506	957.527836	114.6189925	842.2743379	0			
Contra Costa	2014 Annual	LHD1	DSL	Aggregated	Aggregated	8,451	20.7%	345,573	16.0%	106,304	524.929762	141.753403	0	517.0558156	139.627102	0	0			
Contra Costa	2014 Annual	LHD2	GAS	Aggregated	Aggregated	1,268	3.1%	51,483	2.4%	18,886	972.1095163	116.364458	877.9385985	957.5278736	114.618991	864.7695195	0			
Contra Costa	2014 Annual	LHD2	DSL	Aggregated	Aggregated	2,202	5.4%	90,580	4.2%	27,699	523.8846684	141.753417	0	516.0263983	139.6271159	0	0			
Contra Costa	2014 Annual	Motor Coach	DSL	Aggregated	Aggregated	49	0.1%	7,039	0.3%	0	1756.875858	11800.5806	0	1730.52272	11623.57187	0	0			
Contra Costa	2014 Annual	OBUS	GAS	Aggregated	Aggregated	413	1.0%	20,998	1.0%	18,840	677.4460162	407.400919	1728.738493	667.284326	401.2899048	1702.807416	0			
Contra Costa	2014 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	12,329	0.6%	0	2157.305589	0	0	2124.946005	0	0	0			
Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.1199516	0	574.1639516	730.9881523	0	565.5514923	0			
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0	0			
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.791888	647.584438	0	1180.81001	637.8706719	0	0			
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.661106	714.875319	0	1183.63619	704.1521895	0	0			
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0	0			
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0	0			
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0	0			
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0	0			
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.417677	706.693695	0	1179.456412	696.0932899	0	0			
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.744477	727.319448	0	1167.95831	716.4096563	0	0			
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.790674	708.254788	0	1177.853814	697.630966	0	0			
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.433845	728.666232	0	1166.667338	717.7362388	0	0			
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.201902	742.182158	0	1177.273874	731.0494258	0	0			
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.4460281	251.580107	1290.514347	667.2843377	247.806405	1271.156632	0			
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.933742	2297.66297	0	1739.444736	2263.198023	0	0			
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.716237	20670.356	0	1723.470494	20360.3007	0	0			
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.975339	20346.1753	0	1724.710709	20040.98263	0	0			
Contra Costa	2014 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	356	0.9%	95,271	4.4%	0	1732.413619	32190.8627	0	1706.427415	31707.99979	0	0			
Contra Costa	2014 Annual	T7 NOOS	DSL	Aggregated	Aggregated	135	0.3%	30,841	1.4%	0	1750.02825	25645.5649	0	1723.777826	25260.88146	0	0			
Contra Costa	2014 Annual	T7 other port	DSL	Aggregated	Aggregated	57	0.1%	8,856	0.4%	0	1772.228382	5714.69289	0	1745.644956	5628.972495	0	0			
Contra Costa	2014 Annual	T7 POAK	DSL	Aggregated	Aggregated	249	0.6%	38,806	1.8%	0	1772.228382	9479.44741	0	1745.644956	9337.255701	0	0			
Contra Costa	2014 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0			
Contra Costa	2014 Annual	T7 Public	DSL	Aggregated	Aggregated	200	0.5%	4,977	0.2%	0	1783.810989	8323.90896	0	1757.053824	8199.050329	0	0			
Contra Costa	2014 Annual	T7 Single	DSL	Aggregated	Aggregated	689	1.7%	51,363	2.4%	0	1750.360913	2889.45563	0	1724.105499	2846.113792	0	0			
Contra Costa	2014 Annual	T7 single consti	DSL	Aggregated	Aggregated	282	0.7%	20,829	1.0%	0	1751.199785	2842.46408	0	1724.931789	2799.827122	0	0			
Contra Costa	2014 Annual	T7 SWCV	DSL	Aggregated	Aggregated	270	0.7%	13,545	0.6%	0	1764.056869	8425.7498	0	1737.596016	8299.36355	0	0			
Contra Costa	2014 Annual	T7 tractor	DSL	Aggregated	Aggregated	988	2.4%	154,717	7.2%	0	1755.735237	3023.86346	0	1729.399208	2978.505509	0	0			
Contra Costa	2014 Annual	T7 tractor const	DSL	Aggregated	Aggregated	204	0.5%	15,530	0.7%	0	1754.088653	2973.20875	0	1727.777324	2928.610616	0	0			
Contra Costa	2014 Annual	T7 utility	DSL	Aggregated	Aggregated	33	0.1%	814	0.0%	0	1755.355813	8488.4779	0	1729.025476	8361.150734	0	0			
Contra Costa	2014 Annual	T7IS	GAS	Aggregated	Aggregated	76	0.2%	8,963	0.4%	1,516	584.6674306	0	1487.453283	575.8974192	0	1465.141483	0			
Contra Costa	2014 Annual	UBUS	GAS	Aggregated	Aggregated	75	0.2%	9,951	0.5%	299	744.1870674	0	596.1314986	733.0242614	0	587.1895261	0			
Contra Costa	2014 Annual	UBUS	DSL	Aggregated	Aggregated	247	0.6%	32,905	1.5%	987	2519.191285	0	0	2481.403415	0	0	0			
Contra Costa	2014 Annual	All Other Buses	DSL	Aggregated	Aggregated	128	0.3%	6,941	0.3%	0	1201.198101	680.421704	0	1183.180129	670.2153785	0	0			
							40,816	100.0%	2,163,682	1	453,132									
									Mi/Veh	53.01120191										

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.1199516	0	574.1639516	730.9881523	0	565.5514923
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.791888	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.661106	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.417677	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.744477	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.790674	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.433845	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.201902	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.4460281	251.580107	1290.514347	667.2843377	247.806405	1271.156632
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.933742	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.716237	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.975339	20346.1753	0	1724.710709	20040.98263	0

Emission Estimate Without Pavley and LCFS 2014

	VMT Fraction	San Ramon Miles/Day		San Ramon Miles/Day/Veh		San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day
		Passenger	Non-Passenger	Class	(gms/mile)	gms/day	Fraction				
LHD1	0.329	230.604	75,826	972.10948	73,710,930	0.427	1,856	116.3644594	855.1008506	1,803,039.3	
LHD1	0.160	230.604	36,831	524.92976	19,333,672	0.207	901	141.753403	0	127,676.2	
LHD2	0.024	230.604	5,487	972.10952	5,334,005	0.031	135	116.3644579	877.9385985	134,335.4	
LHD2	0.042	230.604	9,654	523.88467	5,057,559	0.054	235	141.7534172	0	33,267.5	
Motor Coach	0.003	230.604	750	1756.8759	1,318,103	0.001	5	11800.58058	0	61,830.9	
OBUS	0.010	230.604	2,238	677.44602	1,516,119	0.010	44	407.4009186	1728.738493	93,920.7	
PTO	0.000	230.604	92	2157.3056	197,778	0.000	0	0	0	0.0	
SBUS	0.002	230.604	477	742.11995	353,729	0.002	11	0	574.1639516	6,092.6	
SBUS	0.001	230.604	345	1299.958	448,187	0.037	163	3744.833697	0	609,029.9	
T6 Ag	0.001	230.604	194	1198.7919	231,980	0.001	6	647.5844384	0	3,757.9	
T6 Public	0.003	230.604	607	1201.6611	729,922	0.008	33	714.8753193	0	23,442.4	
T6 CAIRP heavy	0.000	230.604	14	1189.3871	16,159	0.000	0	727.8571769	0	159.2	
T6 CAIRP small	0.000	230.604	44	1182.8136	52,478	0.000	1	738.6620329	0	468.9	
T6 OOS heavy	0.000	230.604	8	1189.3871	9,264	0.000	0	727.8571769	0	91.3	
T6 OOS small	0.000	230.604	25	1182.8136	30,087	0.000	0	738.6620329	0	268.8	
T6 instate construction heavy	0.004	230.604	868	1197.4177	1,039,275	0.004	17	706.6936954	0	11,665.8	
T6 instate construction small	0.010	230.604	2,252	1185.7445	2,670,535	0.008	35	727.319448	0	25,687.2	
T6 instate heavy	0.024	230.604	5,441	1195.7907	6,506,663	0.023	101	708.2547878	0	71,779.2	
T6 instate small	0.063	230.604	14,580	1184.4338	17,269,608	0.052	224	728.6662323	0	163,543.9	
T6 utility	0.000	230.604	101	1195.2019	120,904	0.001	5	742.1821582	0	3,813.0	
T6TS	0.020	230.604	4,561	677.44603	3,090,112	0.023	100	251.5801066	1290.514347	154,022.4	
T7 Ag	0.003	230.604	705	1765.9337	1,244,322	0.002	10	2297.662967	0	23,703.0	
T7 CAIRP	0.039	230.604	9,026	1749.7162	15,793,039	0.009	39	20670.35604	0	815,383.7	
T7 CAIRP construction	0.000	230.604	60	1750.9753	104,838	0.001	4	20346.17526	0	77,074.4	
T7 NNOOS	0.044	230.604	10,154	1732.4136	17,590,888	0.009	38	32190.86273	0	1,219,734.7	
T7 NOOS	0.014	230.604	3,287	1750.0283	5,752,449	0.003	14	25645.56493	0	368,413.9	
T7 other port	0.004	230.604	944	1772.2284	1,672,787	0.001	6	5714.692888	0	34,495.9	
T7 POAK	0.018	230.604	4,136	1772.2284	7,329,795	0.006	26	9479.447412	0	251,174.0	
T7 POLA	0.000	230.604	0	0	0	0.000	0	0	0	0.0	
T7 Public	0.002	230.604	530	1783.811	946,212	0.005	21	8323.908963	0	177,650.4	
T7 Single	0.024	230.604	5,474	1750.3609	9,581,889	0.017	73	2889.455626	0	212,113.2	
T7 single construction	0.010	230.604	2,220	1751.1998	3,887,570	0.007	30	2842.464083	0	85,394.6	
T7 SWCV	0.006	230.604	1,444	1764.0569	2,546,677	0.007	29	8425.749797	0	242,824.2	
T7 tractor	0.072	230.604	16,490	1755.7352	28,951,549	0.024	105	3023.863461	0	318,522.5	
T7 tractor construction	0.007	230.604	1,655	1754.0887	2,903,252	0.005	22	2973.208747	0	64,791.2	
T7 utility	0.000	230.604	87	1755.3558	152,379	0.001	3	8488.477903	0	29,578.8	
T7IS	0.004	230.604	955	584.66743	558,505	0.002	8	0	1487.453283	12,007.9	
UBUS	0.005	230.604	1,061	744.18707	789,278	0.002	8	0	596.1314986	4,742.6	
UBUS	0.015	230.604	3,507	2519.1913	8,834,857	0.006	26	0	0	0.0	
All Other Buses	0.003	230.604	740	1201.1981	888,592	0.003	14	680.421704	0	9,251.2	
			248,565,947		1,000		4,350			7,274,748.4	

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.1199516	0	574.1639516	730.9881523	0	565.5514923
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.791888	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.661106	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.417677	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.744477	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.790674	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.433845	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.201902	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.4460281	251.580107	1290.514347	667.2843377	247.806405	1271.156632
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.933742	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.716237	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.975339	20346.1753	0	1724.710709	20040.98263	0

San Ramon Vehicles

Avg Miles		Vehicles	
VMT	CCC		
230,604	53	4,350	

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
248,565,947	7,274,748	255,840,696	907184.7	282.02	102,935.9

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.1199516	0	574.1639516	730.9881523	0	565.5514923
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.791888	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.661106	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.417677	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate cons	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.744477	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.790674	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.433845	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.201902	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.4460281	251.580107	1290.514347	667.2843377	247.806405	1271.156632
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.933742	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.716237	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.975339	20346.1753	0	1724.710709	20040.98263	0

Emission Estimate With Pavley and LCFS 2014

	VMT Fraction	San Ramon Miles/Day			gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/d ay)	Starting Emissions (g/veh/day)	g/day
		Non-Passenger	Miles/Day/Veh Class	(gms/mile)						
LHD1	0.329	230.604	75,826	957.52784	72,605,266	0.427	1,856	114.6189925	842.2743379	1,775,993.7
LHD1	0.160	230.604	36,831	517.05582	19,043,667	0.207	901	139.627102	0	125,761.0
LHD2	0.024	230.604	5,487	957.52787	5,253,995	0.031	135	114.618991	864.7695195	132,320.3
LHD2	0.042	230.604	9,654	516.0264	4,981,696	0.054	235	139.6271159	0	32,768.5
Motor Coach	0.003	230.604	750	1730.5227	1,298,332	0.001	5	11623.57187	0	60,903.4
OBUS	0.010	230.604	2,238	667.28433	1,493,377	0.010	44	401.2899048	1702.807416	92,511.9
PTO	0.000	230.604	92	2124.946	194,811	0.000	0	0	0	0.0
SBUS	0.002	230.604	477	730.98815	348,423	0.002	11	0	565.5514923	6,001.3
SBUS	0.001	230.604	345	1280.4586	441,464	0.037	163	3688.661192	0	599,894.5
T6 Ag	0.001	230.604	194	1180.81	228,500	0.001	6	637.8706719	0	3,701.5
T6 Public	0.003	230.604	607	1183.6362	718,973	0.008	33	704.1521895	0	23,090.8
T6 CAIRP heavy	0.000	230.604	14	1171.5463	15,917	0.000	0	716.9393193	0	156.8
T6 CAIRP small	0.000	230.604	44	1165.0714	51,691	0.000	1	727.5821024	0	461.8
T6 OOS heavy	0.000	230.604	8	1171.5463	9,126	0.000	0	716.9393193	0	89.9
T6 OOS small	0.000	230.604	25	1165.0714	29,636	0.000	0	727.5821024	0	264.8
T6 instate construction heavy	0.004	230.604	868	1179.4564	1,023,686	0.004	17	696.0932899	0	11,490.8
T6 instate construction small	0.010	230.604	2,252	1167.9583	2,630,477	0.008	35	716.4096563	0	25,301.9
T6 instate heavy	0.024	230.604	5,441	1177.8538	6,409,063	0.023	101	697.630966	0	70,702.5
T6 instate small	0.063	230.604	14,580	1166.6673	17,010,564	0.052	224	717.7362388	0	161,090.7
T6 utility	0.000	230.604	101	1177.2739	119,090	0.001	5	731.0494258	0	3,755.9
T6TS	0.020	230.604	4,561	667.28434	3,043,761	0.023	100	247.806405	1271.156632	151,712.0
T7 Ag	0.003	230.604	705	1739.4447	1,225,657	0.002	10	2263.198023	0	23,347.5
T7 CAIRP	0.039	230.604	9,026	1723.4705	15,556,143	0.009	39	20360.3007	0	803,152.9
T7 CAIRP construction	0.000	230.604	60	1724.7107	103,266	0.001	4	20040.98263	0	75,918.2
T7 NNOOS	0.044	230.604	10,154	1706.4274	17,327,024	0.009	38	31707.99979	0	1,201,438.7
T7 NOOS	0.014	230.604	3,287	1723.7778	5,666,162	0.003	14	25260.88146	0	362,887.6
T7 other port	0.004	230.604	944	1745.645	1,647,696	0.001	6	5628.972495	0	33,978.4
T7 POAK	0.018	230.604	4,136	1745.645	7,219,848	0.006	26	9337.255701	0	247,406.3
T7 POLA	0.000	230.604	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	230.604	530	1757.0538	932,019	0.005	21	8199.050329	0	174,985.6
T7 Single	0.024	230.604	5,474	1724.1055	9,438,161	0.017	73	2846.113792	0	208,931.5
T7 single construction	0.010	230.604	2,220	1724.9318	3,829,256	0.007	30	2799.827122	0	84,113.7
T7 SWCV	0.006	230.604	1,444	1737.596	2,508,477	0.007	29	8299.36355	0	239,181.8
T7 tractor	0.072	230.604	16,490	1729.3992	28,517,276	0.024	105	2978.505509	0	313,744.7
T7 tractor construction	0.007	230.604	1,655	1727.7773	2,859,703	0.005	22	2928.610616	0	63,819.3
T7 utility	0.000	230.604	87	1729.0255	150,093	0.001	3	8361.150734	0	29,135.1
T7IS	0.004	230.604	955	575.89742	550,128	0.002	8	0	1465.141483	11,827.8
UBUS	0.005	230.604	1,061	733.02426	777,439	0.002	8	0	587.1895261	4,671.5
UBUS	0.015	230.604	3,507	2481.4034	8,702,334	0.006	26	0	0	0.0
All Other Buses	0.003	230.604	740	1183.1801	875,263	0.003	14	670.2153785	0	9,112.4
					244,837,458	1.000	4,350			7,165,627.2

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.1199516	0	574.1639516	730.9881523	0	565.5514923
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.791888	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.661106	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.387124	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.813615	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.417677	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate consi	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.744477	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.790674	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.433845	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.201902	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.4460281	251.580107	1290.514347	667.2843377	247.806405	1271.156632
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.933742	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.716237	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.975339	20346.1753	0	1724.710709	20040.98263	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
230,604	6,941	33,2240443

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
244,837,458	7,165,627	252,003,085	907184.7	277.8	101,392

Community Greenhouse Gas Inventory

Energy

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.412	PG&E 2014 emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	186,714,088	2,610	38463	2.9	1.0	35,238
Commercial	178,277,122	7,503	36725	2.8	1.0	33,645
City/County/Dist	19,672,661		4053	0.3	0.1	3,713
Total	384,663,870		79,241	6.0	2.1	72,596

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,960,760	164	75,820	7.1	0.1	68,960
Commercial	5,991,826	130	35,052	3.3	0.1	31,881
City/Co/Dist	404,430		2,366	0.2	0.0	2,152
Total	19,357,015		113,239	10.6	0.2	102,993

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: PG&E Third Party Verified Rate for 2013.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area		66,413	73,595	78,820	83,778	96,174
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,087,008	1,019	0.1600	0.0100	930
San Ramon Planning Ar Percent San Ramon/Contra Costa County	78,820 7.3%	74	0	0	67

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,087,008	920	0.360	0.08000	864
San Ramon Planning Ar Percent San Ramon/Contra Costa County	78,820 7.3%	67	0	0	63

Total San Ramon 130

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	22.68
Population	38,340,074
Emissions (MTCO ₂ e per person)	0.59

San Ramon

Population	78,820
Emissions (MTCO ₂ e per person)	46,626
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population from: DOF Report E-2

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2014 Assumptions

	2008	2014
Planning Area Population	66,413	78,820
Water Usage (163 gallons/day)	10,840,000	12,847,660
Water Usage (million gallons/year)	3957	4689
Energy Usage (kWh)	21,409,163	25,374,321
Energy Usage (MWh)	21,409	25,374

Year 2014 Emissions

Greenhouse Gas	Electricity	2014	2014	2014
	Emission Factor (pounds per MWh)	Emissions (pounds/year)	Emissions (tons/year)	Emissions MTCO _{2e}
Carbon dioxide	412	10,454,220	5,227	4,742.0
Methane	0.031	786.60	0.393	7.5
Nitrous oxide	0.011	279.12	0.140	39.2
				4,788.8

Source for electricity emission factor:

California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 3.1, January 2009. Table C.2.

www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Source for electricity requirements:

Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.

www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for 2008 and 2030 population estimates: City of San Ramon General Plan (2010). Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory BAU

Summary

Year: 2020

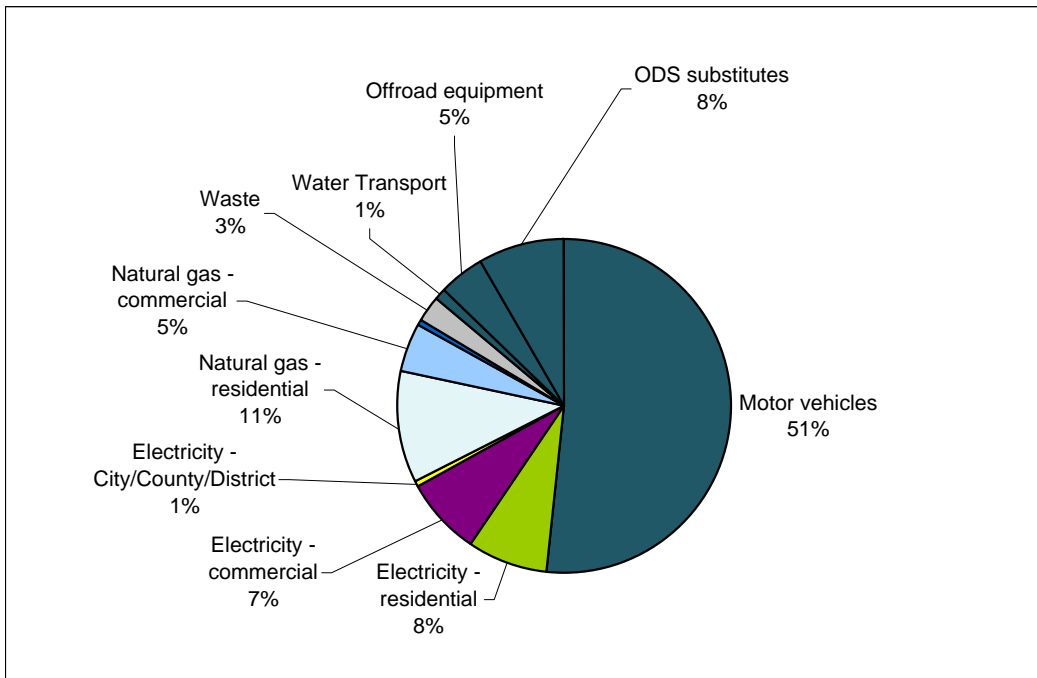
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	83,778	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,147,399	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO2e
Motor vehicles	355,931
Electricity - residential	53,873
Electricity - commercial	51,445
Electricity - City/County/District	5,677
Natural gas - residential	73,232
Natural gas - commercial	33,856
Natural gas - City/County/District	2,285
Waste	17,762
Water Transport	7,329
Offroad equipment	31,243
ODS substitutes	57,705
Total	690,338



Community Greenhouse Gas Inventory

Waste BAU

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 39,045

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	17,762	
Emissions (MTCO ₂ e/person)	0.2120	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 22, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		37,053		36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,840,475 Source: MTC. 2014
Vehicle miles traveled / year 671,773,375 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	298,571.5	270,859.5
Non Passenger Vehicles	93,775.5	85,071.7
	392,347.0	355,931.2

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	298,571.5	270,859.5
Non Passenger Vehicles	92,035.9	83,493.5
	390,607.4	354,353.1

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2020 BAU

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT		CO2_RUNEX	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/d ay)
									Fraction	Trips				
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)				
Contra Costa	2005 Annual	LDA	GAS	Aggregated	Aggregated		364,791	13,297,779	0.543	2,291,334	332.5838917	460.3646763	332.5838917	460.3646763
Contra Costa	2005 Annual	LDA	DSL	Aggregated	Aggregated		2,017	55,051	0.002	11,729	362.249441	0	362.249441	0
Contra Costa	2005 Annual	LDT1	GAS	Aggregated	Aggregated		45,393	1,668,570	0.068	278,461	380.6486469	527.1606221	380.6486469	527.1606221
Contra Costa	2005 Annual	LDT1	DSL	Aggregated	Aggregated		103	3,050	0.000	590	373.5873232	0	373.5873232	0
Contra Costa	2005 Annual	LDT2	GAS	Aggregated	Aggregated		115,717	4,868,196	0.199	736,797	455.8272576	633.3019897	455.8272576	633.3019897
Contra Costa	2005 Annual	LDT2	DSL	Aggregated	Aggregated		87	2,732	0.000	496	372.2726309	0	372.2726309	0
Contra Costa	2005 Annual	MDV	GAS	Aggregated	Aggregated		98,972	4,570,428	0.187	635,720	570.5037165	792.1227449	570.5037165	792.1227449
Contra Costa	2005 Annual	MDV	DSL	Aggregated	Aggregated		95	2,745	0.000	550	368.5728982	0	368.5728982	0
							627,174	24,468,550	1.000					
								avg miles/vehicle						
														39.0139465

Emission Estimate Without Pavley and LCFS

	VMT Fraction	SR VMT	CO2_RUN EX		Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day
			Miles/Day/Veh	Class				
LDA	0.573	1,613,398	924,137	332.58389	307,353,150	41,354	460.3646763	19,038,101
LDA	0.002	1,613,398	3,857	362.24944	1,397,126	41,354	0	0
LDT1	0.071	1,613,398	114,749	380.64865	43,679,133	41,354	527.1606221	21,800,407
LDT1	0.000	1,613,398	146	373.58732	54,410	41,354	0	0
LDT2	0.192	1,613,398	310,302	455.82726	141,444,105	41,354	633.3019897	26,189,818
LDT2	0.000	1,613,398	147	372.27263	54,891	41,354	0	0
MDV	0.161	1,613,398	259,797	570.50372	148,215,300	41,354	792.1227449	32,757,754
MDV	0.000	1,613,398	262	368.5729	96,726	41,354	0	0
Total Passenger Vehicle Emissions					642,294,841			99,786,079

San Ramon Vehicles 2020

VMT	Avg Miles/Day	CCC	Vehicles
1,613,398	39		41,354

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
642,294,841	99,786,079	742,080,920	907184.7	818.0	298,571.5

Emission Estimate With Pavley and LCFS

	VMT Fraction	SR VMT	CO2_RUN EX(Pavley I+LCFS)		Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicleday)
			Miles/Day/Veh	Class				
LDA	0.573	1,613,398	924,137	332.58389	307,353,150	41,354	460.3646763	19,038,101
LDA	0.002	1,613,398	3,857	362.24944	1,397,126	41,354	0	0
LDT1	0.071	1,613,398	114,749	380.64865	43,679,133	41,354	527.1606221	21,800,407
LDT1	0.000	1,613,398	146	373.58732	54,410	41,354	0	0
LDT2	0.192	1,613,398	310,302	455.82726	141,444,105	41,354	633.3019897	26,189,818
LDT2	0.000	1,613,398	147	372.27263	54,891	41,354	0	0
MDV	0.161	1,613,398	259,797	570.50372	148,215,300	41,354	792.1227449	32,757,754
MDV	0.000	1,613,398	262	368.5729	96,726	41,354	0	0
Total Passenger Vehicle Emissions					642,294,841			99,786,079

San Ramon Vehicles

VMT	Avg Miles/Day	CCC	Vehicles
1,613,398	39		41,354

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
642,294,841	99,786,079	742,080,920	907184.7	818.0	298,572

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2020 BAU
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX		
												X	CO2_IDLEX		(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)		
												(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)				
												(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)				
												(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2005 Annual	LHD1	GAS	Aggregated	Aggregated		15,365	41.3%	686,475	29.5%	269,190	972.1094988	116.364456	819.7728342	972.1094988	116.3644561	819.7728342		
Contra Costa	2005 Annual	LHD1	DSL	Aggregated	Aggregated		8,125	21.8%	399,468	17.2%	110,294	532.3059325	141.748251	0	532.3059325	141.7482507	0		
Contra Costa	2005 Annual	LHD2	GAS	Aggregated	Aggregated		1,322	3.6%	56,240	2.4%	19,711	972.1095363	116.338965	1045.68254	972.1095363	116.338965	1045.68254		
Contra Costa	2005 Annual	LHD2	DSL	Aggregated	Aggregated		1,772	4.8%	86,342	3.7%	28,908	535.0134187	141.753311	0	535.0134187	141.7533106	0		
Contra Costa	2005 Annual	Motor Coach	DSL	Aggregated	Aggregated		48	0.1%	8,163	0.4%	0	1745.971421	11338.6466	0	1745.971421	11338.64661	0		
Contra Costa	2005 Annual	OBUS	GAS	Aggregated	Aggregated		376	1.0%	20,858	0.9%	20,022	677.4460346	407.400915	1962.23896	677.4460346	407.4009152	1962.23896		
Contra Costa	2005 Annual	PTO	DSL	Aggregated	Aggregated		0	0.0%	15,087	0.6%	0	2183.103618		0	2183.103618		0		
Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated		93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159		
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated		1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0		
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated		62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0		
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated		297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0		
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated		2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0		
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated		6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0		
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated		1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0		
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated		3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0		
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated		105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0		
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated		247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0		
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated		811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0		
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated		1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0		
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated		43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0		
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated		831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808		
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated		112	0.3%	6,717	0.3%	0	1780.239104	2354.91590	0	1780.239104	2354.915902	0		
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated		311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0		
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated		25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0		
Contra Costa	2005 Annual	T7 NNOOS	DSL	Aggregated	Aggregated		306	0.8%	116,836	5.0%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0		
Contra Costa	2005 Annual	T7 NOOS	DSL	Aggregated	Aggregated		113	0.3%	37,822	1.6%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0		
Contra Costa	2005 Annual	T7 other port	DSL	Aggregated	Aggregated		58	0.2%	10,077	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0		
Contra Costa	2005 Annual	T7 POAK	DSL	Aggregated	Aggregated		249	0.7%	54,852	2.4%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0		
Contra Costa	2005 Annual	T7 POLA	DSL	Aggregated	Aggregated		0	0.0%	0	0.0%	0			0			0		
Contra Costa	2005 Annual	T7 Public	DSL	Aggregated	Aggregated		197	0.5%	5,803	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0		
Contra Costa	2005 Annual	T7 Single	DSL	Aggregated	Aggregated		591	1.6%	62,989	2.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0		
Contra Costa	2005 Annual	T7 single consti	DSL	Aggregated	Aggregated		204	0.5%	16,908	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0		
Contra Costa	2005 Annual	T7 SWCV	DSL	Aggregated	Aggregated		266	0.7%	15,794	0.7%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0		
Contra Costa	2005 Annual	T7 tractor	DSL	Aggregated	Aggregated		811	2.2%	189,737	8.2%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0		
Contra Costa	2005 Annual	T7 tractor const	DSL	Aggregated	Aggregated		143	0.4%	12,606	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0		
Contra Costa	2005 Annual	T7 utility	DSL	Aggregated	Aggregated		30	0.1%	931	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0		
Contra Costa	2005 Annual	T7IS	GAS	Aggregated	Aggregated		74	0.2%	8,511	0.4%	1,411	584.6674163	0	2353.967488	584.6674163	0	2353.967488		
Contra Costa	2005 Annual	UBUS	GAS	Aggregated	Aggregated		64	0.2%	10,312	0.4%	309	744.1870709	0	615.0541717	744.1870709	0	615.0541717		
Contra Costa	2005 Annual	UBUS	DSL	Aggregated	Aggregated		235	0.6%	34,097	1.5%	1,023	2573.001593	0	0	2573.001593	0	0		
Contra Costa	2005 Annual	All Other Buses	DSL	Aggregated	Aggregated		121	0.3%	7,975	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0		
							37,215	100.0%	2,326,162	1	470,931								
									Mi/Veh										
									62.50593239										

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate consl	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate consl	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS

	VMT Fraction	San Ramon		Run Emis (gms/mile)	Run Emis gms/day	San Ramon		Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day
		Miles/Day Non-Passenger	Miles/Day/Veh Class			Pop	Vehicle Population			
LHD1	0.423	227,077	96,159	972.1095	93,477,110	42.3%	1,840	116.3644561	819.7728342	1,722,535.8
LHD1	0.206	227,077	46,665	532.30593	24,839,905	11.2%	489	141.7482507	0	69,309.2
LHD2	0.031	227,077	7,041	972.10954	6,844,698	3.1%	135	116.338965	1045.68254	156,564.0
LHD2	0.054	227,077	12,231	535.01342	6,543,636	3.0%	129	141.7533106	0	18,258.9
Motor Coach	0.001	227,077	303	1745.9714	529,389	0.2%	10	11338.64661	0	118,157.1
OBUS	0.010	227,077	2,333	677.44603	1,580,637	0.7%	31	407.4009152	1962.23896	73,728.9
PTO	0.000	227,077	0	2183.1036	0	0.0%	0	0	0	0.0
SBUS	0.002	227,077	549	742.11995	407,482	0.2%	8	0	788.3524159	6,323.4
SBUS	0.036	227,077	8,095	1299.9836	10,523,493	4.8%	207	3474.936051	0	719,830.4
T6 Ag	0.001	227,077	294	1214.0161	357,347	0.2%	7	591.9178211	0	4,163.7
T6 Public	0.008	227,077	1,901	1210.2525	2,300,537	1.0%	45	636.79636	0	28,837.2
T6 CAIRP heavy	0.000	227,077	11	1194.1438	13,724	0.0%	0	666.3500758	0	180.0
T6 CAIRP small	0.000	227,077	35	1187.5142	41,759	0.0%	1	693.3277468	0	569.9
T6 OOS heavy	0.000	227,077	7	1194.1438	7,868	0.0%	0	666.3500758	0	103.2
T6 OOS small	0.000	227,077	20	1187.5142	23,941	0.0%	0	693.3277468	0	326.7
T6 instate construction heavy	0.003	227,077	638	1206.7402	770,068	0.3%	15	628.1342767	0	9,521.5
T6 instate construction small	0.006	227,077	1,386	1190.6752	1,650,663	0.7%	32	671.5227753	0	21,819.4
T6 instate heavy	0.023	227,077	5,271	1206.7402	6,361,029	2.9%	125	628.1342767	0	78,650.8
T6 instate small	0.054	227,077	12,161	1190.6752	14,479,506	6.6%	285	671.5227753	0	191,398.2
T6 utility	0.001	227,077	290	1190.3417	344,800	0.2%	7	669.3517103	0	4,543.0
T6TS	0.023	227,077	5,227	677.44602	3,541,101	1.6%	70	251.5801036	1824.797808	144,733.2
T7 Ag	0.002	227,077	533	1780.2391	949,030	0.4%	19	2354.915902	0	43,992.5
T7 CAIRP	0.010	227,077	2,243	1740.7084	3,904,222	1.8%	77	29278.79509	0	2,250,148.5
T7 CAIRP construction	0.001	227,077	142	1740.7084	246,583	0.1%	5	29278.79509	0	142,114.9
T7 NNOOS	0.010	227,077	2,210	1736.3283	3,837,338	1.7%	76	37700.75308	0	2,847,760.6
T7 NOOS	0.004	227,077	817	1740.7084	1,421,819	0.6%	28	37153.84079	0	1,039,851.5
T7 other port	0.002	227,077	343	1728.3376	592,815	0.3%	12	4421.893594	0	51,600.1
T7 POAK	0.007	227,077	1,601	1732.4648	2,774,051	1.3%	55	6989.078773	0	381,643.4
T7 POLA	0.000	227,077	0	0	0	0.0%	0	0	0	0.0
T7 Public	0.005	227,077	1,243	1806.7866	2,246,027	1.0%	44	7861.899623	0	347,588.9
T7 Single	0.019	227,077	4,319	1771.2925	7,650,879	3.5%	151	2423.170701	0	364,937.7
T7 single construction	0.005	227,077	1,171	1771.2925	2,074,513	0.9%	41	2423.170701	0	98,951.8
T7 SWCV	0.007	227,077	1,678	1777.5297	2,982,862	1.3%	59	8016.434181	0	470,693.1
T7 tractor	0.027	227,077	6,193	1754.4508	10,865,625	4.9%	214	2452.592201	0	524,570.0
T7 tractor construction	0.004	227,077	851	1756.0931	1,494,674	0.7%	29	2452.592201	0	72,159.8
T7 utility	0.001	227,077	199	1757.3339	349,429	0.2%	7	8116.295492	0	55,826.5
T7IS	0.002	227,077	375	584.66742	219,378	0.1%	4	0	2353.967488	10,165.2
UBUS	0.002	227,077	412	744.18707	306,353	0.1%	6	0	615.0541717	3,709.0
UBUS	0.006	227,077	1,361	2573.0016	3,502,434	1.6%	69	0	0	0.0
All Other Buses	0.003	227,077	767	1211.582	929,820	0.4%	18	615.1471436	0	11,259.0
		227,077			220,986,545	1.000	4,350			12,086,527.3

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
227,077	63	3,633

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
220,986,545	12,086,527	233,073,072	907184.7	256.92	93,775.5

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.93605	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2005 Annual	T6 instate cons	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2005 Annual	T6 instate cons	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.35171	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate With Pavley and LCFS

	San Ramon Miles/Day				San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/d ay)	Starting Emissions (g/veh/d)	g/day
	VMT Fraction	Non-Passenger	Miles/Day/Veh Class	Run Emis (gms/mile)	gms/day	Fraction				
LHD1	0.423	227,077	96,159	972.1095	93,476,997	0.427	1,856	116.3644561	819.7728342	1,737,470.5
LHD1	0.206	227,077	46,665	532.30593	24,839,875	0.207	901	141.7482507	0	127,671.5
LHD2	0.031	227,077	7,041	972.10954	6,844,690	0.031	135	116.338965	1045.68254	156,995.0
LHD2	0.054	227,077	12,231	535.01342	6,543,628	0.054	235	141.7533106	0	33,267.5
Motor Coach	0.001	227,077	303	1745.9714	529,389	0.001	5	11338.64661	0	59,410.5
OBUS	0.010	227,077	2,333	677.44603	1,580,635	0.010	44	407.4009152	1962.23896	104,187.1
PTO	0.000	227,077	0	2183.1036	0	0.000	0	0	0	0.0
SBUS	0.002	227,077	549	742.11995	407,481	0.002	11	0	788.3524159	8,365.5
SBUS	0.036	227,077	8,095	1299.9836	10,523,481	0.037	163	3474.936051	0	565,135.9
T6 Ag	0.001	227,077	294	1214.0161	357,346	0.001	6	591.9178211	0	3,434.9
T6 Public	0.008	227,077	1,901	1210.2525	2,300,534	0.008	33	636.79636	0	20,882.0
T6 CAIRP heavy	0.000	227,077	11	1194.1438	13,724	0.000	0	666.3500758	0	145.8
T6 CAIRP small	0.000	227,077	35	1187.5142	41,759	0.000	1	693.3277468	0	440.1
T6 OOS heavy	0.000	227,077	7	1194.1438	7,868	0.000	0	666.3500758	0	83.6
T6 OOS small	0.000	227,077	20	1187.5142	23,941	0.000	0	693.3277468	0	252.3
T6 instate construction heavy	0.003	227,077	638	1206.7402	770,067	0.004	17	628.1342767	0	10,369.0
T6 instate construction small	0.006	227,077	1,386	1190.6752	1,650,661	0.008	35	671.5227753	0	23,716.6
T6 instate heavy	0.023	227,077	5,271	1206.7402	6,361,022	0.023	101	628.1342767	0	63,659.2
T6 instate small	0.054	227,077	12,161	1190.6752	14,479,488	0.052	224	671.5227753	0	150,718.4
T6 utility	0.001	227,077	290	1190.3417	344,800	0.001	5	669.3517103	0	3,438.9
T6TS	0.023	227,077	5,227	677.44602	3,541,097	0.023	100	251.5801036	1824.797808	207,385.9
T7 Ag	0.002	227,077	533	1780.2391	949,029	0.002	10	2354.915902	0	24,293.7
T7 CAIRP	0.010	227,077	2,243	1740.7084	3,904,218	0.009	39	29278.79509	0	1,154,960.8
T7 CAIRP construction	0.001	227,077	142	1740.7084	246,583	0.001	4	29278.79509	0	110,912.5
T7 NNOOS	0.010	227,077	2,210	1736.3283	3,837,333	0.009	38	37700.75308	0	1,428,508.4
T7 NOOS	0.004	227,077	817	1740.7084	1,421,817	0.003	14	37153.84079	0	533,737.1
T7 other port	0.002	227,077	343	1728.3376	592,814	0.001	6	4421.893594	0	26,692.1
T7 POAK	0.007	227,077	1,601	1732.4648	2,774,047	0.006	26	6989.078773	0	185,187.4
T7 POLA	0.000	227,077	0	0	0	0.000	0	0	0	0.0
T7 Public	0.005	227,077	1,243	1806.7866	2,246,024	0.005	21	7861.899623	0	167,790.1
T7 Single	0.019	227,077	4,319	1771.2925	7,650,870	0.017	73	2423.170701	0	177,883.5
T7 single construction	0.005	227,077	1,171	1771.2925	2,074,510	0.007	30	2423.170701	0	72,798.0
T7 SWCV	0.007	227,077	1,678	1777.5297	2,982,858	0.007	29	8016.434181	0	231,028.0
T7 tractor	0.027	227,077	6,193	1754.4508	10,865,612	0.024	105	2452.592201	0	258,347.0
T7 tractor construction	0.004	227,077	851	1756.0931	1,494,672	0.005	22	2452.592201	0	53,446.1
T7 utility	0.001	227,077	199	1757.3339	349,429	0.001	3	8116.295492	0	28,281.9
T7IS	0.002	227,077	375	584.66742	219,376	0.002	8	0	2353.967488	19,003.2
UBUS	0.002	227,077	412	744.18707	306,352	0.002	8	0	615.0541717	4,893.2
UBUS	0.006	227,077	1,361	2573.0016	3,502,429	0.006	26	0	0	0.0
All Other Buses	0.003	227,077	767	1211.582	929,819	0.003	14	615.1471436	0	8,363.7
					220,986,278	1.000	4,350			7,763,156.6

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
227,077	7,975	28,4739308

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
220,986,278	7,763,157	228,749,434	907184.7	252.2	92,036

Community Greenhouse Gas Inventory

Energy

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.595	PG&E Avg emission factor for 2003-2005
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	198,256,428	2,366	58981	3.1	1.1	53,873
Commercial	189,321,345	4,117	56323	2.9	1.0	51,445
City/County/Dist	20,891,377		6215	0.3	0.1	5,677
Total	408,469,149		121,520	6.3	2.2	110,995

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	13,763,675	164	80,517	7.6	0.2	73,232
Commercial	6,363,018	138	37,224	3.5	0.1	33,856
City/Co/Dist	429,484		2,512	0.2	0.0	2,285
Total	20,556,177		120,254	11.3	0.2	109,373

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population			1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction			0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)			29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,147,399	1,019	0.1600	0.0100	930
San Ramon Planning Area	83,778	74	0	0	68
Percent San Ramon/Contra Costa County	7.3%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,147,399	920	0.360	0.08000	864
San Ramon Planning Area	83,778	67	0	0	63
Percent San Ramon/Contra Costa County	7.3%				

Total San Ramon 131

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	83,778
Emissions (MTCO ₂ e per person)	57,705
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2020 Assumptions

	2008	2020
Planning Area Population	66,413	83,778
Water Usage (163 gallons/day)	10,840,000	13,655,814
Water Usage (million gallons/year)	3957	4984
Energy Usage (kWh)	21,409,163	26,970,437
Energy Usage (MWh)	21,409	26,970

Year 2020 Emissions

Greenhouse Gas	Electricity	2020	2020	2020
	Emission Factor (pounds per MWh)	Emissions (pounds/year)	Emissions (tons/year)	Emissions MTCO2e
Carbon dioxide	595	16,047,410	8,024	7,279.1
Methane	0.031	836.08	0.418	8.0
Nitrous oxide	0.011	296.67	0.148	41.7
				7,328.8

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update. Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2020

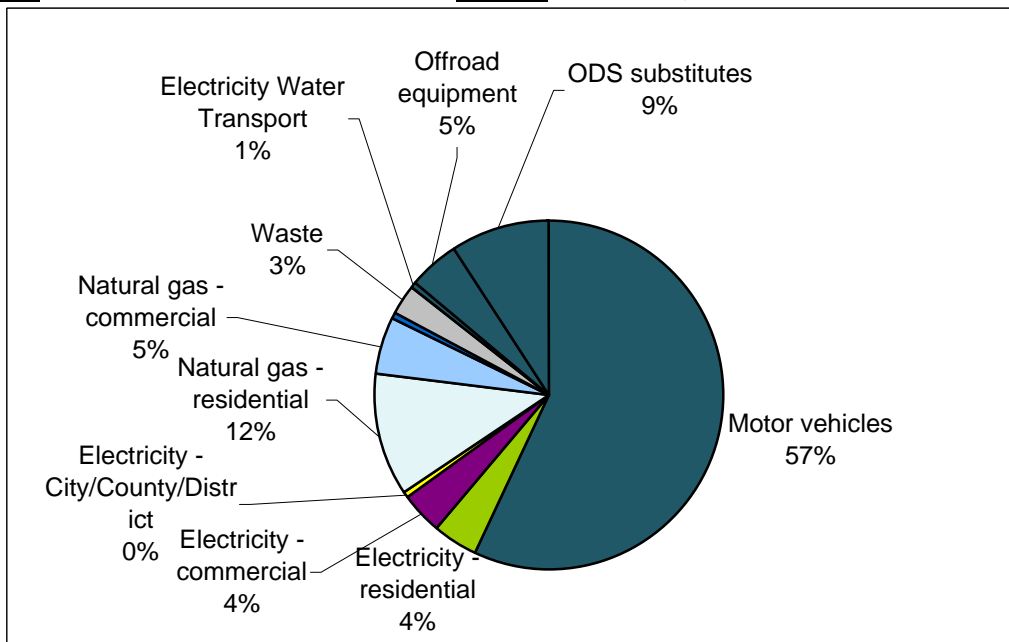
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	83,778	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,147,399	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCs
Motor vehicles	361,946	279,012
Electricity - residential	26,448	26,448
Electricity - commercial	25,253	25,253
Electricity - City/County/District	2,787	2,787
Natural gas - residential	73,232	73,232
Natural gas - commercial	33,856	33,856
Natural gas - City/County/District	2,285	2,285
Waste	17,762	17,762
Electricity Water Transport	3,597	3,597
Offroad equipment	31,243	31,243
ODS substitutes	57,705	57,705
Total	636,114	553,180



Community Greenhouse Gas Inventory

Waste

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 39,045

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	17,762	
Emissions (MTCO ₂ e/person)	0.2120	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 22, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tons)	CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		37,053		36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

BAU

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		36,325		47,963	50,980	58,523
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.608516		0.6085155	0.608516	0.608516

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,840,475 Source: MTC. 2014
Vehicle miles traveled / year 671,773,375 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	305,377.3	277,033.6
Non Passenger Vehicles	93,599.8	84,912.3
	398,977.0	361,945.9

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	225,122.9	204,228.0
Non Passenger Vehicles	82,435.7	74,784.4
	307,558.6	279,012.4

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2020

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County

Region: Contra Costa

Calendar Year: 2020

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_STREX (gms/vehicle/day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
Contra Costa	2020 Annual	LDA	GAS	Aggregated	Aggregated	424,864	15,739,591	0.574	2,683,845	339,207,2834	466.9079454	234.101192	331.5940628	
Contra Costa	2020 Annual	LDA	DSL	Aggregated	Aggregated	1,891	66,079	0.002	11,610	356.1963401	0	251.8142547	0	
Contra Costa	2020 Annual	LDT1	GAS	Aggregated	Aggregated	52,604	1,965,850	0.072	318,897	391.92988	513.7250871	288.2225492	385.8435391	
Contra Costa	2020 Annual	LDT1	DSL	Aggregated	Aggregated	72	2,710	0.000	414	359.8396818	0	249.6266181	0	
Contra Costa	2020 Annual	LDT2	GAS	Aggregated	Aggregated	133,815	5,293,642	0.193	841,716	461.7171627	632.1206447	350.807208	487.7037508	
Contra Costa	2020 Annual	LDT2	DSL	Aggregated	Aggregated	64	2,506	0.000	397	356.6627213	0	266.1579475	0	
Contra Costa	2020 Annual	MDV	GAS	Aggregated	Aggregated	115,068	4,329,382	0.158	709,064	588.5344972	783.8767832	466.4589287	635.4455368	
Contra Costa	2020 Annual	MDV	DSL	Aggregated	Aggregated	115	4,387	0.000	694	357.7018445	0	280.1326541	0	
								728,594	27,404,150	1.000				
								avg miles/vehicle	37.6123898					

Emission Estimate Without Pavley and LCFS

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_STREX (gms/vehicle/day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
LDA	0.573	1,613,398	924,137	339,20728	313,474,073	42,895	466.9079454	20,028,197						
LDA	0.002	1,613,398	3,857	356.19634	1,373,780	42,895	0	0						
LDT1	0.071	1,613,398	114,749	391.92988	44,973,645	42,895	513.7250871	22,036,436						
LDT1	0.000	1,613,398	146	359.83968	52,408	42,895	0	0						
LDT2	0.192	1,613,398	310,302	461.71716	143,271,754	42,895	632.1206447	27,115,059						
LDT2	0.000	1,613,398	147	356.66272	52,589	42,895	0	0						
MDV	0.161	1,613,398	259,797	588.5345	152,899,648	42,895	783.8767832	33,624,698						
MDV	0.000	1,613,398	262	357.70184	93,873	42,895	0	0						
Total Passenger Vehicle Emissions								656,191,770	102,804,390					

San Ramon Vehicles 2020

VMT	Avg Miles/Day CCC	Vehicles
1,613,398	38	42,895

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
656,191,770	102,804,390	758,996,160	907184.7	836.7	305,377.3

Emission Estimate With Pavley and LCFS

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_STREX (gms/vehicle/day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
LDA	0.573	1,613,398	924,137	234.10119	216,341,623	42,895	331.5940628	14,223,856						
LDA	0.002	1,613,398	3,857	251.81425	971,199	42,895	0	0						
LDT1	0.071	1,613,398	114,749	288.22255	33,073,311	42,895	385.8435391	16,550,908						
LDT1	0.000	1,613,398	146	249.62662	36,356	42,895	0	0						
LDT2	0.192	1,613,398	310,302	350.80721	108,856,174	42,895	487.7037508	20,920,241						
LDT2	0.000	1,613,398	147	266.15795	39,244	42,895	0	0						
MDV	0.161	1,613,398	259,797	466.45893	121,184,750	42,895	635.4455368	27,257,682						
MDV	0.000	1,613,398	262	280.13265	73,517	42,895	0	0						
Total Passenger Vehicle Emissions								480,576,174	78,952,686					

San Ramon Vehicles

VMT	Avg Miles/Day CCC	Vehicles
1,613,398	38	42,895

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
480,576,174	78,952,686	559,528,860	907184.7	616.8	225,123

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2020
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX						
												X	(gms/vehicle/day)		(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)						
						(miles/hr)	(vehicles)	(miles/day)		(trips/day)		(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)						
Contra Costa	2020 Annual		LHD1	GAS	Aggregated	Aggregated	18,068	42.3%	728,377	31.3%	269,190	972.1094857	116.36445	871.8606874	874.8985371	104.7280049	784.6746186						
Contra Costa	2020 Annual		LHD1	DSL	Aggregated	Aggregated	8,768	20.6%	354,279	15.2%	110,294	521.8982407	141.753402	0	469.7084166	127.5780619	0						
Contra Costa	2020 Annual		LHD2	GAS	Aggregated	Aggregated	1,323	3.1%	53,254	2.3%	19,711	972.1095071	116.36445	876.0096681	874.8985564	104.7280048	788.4087013						
Contra Costa	2020 Annual		LHD2	DSL	Aggregated	Aggregated	2,298	5.4%	91,285	3.9%	28,908	521.4140862	141.7534	0	469.2726776	127.5780601	0						
Contra Costa	2020 Annual		Motor Coach	DSL	Aggregated	Aggregated	57	0.1%	8,163	0.4%	0	1728.640902	11909.0408	0	1555.776812	10718.13672	0						
Contra Costa	2020 Annual		OBUS	GAS	Aggregated	Aggregated	438	1.0%	20,858	0.9%	20,022	677.4460049	407.400932	1666.886337	609.7014044	366.8608391	1500.197704						
Contra Costa	2020 Annual		PTO	DSL	Aggregated	Aggregated	0	0.0%	15,087	0.6%	0	2139.045169			1925.140652								
Contra Costa	2020 Annual		SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001						
Contra Costa	2020 Annual		SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0						
Contra Costa	2020 Annual		T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0						
Contra Costa	2020 Annual		T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0						
Contra Costa	2020 Annual		T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0						
Contra Costa	2020 Annual		T6 CAIRP smal	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0						
Contra Costa	2020 Annual		T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0						
Contra Costa	2020 Annual		T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0						
Contra Costa	2020 Annual		T6 instate consi	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0						
Contra Costa	2020 Annual		T6 instate consi	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0						
Contra Costa	2020 Annual		T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0						
Contra Costa	2020 Annual		T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0						
Contra Costa	2020 Annual		T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0						
Contra Costa	2020 Annual		T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001						
Contra Costa	2020 Annual		T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0						
Contra Costa	2020 Annual		T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0						
Contra Costa	2020 Annual		T7 CAIRP cons	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0						
Contra Costa	2020 Annual		T7 NNOOS	DSL	Aggregated	Aggregated	415	1.0%	116,836	5.0%	0	1718.657262	38191.7299	0	1546.791536	34372.55693	0						
Contra Costa	2020 Annual		T7 NOOS	DSL	Aggregated	Aggregated	153	0.4%	37,822	1.6%	0	1721.339573	36440.9893	0	1549.205616	32796.8904	0						
Contra Costa	2020 Annual		T7 other port	DSL	Aggregated	Aggregated	64	0.2%	10,077	0.4%	0	1773.310228	6461.49074	0	1595.979205	5815.341668	0						
Contra Costa	2020 Annual		T7 POAK	DSL	Aggregated	Aggregated	301	0.7%	54,852	2.4%	0	1773.778726	11096.7178	0	1596.400854	9987.045991	0						
Contra Costa	2020 Annual		T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0			0			0						
Contra Costa	2020 Annual		T7 Public	DSL	Aggregated	Aggregated	234	0.5%	5,803	0.2%	0	1763.251378	8395.98652	0	1586.92624	7556.387872	0						
Contra Costa	2020 Annual		T7 Single	DSL	Aggregated	Aggregated	812	1.9%	62,989	2.7%	0	1735.545058	4374.10715	0	1561.990552	3936.696431	0						
Contra Costa	2020 Annual		T7 single consti	DSL	Aggregated	Aggregated	220	0.5%	16,908	0.7%	0	1736.414363	4325.52739	0	1562.772926	3892.974652	0						
Contra Costa	2020 Annual		T7 SWCV	DSL	Aggregated	Aggregated	315	0.7%	15,794	0.7%	0	1740.909181	8454.80385	0	1566.818262	7609.323467	0						
Contra Costa	2020 Annual		T7 tractor	DSL	Aggregated	Aggregated	1,164	2.7%	189,737	8.2%	0	1730.413544	4688.37442	0	1557.372189	4219.53698	0						
Contra Costa	2020 Annual		T7 tractor const	DSL	Aggregated	Aggregated	160	0.4%	12,606	0.5%	0	1732.305465	4627.43927	0	1559.074919	4164.695339	0						
Contra Costa	2020 Annual		T7 utility	DSL	Aggregated	Aggregated	37	0.1%	931	0.0%	0	1736.735569	8474.95502	0	1563.062013	7627.459522	0						
Contra Costa	2020 Annual		T7IS	GAS	Aggregated	Aggregated	71	0.2%	8,511	0.4%	1,411	584.6674475	0	1130.650402	526.2007028	0	1017.585361						
Contra Costa	2020 Annual		UBUS	GAS	Aggregated	Aggregated	77	0.2%	10,312	0.4%	309	744.1870785	0	596.1315348	669.7683707	0	536.5183813						
Contra Costa	2020 Annual		UBUS	DSL	Aggregated	Aggregated	256	0.6%	34,097	1.5%	1,023	2492.053783	0	0	2242.848405	0	0						
Contra Costa	2020 Annual		All Other Buses	DSL	Aggregated	Aggregated	144	0.3%	7,975	0.3%	0	1179.727994	744.586627	0	1061.755195	670.1279642	0						
							42,668	100.0%	2,324,831	1	470,931												
								Mi/Veh	54.48695267														

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate cons	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate cons	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

Emission Estimate Without Pavley and LCFS

	VMT Fraction	San Ramon		Run Emis (gms/mile)	Run Emis (gms/day)	San Ramon		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	
		Miles/Day Non-Passenger	Miles/Day/Veh Class			San Ramon Pop	San Ramon Population			g/day	g/day
LHD1	0.423	227,077	96,159	972.10949	93,477,109	42.7%	1,855	116.3644499	871.8606874	1,833,584.6	
LHD1	0.206	227,077	46,665	521.89824	24,354,233	11.1%	483	141.7534021	0	68,524.8	
LHD2	0.031	227,077	7,041	972.10951	6,844,698	3.1%	136	116.3644497	876.0096681	134,824.7	
LHD2	0.054	227,077	12,231	521.41409	6,377,306	2.9%	127	141.7534001	0	17,943.6	
Motor Coach	0.001	227,077	303	1728.6409	524,135	0.2%	10	11909.0408	0	123,896.6	
OBUS	0.010	227,077	2,333	677.446	1,580,637	0.7%	31	407.4009324	1666.886337	65,079.0	
PTO	0.000	227,077	0	2139.0452	0	0.0%	0	0	0	0.0	
SBUS	0.002	227,077	549	742.11993	407,482	0.2%	8	0	520.3885556	4,209.0	
SBUS	0.036	227,077	8,095	1291.2104	10,452,473	4.8%	207	3863.953327	0	801,661.0	
T6 Ag	0.001	227,077	294	1180.7981	347,569	0.2%	7	697.9663116	0	4,815.2	
T6 Public	0.008	227,077	1,901	1186.5847	2,255,547	1.0%	45	737.3093876	0	33,009.7	
T6 CAIRP heavy	0.000	227,077	11	1175.9558	13,515	0.0%	0	746.3730425	0	200.2	
T6 CAIRP small	0.000	227,077	35	1171.3733	41,192	0.0%	1	745.7841238	0	609.8	
T6 OOS heavy	0.000	227,077	7	1175.9558	7,749	0.0%	0	746.3730425	0	114.8	
T6 OOS small	0.000	227,077	20	1171.3733	23,616	0.0%	0	745.7841238	0	349.6	
T6 instate construction heavy	0.003	227,077	638	1183.2823	755,099	0.3%	15	746.3891639	0	11,186.9	
T6 instate construction small	0.006	227,077	1,386	1173.7223	1,627,161	0.7%	32	745.7841238	0	24,087.0	
T6 instate heavy	0.023	227,077	5,271	1181.7029	6,229,051	2.8%	124	746.5900996	0	92,309.0	
T6 instate small	0.054	227,077	12,161	1173.1476	14,266,358	6.5%	283	745.7841238	0	211,186.4	
T6 utility	0.001	227,077	290	1178.7158	341,433	0.2%	7	746.8211926	0	5,061.3	
T6TS	0.023	227,077	5,227	677.446	3,541,101	1.6%	70	251.58011	1104.516667	95,316.7	
T7 Ag	0.002	227,077	533	1736.8212	925,884	0.4%	18	3701.152193	0	68,019.5	
T7 CAIRP	0.010	227,077	2,243	1721.3322	3,860,763	1.8%	77	29375.11388	0	2,251,088.4	
T7 CAIRP construction	0.001	227,077	142	1721.586	243,874	0.1%	5	29235.26306	0	141,518.3	
T7 NNOOS	0.010	227,077	2,210	1718.6573	3,798,284	1.7%	75	38191.72993	0	2,879,364.0	
T7 NOOS	0.004	227,077	817	1721.3396	1,405,998	0.6%	28	36440.98934	0	1,016,985.3	
T7 other port	0.002	227,077	343	1773.3102	608,240	0.3%	12	6461.490742	0	78,009.5	
T7 POAK	0.007	227,077	1,601	1773.7787	2,840,203	1.3%	56	11096.71777	0	625,581.3	
T7 POLA	0.000	227,077	0	0	0	0.0%	0	0	0	0.0	
T7 Public	0.005	227,077	1,243	1763.2514	2,191,908	1.0%	44	8395.986524	0	365,286.7	
T7 Single	0.019	227,077	4,319	1735.5451	7,496,472	3.4%	149	4374.107146	0	650,857.9	
T7 single construction	0.005	227,077	1,171	1736.4144	2,033,664	0.9%	40	4325.527391	0	174,605.6	
T7 SWCV	0.007	227,077	1,678	1740.9092	2,921,409	1.3%	58	8454.803852	0	490,270.5	
T7 tractor	0.027	227,077	6,193	1730.4135	10,716,758	4.9%	213	4688.374422	0	997,299.3	
T7 tractor construction	0.004	227,077	851	1732.3055	1,474,428	0.7%	29	4627.439266	0	135,426.6	
T7 utility	0.001	227,077	199	1736.7356	345,334	0.2%	7	8474.955024	0	58,092.0	
T7IS	0.002	227,077	375	584.66745	219,378	0.1%	4	0	1130.650402	4,923.4	
UBUS	0.002	227,077	412	744.18708	306,353	0.1%	6	0	596.1315348	3,625.0	
UBUS	0.006	227,077	1,361	2492.0538	3,392,245	1.5%	67	0	0	0.0	
All Other Buses	0.003	227,077	767	1179.728	905,374	0.4%	18	744.5866269	0	13,380.8	
		227,077		219,154,032	1,000	4,350				13,482,303.7	

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate consi	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate consi	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
227,077	54	4,168

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
219,154,032	13,482,304	232,636,336	907184.7	256.44	93,599.8

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate cons	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate cons	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

Emission Estimate With Pavley and LCFS

	VMT Fraction	San Ramon Miles/Day		Run Emis (gms/mile)	gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day
		Non-Passenger	Miles/Day/Veh Class							
LHD1	0.423	227,077	96,159	874.89854	84,129,296	0.427	1,856	104.7280049	784.6746186	1,650,731.0
LHD1	0.206	227,077	46,665	469.70842	21,918,783	0.207	901	127.5780619	0	114,908.5
LHD2	0.031	227,077	7,041	874.89856	6,160,221	0.031	135	104.7280048	788.4087013	120,667.3
LHD2	0.054	227,077	12,231	469.27268	5,739,568	0.054	235	127.5780601	0	29,940.8
Motor Coach	0.001	227,077	303	1555.7768	471,721	0.001	5	10718.13672	0	56,159.2
OBUS	0.010	227,077	2,333	609.7014	1,422,571	0.010	44	366.6608391	1500.197704	82,081.1
PTO	0.000	227,077	0	1925.1407	0	0.000	0	0	0	0.0
SBUS	0.002	227,077	549	667.90794	366,733	0.002	11	0	468.3497001	4,969.8
SBUS	0.036	227,077	8,095	1162.0894	9,407,215	0.037	163	3477.557995	0	565,562.3
T6 Ag	0.001	227,077	294	1062.7183	312,812	0.001	6	628.1696804	0	3,645.2
T6 Public	0.008	227,077	1,901	1067.9263	2,029,990	0.008	33	663.5784488	0	21,760.3
T6 CAIRP heavy	0.000	227,077	11	1058.3603	12,164	0.000	0	671.7357382	0	147.0
T6 CAIRP small	0.000	227,077	35	1054.236	37,072	0.000	1	671.2057114	0	426.1
T6 OOS heavy	0.000	227,077	7	1058.3603	6,974	0.000	0	671.7357382	0	84.3
T6 OOS small	0.000	227,077	20	1054.236	21,254	0.000	0	671.2057114	0	244.3
T6 instate construction heavy	0.003	227,077	638	1064.9541	679,588	0.004	17	671.7502475	0	11,089.0
T6 instate construction small	0.006	227,077	1,386	1056.35	1,464,443	0.008	35	671.2057114	0	23,705.4
T6 instate heavy	0.023	227,077	5,271	1063.5326	5,606,139	0.023	101	671.9310897	0	68,097.9
T6 instate small	0.054	227,077	12,161	1055.8329	12,839,707	0.052	224	671.2057114	0	150,647.3
T6 utility	0.001	227,077	290	1060.8442	307,289	0.001	5	672.1390733	0	3,453.2
T6TS	0.023	227,077	5,227	609.7014	3,186,987	0.023	100	226.422099	994.0650001	121,900.6
T7 Ag	0.002	227,077	533	1563.139	833,295	0.002	10	3331.036973	0	34,363.5
T7 CAIRP	0.010	227,077	2,243	1549.1989	3,474,683	0.009	39	26437.60249	0	1,042,884.3
T7 CAIRP construction	0.001	227,077	142	1549.4274	219,486	0.001	4	26311.73675	0	99,672.8
T7 NNOOS	0.010	227,077	2,210	1546.7915	3,418,452	0.009	38	34372.55693	0	1,302,400.7
T7 NOOS	0.004	227,077	817	1549.2056	1,265,397	0.003	14	32796.8904	0	471,146.9
T7 other port	0.002	227,077	343	1595.9792	547,415	0.001	6	5815.341668	0	35,103.4
T7 POAK	0.007	227,077	1,601	1596.4009	2,556,180	0.006	26	9987.045991	0	264,623.6
T7 POLA	0.000	227,077	0	0	0	0.000	0	0	0	0.0
T7 Public	0.005	227,077	1,243	1586.9262	1,972,715	0.005	21	7556.387872	0	161,269.8
T7 Single	0.019	227,077	4,319	1561.9906	6,746,817	0.017	73	3936.696431	0	288,990.5
T7 single construction	0.005	227,077	1,171	1562.7729	1,830,295	0.007	30	3892.974652	0	116,954.5
T7 SWCV	0.007	227,077	1,678	1566.8183	2,629,265	0.007	29	7609.323467	0	219,295.3
T7 tractor	0.027	227,077	6,193	1557.3722	9,645,071	0.024	105	4219.53698	0	444,470.4
T7 tractor construction	0.004	227,077	851	1559.0749	1,326,983	0.005	22	4164.695339	0	90,755.6
T7 utility	0.001	227,077	199	1563.062	310,800	0.001	3	7627.459522	0	26,578.5
T7IS	0.002	227,077	375	526.2007	197,440	0.002	8	0	1017.585361	8,214.8
UBUS	0.002	227,077	412	669.76837	275,717	0.002	8	0	536.5183813	4,268.4
UBUS	0.006	227,077	1,361	2242.8484	3,053,017	0.006	26	0	0	0.0
All Other Buses	0.003	227,077	767	1061.7552	814,836	0.003	14	670.1279642	0	9,111.2
					197,238,390	1.000	4,350			7,650,324.6

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate consl	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate consl	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
227,077	7,975	28.4739308

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
197,238,390	7,650,325	204,888,715	907184.7	225.9	82,436

Community Greenhouse Gas Inventory

Energy

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	PG&E 2020 Emission Factor Forecast
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	198,281,471	2,367	28751	3.1	1.1	26,448
Commercial	189,321,345	4,117	27452	2.9	1.0	25,253
City/County/Dist	20,891,377		3029	0.3	0.1	2,787
Total	408,494,193		59,232	6.3	2.2	54,487

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	13,763,675	164	80,517	7.6	0.2	73,232
Commercial	6,363,018	138	37,224	3.5	0.1	33,856
City/Co/Dist	429,484		2,512	0.2	0.0	2,285
Total	20,556,177		120,254	11.3	0.2	109,373

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population			1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction			0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)			29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO ₂ e
		CO ₂	CH ₄	N ₂ O	
Contra Costa Co	1,147,399	1,019	0.1600	0.0100	930
San Ramon Planning Area	83,778	74	0	0	68
Percent San Ramon/Contra Costa County	7.3%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO ₂ e
		CO ₂	CH ₄	N ₂ O	
Contra Costa County	1,147,399	920	0.360	0.08000	864
San Ramon Planning Area	83,778	67	0	0	63
Percent San Ramon/Contra Costa County	7.3%				

Total San Ramon 131

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	83,778
Emissions (MTCO ₂ e per person)	57,705
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:

http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:

<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2020 Assumptions

	2008	2020
Planning Area Population	66,413	83,778
Water Usage (163 gallons/day)	10,840,000	13,655,814
Water Usage (million gallons/year)	3957	4984
Energy Usage (kWh)	21,409,163	26,970,437
Energy Usage (MWh)	21,409	26,970

Year 2020 Emissions

Greenhouse Gas	Electricity	2020	2020	2020
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO _{2e}
	(pounds per MWh)			
Carbon dioxide	290	7,821,427	3,911	3,547.8
Methane	0.031	836.08	0.418	8.0
Nitrous oxide	0.011	296.67	0.148	41.7
				3,597.5

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update. Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory BAU

Summary

Year: 2035

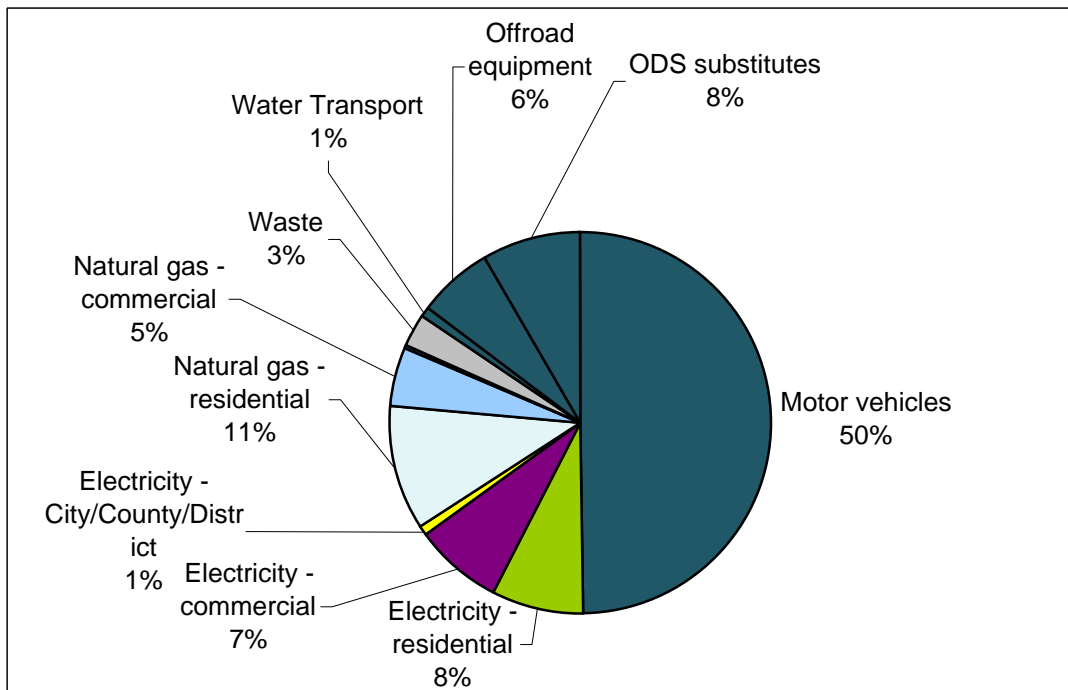
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	96,174	City of San Ramon/ DOF
Employment	57,667	City of San Ramon

County Information		
Population	1,324,740	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e		
Motor vehicles	392,691		
Electricity - residential	61,738		
Electricity - commercial	58,948		
Electricity - City/County/District	6,505		
Natural gas - residential	83,912		
Natural gas - commercial	38,793		
Natural gas - City/County/District	2,618		
Waste	20,390		
Water Transport	8,413		
Offroad equipment	48,938		
ODS substitutes	66,243		
Total	789,190	8,172	797,362



Community Greenhouse Gas Inventory

Waste BAU

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 44,822

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	20,390	
Emissions (MTCO ₂ e/person)	0.2120	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 23, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		37,053		36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 2,006,172 Source: MTC. 2014
Vehicle miles traveled / year 732,252,780 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	320,905.4	291,120.5
Non Passenger Vehicles	111,962.3	101,570.5
	432,867.7	392,691.0

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	320,905.4	291,120.5
Non Passenger Vehicles	108,776.9	98,680.7
	429,682.3	389,801.2

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2035 BAU

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT		CO2_RUNEX (gms/mile)	CO2_STREX (gms/vehicle/day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
									Fraction	Trips (trips/day)				
Contra Costa	2005 Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	460.3646763	332.5838917	460.3646763	
Contra Costa	2005 Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	362.249441	0	
Contra Costa	2005 Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	527.1606221	380.6486469	527.1606221	
Contra Costa	2005 Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	373.5873232	0	
Contra Costa	2005 Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	633.3019897	455.8272576	633.3019897	
Contra Costa	2005 Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	372.2726309	0	
Contra Costa	2005 Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	792.1227449	570.5037165	792.1227449	
Contra Costa	2005 Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	368.5728982	0	
								627,174	24,468,550	1.000				
								avg miles/vehicle	39.0139465					

Emission Estimate Without Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX (gms/mile)	Run Emissions (gms/day)	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day (g/day)
LDA	0.573	1,734,084	993,265	332,583,895	44,448	460.3646763	20,462,196
LDA	0.002	1,734,084	4,145	362,249,441	44,448	0	0
LDT1	0.071	1,734,084	123,333	380,648,665	44,448	527.1606221	23,431,129
LDT1	0.000	1,734,084	157	373,587,323	44,448	0	0
LDT2	0.192	1,734,084	333,513	455,827,263	44,448	633.3019897	28,148,879
LDT2	0.000	1,734,084	158	372,272,630	44,448	0	0
MDV	0.161	1,734,084	279,231	570,503,723	44,448	792.1227449	35,208,112
MDV	0.000	1,734,084	282	368,572,916	44,448	0	0
Total Passenger Vehicle Emissions							
						690,340,019	107,250,315

San Ramon Vehicles 2035

VMT	Avg Miles/Day CCC	Vehicles
1,734,084	39	44,448

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
690,340,019	107,250,315	797,590,334	907184.7	879.2	320,905.4

Emission Estimate With Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX(Pavley I+LCFS) (gms/mile)	Run Emissions (gms/day)	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
LDA	0.573	1,734,084	993,265	332,583,895	44,448	460.3646763	20,462,196
LDA	0.002	1,734,084	4,145	362,249,441	44,448	0	0
LDT1	0.071	1,734,084	123,333	380,648,665	44,448	527.1606221	23,431,129
LDT1	0.000	1,734,084	157	373,587,323	44,448	0	0
LDT2	0.192	1,734,084	333,513	455,827,263	44,448	633.3019897	28,148,879
LDT2	0.000	1,734,084	158	372,272,630	44,448	0	0
MDV	0.161	1,734,084	279,231	570,503,723	44,448	792.1227449	35,208,112
MDV	0.000	1,734,084	282	368,572,916	44,448	0	0
Total Passenger Vehicle Emissions							
						690,340,019	107,250,315

San Ramon Vehicles

VMT	Avg Miles/Day CCC	Vehicles
1,734,084	39	44,448

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
690,340,019	107,250,315	797,590,334	907184.7	879.2	320,905

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX			
												X	CO2_IDLEX		(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)			
												(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)					
												(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2005 Annual	LHD1	GAS	Aggregated	Aggregated	15,365	41.3%	686,475	29.5%	269,190	972.1094988	116.364456	819.7728342	972.1094988	116.3644561	819.7728342	0			
Contra Costa	2005 Annual	LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	17.2%	110,294	532.3059325	141.748251	0	532.3059325	141.7482507	0	0			
Contra Costa	2005 Annual	LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.4%	19,711	972.1095363	116.338965	1045.68254	972.1095363	116.338965	1045.68254	0			
Contra Costa	2005 Annual	LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	3.7%	28,908	535.0134187	141.753311	0	535.0134187	141.7533106	0	0			
Contra Costa	2005 Annual	Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	8,163	0.4%	0	1745.971421	11338.6466	0	1745.971421	11338.64661	0	0			
Contra Costa	2005 Annual	OBUS	GAS	Aggregated	Aggregated	376	1.0%	20,858	0.9%	20,022	677.4460346	407.400915	1962.23896	677.4460346	407.4009152	1962.23896	0			
Contra Costa	2005 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	15,087	0.6%	0	2183.103618	0	0	2183.103618	0	0	0			
Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159	0			
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0	0			
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0	0			
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0	0			
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0	0			
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0	0			
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0	0			
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0	0			
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0	0			
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0	0			
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0	0			
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0	0			
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0	0			
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808	0			
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0	0			
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	0			
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	0			
Contra Costa	2005 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	116,836	5.0%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0	0			
Contra Costa	2005 Annual	T7 NOOS	DSL	Aggregated	Aggregated	113	0.3%	37,822	1.6%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0	0			
Contra Costa	2005 Annual	T7 other port	DSL	Aggregated	Aggregated	58	0.2%	10,077	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0	0			
Contra Costa	2005 Annual	T7 POAK	DSL	Aggregated	Aggregated	249	0.7%	54,852	2.4%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0	0			
Contra Costa	2005 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0			
Contra Costa	2005 Annual	T7 Public	DSL	Aggregated	Aggregated	197	0.5%	5,803	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0	0			
Contra Costa	2005 Annual	T7 Single	DSL	Aggregated	Aggregated	591	1.6%	62,989	2.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	0			
Contra Costa	2005 Annual	T7 single consti	DSL	Aggregated	Aggregated	204	0.5%	16,908	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	0			
Contra Costa	2005 Annual	T7 SWCV	DSL	Aggregated	Aggregated	266	0.7%	15,794	0.7%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0	0			
Contra Costa	2005 Annual	T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	189,737	8.2%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0	0			
Contra Costa	2005 Annual	T7 tractor const	DSL	Aggregated	Aggregated	143	0.4%	12,606	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0	0			
Contra Costa	2005 Annual	T7 utility	DSL	Aggregated	Aggregated	30	0.1%	931	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0	0			
Contra Costa	2005 Annual	T7IS	GAS	Aggregated	Aggregated	74	0.2%	8,511	0.4%	1,411	584.6674163	0	2353.967488	584.6674163	0	2353.967488	0			
Contra Costa	2005 Annual	UBUS	GAS	Aggregated	Aggregated	64	0.2%	10,312	0.4%	309	744.1870709	0	615.0541717	744.1870709	0	615.0541717	0			
Contra Costa	2005 Annual	UBUS	DSL	Aggregated	Aggregated	235	0.6%	34,097	1.5%	1,023	2573.001593	0	0	2573.001593	0	0	0			
Contra Costa	2005 Annual	All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	7,975	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0	0			
							37,215	100.0%	2,326,162	1	470,931									
									Mi/Veh											
									62.50593239											

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.93605	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2005 Annual	T6 instate cons	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2005 Annual	T6 instate cons	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.35171	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS 2035

	VMT Fraction	San Ramon Miles/Day		Miles/Day/Veh Class	Run Emis (gms/mile)	Run Emis gms/day	San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/d ay)	Starting Emissions (g/veh/day)	g/day
		Non-Passenger	Passenger				Fraction	Population				
LHD1	0.423	272,089	115,220	972.1095	112,006,260	42.3%	1,840	116.3644499	819.7728342	1,722,535.8		
LHD1	0.206	272,089	55,915	532.30593	29,763,702	11.2%	489	141.7534021	0	69,311.7		
LHD2	0.031	272,089	8,437	972.10954	8,201,463	3.1%	135	116.3644497	1045.68254	156,567.4		
LHD2	0.054	272,089	14,655	535.01342	7,840,724	3.0%	129	141.7534001	0	18,259.0		
Motor Coach	0.001	272,089	363	1745.9714	634,326	0.2%	10	11909.0408	0	124,101.0		
OBUS	0.010	272,089	2,796	677.44603	1,893,953	0.7%	31	407.4009324	1962.23896	73,728.9		
PTO	0.000	272,089	0	2183.1036	0	0.0%	0	0	0	0.0		
SBUS	0.002	272,089	658	742.11995	488,253	0.2%	8	0	788.3524159	6,323.4		
SBUS	0.036	272,089	9,700	1299.9836	12,609,473	4.8%	207	3863.953327	0	800,415.0		
T6 Ag	0.001	272,089	353	1214.0161	428,180	0.2%	7	697.9663116	0	4,909.6		
T6 Public	0.008	272,089	2,278	1210.2525	2,756,552	1.0%	45	737.3093876	0	33,388.9		
T6 CAIRP heavy	0.000	272,089	14	1194.1438	16,445	0.0%	0	746.3730425	0	201.6		
T6 CAIRP small	0.000	272,089	42	1187.5142	50,037	0.0%	1	745.7841238	0	613.0		
T6 OOS heavy	0.000	272,089	8	1194.1438	9,428	0.0%	0	746.3730425	0	115.6		
T6 OOS small	0.000	272,089	24	1187.5142	28,687	0.0%	0	745.7841238	0	351.5		
T6 instate construction heavy	0.003	272,089	765	1206.7402	922,712	0.3%	15	746.3891639	0	11,314.0		
T6 instate construction small	0.006	272,089	1,661	1190.6752	1,977,859	0.7%	32	745.7841238	0	24,232.3		
T6 instate heavy	0.023	272,089	6,316	1206.7402	7,621,920	2.9%	125	746.5900996	0	93,483.1		
T6 instate small	0.054	272,089	14,571	1190.6752	17,349,652	6.6%	285	745.7841238	0	212,564.3		
T6 utility	0.001	272,089	347	1190.3417	413,147	0.2%	7	746.8211926	0	5,068.8		
T6TS	0.023	272,089	6,263	677.44602	4,243,022	1.6%	70	251.58011	1824.797808	144,733.2		
T7 Ag	0.002	272,089	639	1780.2391	1,137,148	0.4%	19	3701.152193	0	69,141.7		
T7 CAIRP	0.010	272,089	2,687	1740.7084	4,678,122	1.8%	77	29375.11388	0	2,257,550.8		
T7 CAIRP construction	0.001	272,089	170	1740.7084	295,461	0.1%	5	29235.26306	0	141,903.6		
T7 NNOOS	0.010	272,089	2,648	1736.3283	4,597,980	1.7%	76	38191.72993	0	2,884,847.0		
T7 NOOS	0.004	272,089	979	1740.7084	1,703,653	0.6%	28	36440.98934	0	1,019,900.4		
T7 other port	0.002	272,089	411	1728.3376	710,323	0.3%	12	6461.490742	0	75,400.6		
T7 POAK	0.007	272,089	1,919	1732.4648	3,323,927	1.3%	55	11096.71777	0	605,943.8		
T7 POLA	0.000	272,089	0	0	0	0.0%	0	0	0	0.0		
T7 Public	0.005	272,089	1,490	1806.7866	2,691,238	1.0%	44	8395.986524	0	371,201.9		
T7 Single	0.019	272,089	5,176	1771.2925	9,167,446	3.5%	151	4374.107146	0	658,755.4		
T7 single construction	0.005	272,089	1,403	1771.2925	2,485,725	0.9%	41	4325.527391	0	176,635.8		
T7 SWCV	0.007	272,089	2,011	1777.5297	3,574,129	1.3%	59	8454.803852	0	496,432.4		
T7 tractor	0.027	272,089	7,421	1754.4508	13,019,423	4.9%	214	4688.374422	0	1,002,767.9		
T7 tractor construction	0.004	272,089	1,020	1756.0931	1,790,950	0.7%	29	4627.439266	0	136,147.8		
T7 utility	0.001	272,089	238	1757.3339	418,694	0.2%	7	8474.955024	0	58,293.5		
T7IS	0.002	272,089	450	584.66742	262,863	0.1%	4	0	2353.967488	10,165.2		
UBUS	0.002	272,089	493	744.18707	367,078	0.1%	6	0	615.0541717	3,709.0		
UBUS	0.006	272,089	1,631	2573.0016	4,196,690	1.6%	69	0	0	0.0		
All Other Buses	0.003	272,089	920	1211.582	1,114,130	0.4%	18	744.5866269	0	13,628.2		
	1.000	272,089	272,089	264,790,775	1,000	4,350				13,484,643.4		

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate consl	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate consl	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

	Avg Miles		
VMT	CCC	Vehicles	
272,089	63	4,353	

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
264,790,775	13,484,643	278,275,418	907184.7	306.75	111,962.3

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.93605	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2005 Annual	T6 instate cons	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2005 Annual	T6 instate cons	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.35171	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate With Pavley and LCFS 2035

	VMT Fraction	San Ramon Miles/Day		Run Emis (gms/mile)	gms/day	San Ramon		Idling (gms/vehicle/d ay)	Starting Emissions (g/veh/day)	g/day
		Non-Passenger	Miles/Day/Veh Class			Pop Fraction	Vehicle Population			
LHD1	0.423	272.089	115,220	972.10949	112,006,259	0.427	1,856	116.3644561	819.7728342	1,737,470.5
LHD1	0.206	272.089	55,915	521.89824	29,181,759	0.207	901	141.7482507	0	127,671.5
LHD2	0.031	272.089	8,437	972.10951	8,201,462	0.031	135	116.338965	1045.68254	156,995.0
LHD2	0.054	272.089	14,655	521.41409	7,641,423	0.054	235	141.7533106	0	33,267.5
Motor Coach	0.001	272.089	363	1728.6409	628,029	0.001	5	11338.64661	0	59,410.5
OBUS	0.010	272.089	2,796	677.446	1,893,952	0.010	44	407.4009152	1962.23896	104,187.1
PTO	0.000	272.089	0	2139.0452	0	0.000	0	0	0	0.0
SBUS	0.002	272.089	658	742.11993	488,253	0.002	11	0	788.3524159	8,365.5
SBUS	0.036	272.089	9,700	1291.2104	12,524,376	0.037	163	3474.936051	0	565,135.9
T6 Ag	0.001	272.089	353	1180.7981	416,465	0.001	6	591.9178211	0	3,434.9
T6 Public	0.008	272.089	2,278	1186.5847	2,702,645	0.008	33	636.79636	0	20,882.0
T6 CAIRP heavy	0.000	272.089	14	1175.9558	16,194	0.000	0	666.3500758	0	145.8
T6 CAIRP small	0.000	272.089	42	1171.3733	49,357	0.000	1	693.3277468	0	440.1
T6 OOS heavy	0.000	272.089	8	1175.9558	9,285	0.000	0	666.3500758	0	83.6
T6 OOS small	0.000	272.089	24	1171.3733	28,297	0.000	0	693.3277468	0	252.3
T6 instate construction heavy	0.003	272.089	765	1183.2823	904,775	0.004	17	628.1342767	0	10,369.0
T6 instate construction small	0.006	272.089	1,661	1173.7223	1,949,698	0.008	35	671.5227753	0	23,716.6
T6 instate heavy	0.023	272.089	6,316	1181.7029	7,463,782	0.023	101	628.1342767	0	63,659.2
T6 instate small	0.054	272.089	14,571	1173.1476	17,094,254	0.052	224	671.5227753	0	150,718.4
T6 utility	0.001	272.089	347	1178.7158	409,112	0.001	5	669.3517103	0	3,438.9
T6TS	0.023	272.089	6,263	677.446	4,243,022	0.023	100	251.5801036	1824.797808	207,385.9
T7 Ag	0.002	272.089	639	1736.8212	1,109,414	0.002	10	2354.915902	0	24,293.7
T7 CAIRP	0.010	272.089	2,687	1721.3322	4,626,049	0.009	39	29278.79509	0	1,154,960.8
T7 CAIRP construction	0.001	272.089	170	1721.586	292,215	0.001	4	29278.79509	0	110,912.5
T7 NNOOS	0.010	272.089	2,648	1718.6573	4,551,185	0.009	38	37700.75308	0	1,428,508.4
T7 NOOS	0.004	272.089	979	1721.3396	1,684,697	0.003	14	37153.84079	0	533,737.1
T7 other port	0.002	272.089	411	1773.3102	728,806	0.001	6	4421.893594	0	26,692.1
T7 POAK	0.007	272.089	1,919	1773.7787	3,403,192	0.006	26	6989.078773	0	185,187.4
T7 POLA	0.000	272.089	0	0	0	0.000	0	0	0	0.0
T7 Public	0.005	272.089	1,490	1763.2514	2,626,391	0.005	21	7861.899623	0	167,790.1
T7 Single	0.019	272.089	5,176	1735.5451	8,982,433	0.017	73	2423.170701	0	177,883.5
T7 single construction	0.005	272.089	1,403	1736.4144	2,436,779	0.007	30	2423.170701	0	72,798.0
T7 SWCV	0.007	272.089	2,011	1740.9092	3,500,495	0.007	29	8016.434181	0	231,028.0
T7 tractor	0.027	272.089	7,421	1730.4135	12,841,047	0.024	105	2452.592201	0	258,347.0
T7 tractor construction	0.004	272.089	1,020	1732.3055	1,766,690	0.005	22	2452.592201	0	53,446.1
T7 utility	0.001	272.089	238	1736.7356	413,786	0.001	3	8116.295492	0	28,281.9
T7IS	0.002	272.089	450	584.66745	262,863	0.002	8	0	2353.967488	19,003.2
UBUS	0.002	272.089	493	744.18708	367,078	0.002	8	0	615.0541717	4,893.2
UBUS	0.006	272.089	1,631	2492.0538	4,064,661	0.006	26	0	0	0.0
All Other Buses	0.003	272.089	920	1179.728	1,084,838	0.003	14	615.1471436	0	8,363.7
					262,595,019	1.000	4,350			7,763,156.6

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate consi	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
272,089	7,975	34,1181103

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
262,595,019	7,763,157	270,358,176	907184.7	298.0	108,777

Community Greenhouse Gas Inventory

Energy

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.595	PG&E 2003-2005 average emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	227,198,770	2,362	67592	3.5	1.2	61,738
Commercial	216,931,902	3,762	64537	3.4	1.2	58,948
City/County/Dist	23,938,168		7122	0.4	0.1	6,505
Total	468,068,840		139,250	7.3	2.6	127,190

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	15,770,965	164	92,260	8.7	0.2	83,912
Commercial	7,290,998	126	42,652	4.0	0.1	38,793
City/Co/Dist	492,120		2,879	0.3	0.0	2,618
Total	23,554,083		137,791	13.0	0.3	125,324

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population			1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction			0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)			29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,324,740	1,019	0.1600	0.0100	930
San Ramon Planning Area	96,174	74	0	0	68
Percent San Ramon/Contra Costa County	7.3%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,324,740	920	0.360	0.08000	864
San Ramon Plannning Area	96,174	67	0	0	63
Percent San Ramon/Contra Costa County	7.3%				

Total San Ramon 130

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	96,174
Emissions (MTCO ₂ e per person)	66,243
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:

http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:

<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2035 Assumptions

	2008	2035
Planning Area Population	66,413	96,174
Water Usage (163 gallons/day)	10,840,000	15,676,362
Water Usage (million gallons/year)	3957	5722
Energy Usage (kWh)	21,409,163	30,961,050
Energy Usage (MWh)	21,409	30,961

Year 2035 Emissions

Greenhouse Gas	Electricity	2035	2035	2035
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO _{2e}
	(pounds per MWh)			
Carbon dioxide	595	18,421,825	9,211	8,356.1
Methane	0.031	959.79	0.480	9.1
Nitrous oxide	0.011	340.57	0.170	47.9
				8,413.2

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update. Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2035

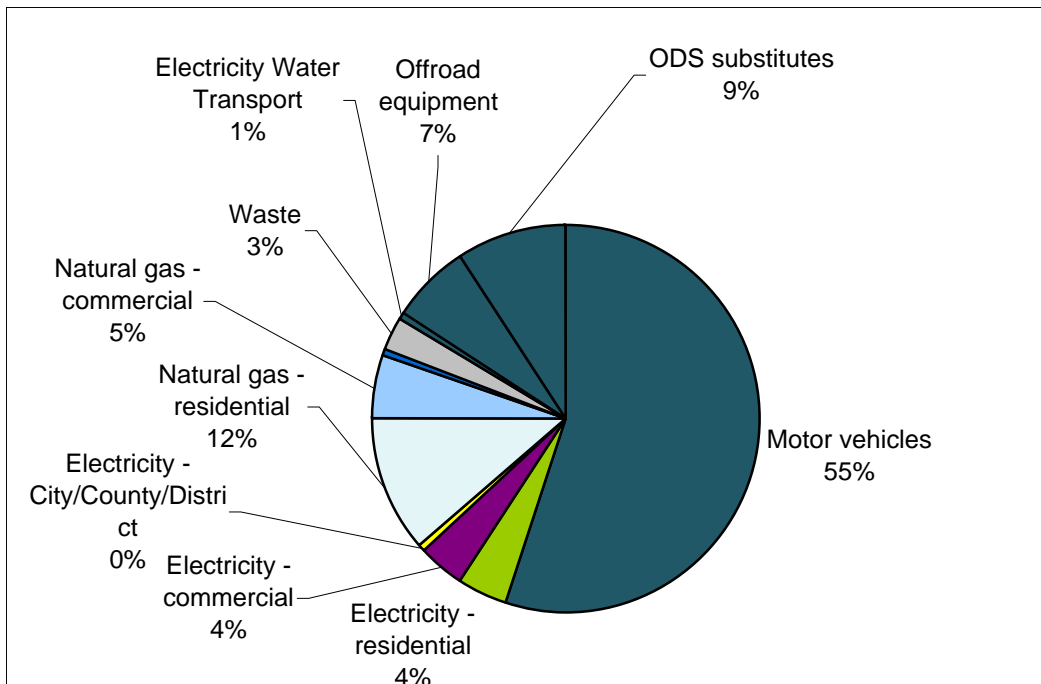
Prepared by FirstCarbon Solutions

	Data	Source
Planning Area Information		
Population	96,174	City of San Ramon/ DOF
Employment	57,667	City of San Ramon

County Information		
Population	1,324,740	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	399,178	304,417
Electricity - residential	30,305	30,305
Electricity - commercial	28,936	28,936
Electricity - City/County/District	3,193	3,193
Natural gas - residential	83,912	83,912
Natural gas - commercial	38,793	38,793
Natural gas - City/County/District	2,618	2,618
Waste	20,390	20,390
Electricity Water Transport	4,130	4,130
Offroad equipment	48,938	48,938
ODS substitutes	66,243	66,243
Total	726,637	631,876



Community Greenhouse Gas Inventory

Waste

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 44,822

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	20,390	
Emissions (MTCO ₂ e/person)	0.2120	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 23, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)		37,053		36,734	39,045	44,822
Population		73,595		78,820	83,778	96,174
Per Capita Waste (tons)		0.503476		0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 2,006,172 Source: MTC. 2014
Vehicle miles traveled / year 732,252,780 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	328,939.9	298,409.3
Non Passenger Vehicles	111,078.0	100,768.2
	440,017.9	399,177.5

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	237,396.0	215,362.0
Non Passenger Vehicles	98,166.2	89,054.8
	335,562.1	304,416.9

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2035

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT Fraction	Trips (trips/day)	CO2_RUNEX (gms/mile)	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
Contra Costa	2035 Annual	LDA	GAS	Aggregated	Aggregated	474,332	17,505,665	0.578	2,994,010	339,357,903	468.6426746	202.4457354	280.2807425	
Contra Costa	2035 Annual	LDA	DSL	Aggregated	Aggregated	2,111	71,381	0.002	13,043	356.6565142	0	217.6449088	0	
Contra Costa	2035 Annual	LDT1	GAS	Aggregated	Aggregated	58,191	2,182,142	0.072	353,746	394.4073641	524.0105902	245.1272065	326.7625403	
Contra Costa	2035 Annual	LDT1	DSL	Aggregated	Aggregated	79	3,031	0.000	497	356.74927	0	214.0765487	0	
Contra Costa	2035 Annual	LDT2	GAS	Aggregated	Aggregated	148,283	5,817,313	0.192	926,740	461.5800166	631.2924566	315.1544926	431.5606508	
Contra Costa	2035 Annual	LDT2	DSL	Aggregated	Aggregated	71	2,662	0.000	440	356.5035649	0	245.051271	0	
Contra Costa	2035 Annual	MDV	GAS	Aggregated	Aggregated	126,790	4,701,892	0.155	757,597	591.3605782	771.4987371	415.9476686	546.5597687	
Contra Costa	2035 Annual	MDV	DSL	Aggregated	Aggregated	127	4,790	0.000	781	356.6966734	0	248.3683183	0	
						809,984	30,288,875	1.000						
						avg miles/vehicle	37.3944097							

Emission Estimate Without Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX (gms/mile)	Run Emissions (gms/day)	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/ Day (g/day)
LDA	0.573	1,734,084	993,265	339,357,912	46,373	468.6426746	21,732,279
LDA	0.002	1,734,084	4,145	356.65651	46,373	0	0
LDT1	0.071	1,734,084	123,333	394,407,36	46,373	524.0105902	24,299,846
LDT1	0.000	1,734,084	157	356.74927	46,373	0	0
LDT2	0.192	1,734,084	333,513	461.58002	46,373	631.2924566	29,274,808
LDT2	0.000	1,734,084	158	356.50356	46,373	0	0
MDV	0.161	1,734,084	279,231	591.36058	46,373	771.4987371	35,776,567
MDV	0.000	1,734,084	282	356.69667	46,373	0	0
Total Passenger Vehicle Emissions							111,083,500

San Ramon Vehicles 2035

VMT	Avg Miles/Day	Vehicles
1,734,084	37	46,373

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
706,476,142	111,083,500	817,559,642	907184.7	901.2	328,939.9

Emission Estimate With Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX(Pavley I+LCFS) (gms/mile)	Run Emissions (gms/day)	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
LDA	0.573	1,734,084	993,265	234,101,19	46,373	280.2807425	12,997,407
LDA	0.002	1,734,084	4,145	251.81425	46,373	0	0
LDT1	0.071	1,734,084	123,333	288.22255	46,373	326.7625403	15,152,898
LDT1	0.000	1,734,084	157	249.62662	46,373	0	0
LDT2	0.192	1,734,084	333,513	350.80721	46,373	431.5606508	20,012,682
LDT2	0.000	1,734,084	158	266.15795	46,373	0	0
MDV	0.161	1,734,084	279,231	466.45893	46,373	546.5597687	25,345,514
MDV	0.000	1,734,084	282	280.13265	46,373	0	0
Total Passenger Vehicle Emissions							73,508,501

San Ramon Vehicles

VMT	Avg Miles/Day	Vehicles
1,734,084	37	46,373

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
516,524,412	73,508,501	590,032,913	907184.7	650.4	237,396

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX
												X	(gms/vehicle/day)		(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)
												(gms/mile)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	
Contra Costa	2035 Annual	LHD1	GAS	Aggregated	Aggregated	20,093	41.1%	811,001	29.0%	269,190	972.1094857	116.36445	871.8606874	874.8985371	104.7280049	784.6746186	
Contra Costa	2035 Annual	LHD1	DSL	Aggregated	Aggregated	9,751	20.0%	397,282	14.2%	110,294	521.8982407	141.753402	0	469.7084166	127.5780619	0	
Contra Costa	2035 Annual	LHD2	GAS	Aggregated	Aggregated	1,468	3.0%	59,615	2.1%	19,711	972.1095071	116.36445	876.0096681	874.8985564	104.7280048	788.4087013	
Contra Costa	2035 Annual	LHD2	DSL	Aggregated	Aggregated	2,551	5.2%	102,570	3.7%	28,908	521.4140862	141.7534	0	469.2726776	127.5780601	0	
Contra Costa	2035 Annual	Motor Coach	DSL	Aggregated	Aggregated	71	0.1%	10,589	0.4%	0	1728.640902	11909.0408	0	1555.776812	10718.13672	0	
Contra Costa	2035 Annual	OBUS	GAS	Aggregated	Aggregated	494	1.0%	22,947	0.8%	20,022	677.4460049	407.400932	1666.886337	609.7014044	366.8608391	1500.197704	
Contra Costa	2035 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	19,755	0.7%	0	2139.045169			1925.140652			
Contra Costa	2035 Annual	SBUS	GAS	Aggregated	Aggregated	108	0.2%	4,842	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001	
Contra Costa	2035 Annual	SBUS	DSL	Aggregated	Aggregated	1,392	2.8%	47,134	1.7%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0	
Contra Costa	2035 Annual	T6 Ag	DSL	Aggregated	Aggregated	50	0.1%	1,769	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0	
Contra Costa	2035 Annual	T6 Public	DSL	Aggregated	Aggregated	475	1.0%	8,991	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0	
Contra Costa	2035 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	3	0.0%	173	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0	
Contra Costa	2035 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	8	0.0%	598	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0	
Contra Costa	2035 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	2	0.0%	99	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0	
Contra Costa	2035 Annual	T6 OOS small	DSL	Aggregated	Aggregated	5	0.0%	343	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0	
Contra Costa	2035 Annual	T6 instate consi	DSL	Aggregated	Aggregated	189	0.4%	10,842	0.4%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0	
Contra Costa	2035 Annual	T6 instate consi	DSL	Aggregated	Aggregated	470	1.0%	31,962	1.1%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0	
Contra Costa	2035 Annual	T6 instate heav	DSL	Aggregated	Aggregated	1,127	2.3%	64,532	2.3%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0	
Contra Costa	2035 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,793	5.7%	189,863	6.8%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0	
Contra Costa	2035 Annual	T6 utility	DSL	Aggregated	Aggregated	71	0.1%	1,432	0.1%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0	
Contra Costa	2035 Annual	T6TS	GAS	Aggregated	Aggregated	1,073	2.2%	50,146	1.8%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001	
Contra Costa	2035 Annual	T7 Ag	DSL	Aggregated	Aggregated	89	0.2%	6,408	0.2%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0	
Contra Costa	2035 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	559	1.1%	135,491	4.8%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0	
Contra Costa	2035 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	49	0.1%	11,773	0.4%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0	
Contra Costa	2035 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	552	1.1%	152,422	5.5%	0	1718.657262	38191.7299	0	1546.791536	34372.55693	0	
Contra Costa	2035 Annual	T7 NOOS	DSL	Aggregated	Aggregated	203	0.4%	49,342	1.8%	0	1721.339573	36440.9893	0	1549.205616	32796.8904	0	
Contra Costa	2035 Annual	T7 other port	DSL	Aggregated	Aggregated	82	0.2%	12,787	0.5%	0	1773.310228	6461.49074	0	1595.979205	5815.341668	0	
Contra Costa	2035 Annual	T7 POAK	DSL	Aggregated	Aggregated	554	1.1%	114,033	4.1%	0	1773.778726	11096.7178	0	1596.400854	9987.045991	0	
Contra Costa	2035 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0	
Contra Costa	2035 Annual	T7 Public	DSL	Aggregated	Aggregated	314	0.6%	7,810	0.3%	0	1763.251378	8395.98652	0	1586.92624	7556.387872	0	
Contra Costa	2035 Annual	T7 Single	DSL	Aggregated	Aggregated	1,042	2.1%	82,174	2.9%	0	1735.545058	4374.10715	0	1561.990552	3936.696431	0	
Contra Costa	2035 Annual	T7 single consti	DSL	Aggregated	Aggregated	387	0.8%	30,454	1.1%	0	1736.414363	4325.52739	0	1562.772926	3892.974652	0	
Contra Costa	2035 Annual	T7 SWCV	DSL	Aggregated	Aggregated	424	0.9%	21,257	0.8%	0	1740.909181	8454.80385	0	1566.818262	7609.323467	0	
Contra Costa	2035 Annual	T7 tractor	DSL	Aggregated	Aggregated	1,488	3.0%	247,528	8.9%	0	1730.413544	4688.37442	0	1557.372189	4219.53698	0	
Contra Costa	2035 Annual	T7 tractor const	DSL	Aggregated	Aggregated	282	0.6%	22,706	0.8%	0	1732.305465	4627.43927	0	1559.074919	4164.695339	0	
Contra Costa	2035 Annual	T7 utility	DSL	Aggregated	Aggregated	49	0.1%	1,222	0.0%	0	1736.735569	8474.95502	0	1563.062013	7627.459522	0	
Contra Costa	2035 Annual	T7IS	GAS	Aggregated	Aggregated	64	0.1%	7,397	0.3%	1,411	584.6674475	0	1130.650402	526.2007028	0	1017.585361	
Contra Costa	2035 Annual	UBUS	GAS	Aggregated	Aggregated	81	0.2%	10,773	0.4%	309	744.1870785	0	596.1315348	669.7683707	0	536.5183813	
Contra Costa	2035 Annual	UBUS	DSL	Aggregated	Aggregated	267	0.5%	35,623	1.3%	1,023	2492.053783	0	0	2242.848405	0	0	
Contra Costa	2035 Annual	All Other Buses	DSL	Aggregated	Aggregated	176	0.4%	10,345	0.4%	0	1179.727994	744.586627	0	1061.755195	670.1279642	0	
							48,854	100.0%	2,796,027	1	470,931						
							Mi/Veh		57.23236457								

Contra Costa	2035 Annual	SBUS	GAS	Aggregated	Aggregated	108	0.2%	4,842	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2035 Annual	SBUS	DSL	Aggregated	Aggregated	1,392	2.8%	47,134	1.7%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2035 Annual	T6 Ag	DSL	Aggregated	Aggregated	50	0.1%	1,769	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2035 Annual	T6 Public	DSL	Aggregated	Aggregated	475	1.0%	8,991	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2035 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	3	0.0%	173	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	8	0.0%	598	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	2	0.0%	99	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 OOS small	DSL	Aggregated	Aggregated	5	0.0%	343	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 instate cons	DSL	Aggregated	Aggregated	189	0.4%	10,842	0.4%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2035 Annual	T6 instate cons	DSL	Aggregated	Aggregated	470	1.0%	31,962	1.1%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2035 Annual	T6 instate heav	DSL	Aggregated	Aggregated	1,127	2.3%	64,532	2.3%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2035 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,793	5.7%	189,863	6.8%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2035 Annual	T6 utility	DSL	Aggregated	Aggregated	71	0.1%	1,432	0.1%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2035 Annual	T6TS	GAS	Aggregated	Aggregated	1,073	2.2%	50,146	1.8%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2035 Annual	T7 Ag	DSL	Aggregated	Aggregated	89	0.2%	6,408	0.2%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2035 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	559	1.1%	135,491	4.8%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2035 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	49	0.1%	11,773	0.4%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

Emission Estimate Without Pavley and LCFS 2035

	VTM Fraction	San Ramon Miles/Day Non-Passenger	Miles/Day/Veh Class	Run Emis (gms/mile)	Run Emis gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day
LHD1	0.423	272.089	115,220	972.10949	112,006,259	42.7%	1,855	116.3644499	871.8606874	1,833,584.6
LHD1	0.206	272.089	55,915	521.89824	29,181,759	11.1%	483	141.7534021	0	68,524.8
LHD2	0.031	272.089	8,437	972.10951	8,201,462	3.1%	136	116.3644497	876.0096681	134,824.7
LHD2	0.054	272.089	14,655	521.41409	7,641,423	2.9%	127	141.7534001	0	17,943.6
Motor Coach	0.001	272.089	363	1728.6409	628,029	0.2%	10	11909.0408	0	123,896.6
OBUS	0.010	272.089	2,796	677.446	1,893,952	0.7%	31	407.4009324	1666.886337	65,079.0
PTO	0.000	272.089	0	2139.0452	0	0.0%	0	0	0	0.0
SBUS	0.002	272.089	658	742.11993	488,253	0.2%	8	0	520.3885556	4,209.0
SBUS	0.036	272.089	9,700	1291.2104	12,524,376	4.8%	207	3863.953327	0	801,661.0
T6 Ag	0.001	272.089	353	1180.7981	416,465	0.2%	7	697.9663116	0	4,815.2
T6 Public	0.008	272.089	2,278	1186.5847	2,702,645	1.0%	45	737.3093876	0	33,009.7
T6 CAIRP heavy	0.000	272.089	14	1175.9558	16,194	0.0%	0	746.3730425	0	200.2
T6 CAIRP small	0.000	272.089	42	1171.3733	49,357	0.0%	1	745.7841238	0	609.8
T6 OOS heavy	0.000	272.089	8	1175.9558	9,285	0.0%	0	746.3730425	0	114.8
T6 OOS small	0.000	272.089	24	1171.3733	28,297	0.0%	0	745.7841238	0	349.6
T6 instate construction heavy	0.003	272.089	765	1183.2823	904,775	0.3%	15	746.3891639	0	11,186.9
T6 instate construction small	0.006	272.089	1,661	1173.7223	1,949,698	0.7%	32	745.7841238	0	24,087.0
T6 instate heavy	0.023	272.089	6,316	1181.7029	7,463,782	2.8%	124	746.5900996	0	92,309.0
T6 instate small	0.054	272.089	14,571	1173.1476	17,094,254	6.5%	283	745.7841238	0	211,186.4
T6 utility	0.001	272.089	347	1178.7158	409,112	0.2%	7	746.8211926	0	5,061.3
T6TS	0.023	272.089	6,263	677.446	4,243,022	1.6%	70	251.58011	1104.516667	95,316.7
T7 Ag	0.002	272.089	639	1736.8212	1,109,414	0.4%	18	3701.152193	0	68,019.5
T7 CAIRP	0.010	272.089	2,687	1721.3322	4,626,049	1.8%	77	29375.11388	0	2,251,088.4
T7 CAIRP construction	0.001	272.089	170	1721.586	292,215	0.1%	5	29235.26306	0	141,518.3
T7 NNOOS	0.010	272.089	2,648	1718.6573	4,551,185	1.7%	75	38191.72993	0	2,879,364.0
T7 NOOS	0.004	272.089	979	1721.3396	1,684,697	0.6%	28	36440.98934	0	1,016,985.3
T7 other port	0.002	272.089	411	1773.3102	728,806	0.3%	12	6461.490742	0	78,009.5
T7 POAK	0.007	272.089	1,919	1773.7787	3,403,192	1.3%	56	11096.71777	0	625,581.3
T7 POLA	0.000	272.089	0	0	0	0.0%	0	0	0	0.0
T7 Public	0.005	272.089	1,490	1763.2514	2,626,391	1.0%	44	8395.986524	0	365,286.7
T7 Single	0.019	272.089	5,176	1735.5451	8,982,433	3.4%	149	4374.107146	0	650,857.9
T7 single construction	0.005	272.089	1,403	1736.4144	2,436,779	0.9%	40	4325.527391	0	174,605.6
T7 SWCV	0.007	272.089	2,011	1740.9092	3,500,495	1.3%	58	8454.803852	0	490,270.5
T7 tractor	0.027	272.089	7,421	1730.4135	12,841,047	4.9%	213	4688.374422	0	997,299.3
T7 tractor construction	0.004	272.089	1,020	1732.3055	1,766,690	0.7%	29	4627.439266	0	135,426.6
T7 utility	0.001	272.089	238	1736.7356	413,786	0.2%	7	8474.955024	0	58,092.0
T7IS	0.002	272.089	450	584.66745	262,863	0.1%	4	0	1130.650402	4,923.4
UBUS	0.002	272.089	493	744.18708	367,078	0.1%	6	0	596.1315348	3,625.0
UBUS	0.006	272.089	1,631	2492.0538	4,064,661	1.5%	67	0	0	0.0
All Other Buses	0.003	272.089	920	1179.728	1,084,838	0.4%	18	744.5866269	0	13,380.8
		272,089		262,595,019	1,000	4,350				13,482,303.7

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2035 Annual	SBUS	GAS	Aggregated	Aggregated	108	0.2%	4,842	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2035 Annual	SBUS	DSL	Aggregated	Aggregated	1,392	2.8%	47,134	1.7%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2035 Annual	T6 Ag	DSL	Aggregated	Aggregated	50	0.1%	1,769	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2035 Annual	T6 Public	DSL	Aggregated	Aggregated	475	1.0%	8,991	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2035 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	3	0.0%	173	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	8	0.0%	598	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	2	0.0%	99	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 OOS small	DSL	Aggregated	Aggregated	5	0.0%	343	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 instate consl	DSL	Aggregated	Aggregated	189	0.4%	10,842	0.4%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2035 Annual	T6 instate consl	DSL	Aggregated	Aggregated	470	1.0%	31,962	1.1%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2035 Annual	T6 instate heav	DSL	Aggregated	Aggregated	1,127	2.3%	64,532	2.3%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2035 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,793	5.7%	189,863	6.8%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2035 Annual	T6 utility	DSL	Aggregated	Aggregated	71	0.1%	1,432	0.1%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2035 Annual	T6TS	GAS	Aggregated	Aggregated	1,073	2.2%	50,146	1.8%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2035 Annual	T7 Ag	DSL	Aggregated	Aggregated	89	0.2%	6,408	0.2%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2035 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	559	1.1%	135,491	4.8%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2035 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	49	0.1%	11,773	0.4%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
272,089	57	4,754

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
262,595,019	13,482,304	276,077,323	907184.7	304.32	111,078.0

Contra Costa	2035 Annual	SBUS	GAS	Aggregated	Aggregated	108	0.2%	4,842	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2035 Annual	SBUS	DSL	Aggregated	Aggregated	1,392	2.8%	47,134	1.7%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2035 Annual	T6 Ag	DSL	Aggregated	Aggregated	50	0.1%	1,769	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2035 Annual	T6 Public	DSL	Aggregated	Aggregated	475	1.0%	8,991	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2035 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	3	0.0%	173	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	8	0.0%	598	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	2	0.0%	99	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 OOS small	DSL	Aggregated	Aggregated	5	0.0%	343	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 instate cons	DSL	Aggregated	Aggregated	189	0.4%	10,842	0.4%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2035 Annual	T6 instate cons	DSL	Aggregated	Aggregated	470	1.0%	31,962	1.1%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2035 Annual	T6 instate heav	DSL	Aggregated	Aggregated	1,127	2.3%	64,532	2.3%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2035 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,793	5.7%	189,863	6.8%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2035 Annual	T6 utility	DSL	Aggregated	Aggregated	71	0.1%	1,432	0.1%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2035 Annual	T6TS	GAS	Aggregated	Aggregated	1,073	2.2%	50,146	1.8%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2035 Annual	T7 Ag	DSL	Aggregated	Aggregated	89	0.2%	6,408	0.2%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2035 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	559	1.1%	135,491	4.8%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2035 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	49	0.1%	11,773	0.4%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

Emission Estimate With Pavley and LCFS 2035

	VMT Fraction	San Ramon Miles/Day			Run Emis (gms/mile)	gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	
		Non-Passenger	Miles/Day/Veh Class	Run Emis (gms/mile)						g/day	g/day
LHD1	0.423	272.089	115,220	874.89854	100,805,633	0.427	1,856	104.7280049	784.6746186	1,650,731.0	
LHD1	0.206	272.089	55,915	469.70842	26,263,583	0.207	901	127.5780619	0	114,908.5	
LHD2	0.031	272.089	8,437	874.89856	7,381,316	0.031	135	104.7280048	788.4087013	120,667.3	
LHD2	0.054	272.089	14,655	469.27268	6,877,281	0.054	235	127.5780601	0	29,940.8	
Motor Coach	0.001	272.089	363	1555.7768	565,226	0.001	5	10718.13672	0	56,159.2	
OBUS	0.010	272.089	2,796	609.7014	1,704,557	0.010	44	366.6608391	1500.197704	82,081.1	
PTO	0.000	272.089	0	1925.1407	0	0.000	0	0	0	0.0	
SBUS	0.002	272.089	658	667.90794	439,428	0.002	11	0	468.3497001	4,969.8	
SBUS	0.036	272.089	9,700	1162.0894	11,271,938	0.037	163	3477.557995	0	565,562.3	
T6 Ag	0.001	272.089	353	1062.7183	374,818	0.001	6	628.1696804	0	3,645.2	
T6 Public	0.008	272.089	2,278	1067.9263	2,432,380	0.008	33	663.5784488	0	21,760.3	
T6 CAIRP heavy	0.000	272.089	14	1058.3603	14,575	0.000	0	671.7357382	0	147.0	
T6 CAIRP small	0.000	272.089	42	1054.236	44,421	0.000	1	671.2057114	0	426.1	
T6 OOS heavy	0.000	272.089	8	1058.3603	8,356	0.000	0	671.7357382	0	84.3	
T6 OOS small	0.000	272.089	24	1054.236	25,467	0.000	0	671.2057114	0	244.3	
T6 instate construction heavy	0.003	272.089	765	1064.9541	814,298	0.004	17	671.7502475	0	11,089.0	
T6 instate construction small	0.006	272.089	1,661	1056.35	1,754,729	0.008	35	671.2057114	0	23,705.4	
T6 instate heavy	0.023	272.089	6,316	1063.5326	6,717,404	0.023	101	671.9310897	0	68,097.9	
T6 instate small	0.054	272.089	14,571	1055.8329	15,384,828	0.052	224	671.2057114	0	150,647.3	
T6 utility	0.001	272.089	347	1060.8442	368,201	0.001	5	672.1390733	0	3,453.2	
T6TS	0.023	272.089	6,263	609.7014	3,818,720	0.023	100	226.422099	994.0650001	121,900.6	
T7 Ag	0.002	272.089	639	1563.139	998,473	0.002	10	3331.036973	0	34,363.5	
T7 CAIRP	0.010	272.089	2,687	1549.1989	4,163,444	0.009	39	26437.60249	0	1,042,884.3	
T7 CAIRP construction	0.001	272.089	170	1549.4274	262,994	0.001	4	26311.73675	0	99,672.8	
T7 NNOOS	0.010	272.089	2,648	1546.7915	4,096,066	0.009	38	34372.55693	0	1,302,400.7	
T7 NOOS	0.004	272.089	979	1549.2056	1,516,227	0.003	14	32796.8904	0	471,146.9	
T7 other port	0.002	272.089	411	1595.9792	655,925	0.001	6	5815.341668	0	35,103.4	
T7 POAK	0.007	272.089	1,919	1596.4009	3,062,873	0.006	26	9987.045991	0	264,623.6	
T7 POLA	0.000	272.089	0	0	0	0.000	0	0	0	0.0	
T7 Public	0.005	272.089	1,490	1586.9262	2,363,752	0.005	21	7556.387872	0	161,269.8	
T7 Single	0.019	272.089	5,176	1561.9906	8,084,189	0.017	73	3936.696431	0	288,990.5	
T7 single construction	0.005	272.089	1,403	1562.7729	2,193,102	0.007	30	3892.974652	0	116,954.5	
T7 SWCV	0.007	272.089	2,011	1566.8183	3,150,445	0.007	29	7609.323467	0	219,295.3	
T7 tractor	0.027	272.089	7,421	1557.3722	11,556,943	0.024	105	4219.53698	0	444,470.4	
T7 tractor construction	0.004	272.089	1,020	1559.0749	1,590,021	0.005	22	4164.695339	0	90,755.6	
T7 utility	0.001	272.089	238	1563.062	372,407	0.001	3	7627.459522	0	26,578.5	
T7IS	0.002	272.089	450	526.2007	236,577	0.002	8	0	1017.585361	8,214.8	
UBUS	0.002	272.089	493	669.76837	330,370	0.002	8	0	536.5183813	4,268.4	
UBUS	0.006	272.089	1,631	2242.8484	3,658,194	0.006	26	0	0	0.0	
All Other Buses	0.003	272.089	920	1061.7552	976,354	0.003	14	670.1279642	0	9,111.2	
					236,335,517	1.000	4,350			7,650,324.6	

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2035 Annual	SBUS	GAS	Aggregated	Aggregated	108	0.2%	4,842	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2035 Annual	SBUS	DSL	Aggregated	Aggregated	1,392	2.8%	47,134	1.7%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2035 Annual	T6 Ag	DSL	Aggregated	Aggregated	50	0.1%	1,769	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2035 Annual	T6 Public	DSL	Aggregated	Aggregated	475	1.0%	8,991	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2035 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	3	0.0%	173	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	8	0.0%	598	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	2	0.0%	99	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 OOS small	DSL	Aggregated	Aggregated	5	0.0%	343	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 instate consi	DSL	Aggregated	Aggregated	189	0.4%	10,842	0.4%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2035 Annual	T6 instate consi	DSL	Aggregated	Aggregated	470	1.0%	31,962	1.1%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2035 Annual	T6 instate heav	DSL	Aggregated	Aggregated	1,127	2.3%	64,532	2.3%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2035 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,793	5.7%	189,863	6.8%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2035 Annual	T6 utility	DSL	Aggregated	Aggregated	71	0.1%	1,432	0.1%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2035 Annual	T6TS	GAS	Aggregated	Aggregated	1,073	2.2%	50,146	1.8%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2035 Annual	T7 Ag	DSL	Aggregated	Aggregated	89	0.2%	6,408	0.2%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2035 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	559	1.1%	135,491	4.8%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2035 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	49	0.1%	11,773	0.4%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
272,089	10,345	26,3007843

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
236,335,517	7,650,325	243,985,842	907184.7	268.9	98,166

Community Greenhouse Gas Inventory

Energy

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	PG&E 2013 emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	227,198,770	2,362	32944	3.5	1.2	30,305
Commercial	216,931,902	3,762	31455	3.4	1.2	28,936
City/County/Dist	23,938,168		3471	0.4	0.1	3,193
Total	468,068,840		67,870	7.3	2.6	62,434

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	15,770,965	164	92,260	8.7	0.2	83,912
Commercial	7,290,998	126	42,652	4.0	0.1	38,793
City/Co/Dist	492,120		2,879	0.3	0.0	2,618
Total	23,554,083		137,791	13.0	0.3	125,324

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in Planning Area			73,595	78,820	83,778	96,174
Contra Costa Population			1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction			0.06994344	0.07251097	0.07301583	0.072598397
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)			29,488	31,243	36,534	48,938

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,324,740	1,019	0.1600	0.0100	930
San Ramon Planning Area	96,174	74	0	0	68
Percent San Ramon/Contra Costa County	7.3%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,324,740	920	0.360	0.08000	864
San Ramon Planning Area	96,174	67	0	0	63
Percent San Ramon/Contra Costa County	7.3%				

Total San Ramon 130

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	96,174
Emissions (MTCO ₂ e per person)	66,243
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2035 Assumptions

	2008	2035
Planning Area Population	66,413	96,174
Water Usage (163 gallons/day)	10,840,000	15,676,362
Water Usage (million gallons/year)	3957	5722
Energy Usage (kWh)	21,409,163	30,961,050
Energy Usage (MWh)	21,409	30,961

Year 2035 Emissions

Greenhouse Gas	Electricity	2035	2035	2035
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO2e
	(pounds per MWh)			
Carbon dioxide	290	8,978,705	4,489	4,072.7
Methane	0.031	959.79	0.480	9.1
Nitrous oxide	0.011	340.57	0.170	47.9
				4,129.8

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update.

Source for water usage: City of San Ramon General Plan (2010).

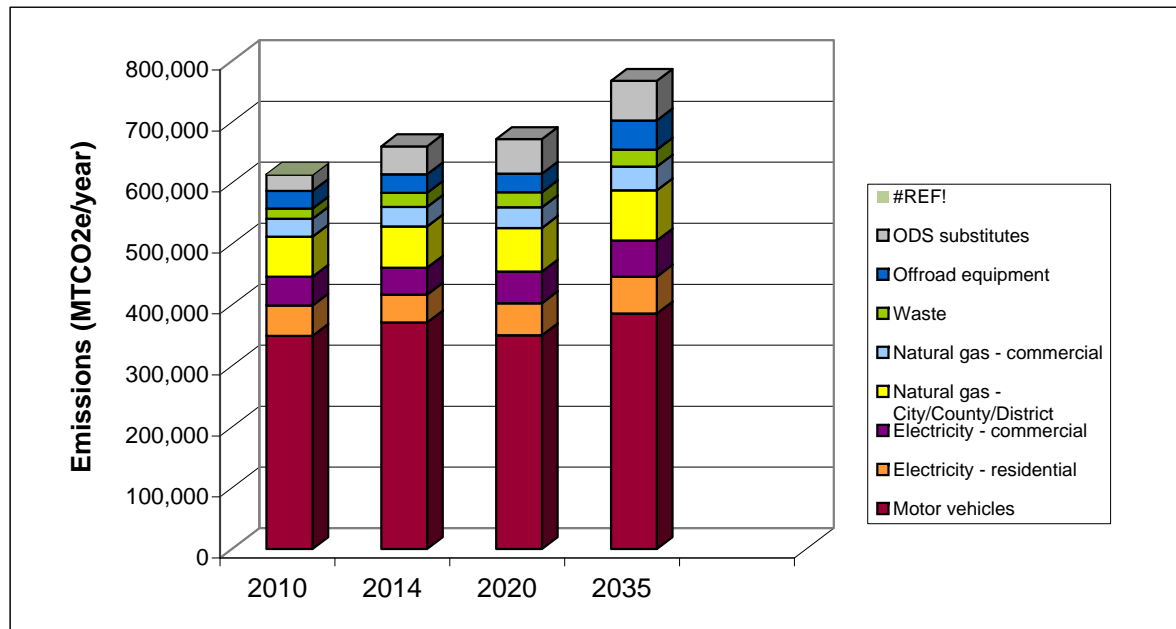
City Limits Modeling Results

Community Greenhouse Gas Business as Usual Inventory

Summary

Prepared by First Carbon Solutions

Source	2010	2014	2020	2035
Motor vehicles	349,246	371,308	350,366	386,183
Electricity - residential	49,860	45,588	52,820	60,524
Electricity - commercial	47,240	44,401	51,445	58,948
Electricity - City/County/District	7,685	4,900	5,677	6,505
Electricity - T&D Losses	7,167	6,490	7,520	8,617
Natural Gas - residential	65,646	67,604	71,792	82,263
Natural gas - commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,525	23,094	24,525	28,102
Water Transport/Treatment Electricity	6,320	6,204	7,188	8,236
Offroad equipment	28,908	30,628	30,628	47,844
ODS substitutes	26,763	45,709	56,520	64,762
Total	637,308	679,958	694,622	793,395



Emission Reductions from Local Measures

Reductions without Local Measures

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	350,365.8	274,816	261,234.2	89,131.5
Reduction			89,131.5	25.44%

Reductions from Land Use Strategy 2020

	Reduction Percentage	Emissions MTCO ₂ e
2020 Lt Duty Vehicle Emissions without Local Measures		187,713.6
SB 375 Land Use Strategy	4.10%	7,696
Emissions after reduction		180,017

Source: ARB, 2014

Technical Evaluation of Greenhouse Gas Emissions Reduction Quantification for the ABAG and MTC SB 375 SCS, April 2014

2035 Emission Emissions without Local Measures

Mobile Source Emissions	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Motor Vehicles	386,182.9	299,602	235,075.4	151,107.5
Reduction		86,580.6		39.13%

Reductions from Land Use Strategy 2035

	Reduction Percentage	Emissions MTCO2e
2035 Light Duty Emissions without Local Measures		139,436.4
SB 375 Land Use Strategy	8.70%	12,131
Lt Duty Emissions after reduction		127,305

Source: ARB 2014. Technical Evaluation of MTC SB375 Strategy
MTC estimates that strategies implementing SB 375 will reduce per capita VMT by 8.7% by 2035

Water Use	Population	Water Use (gal/day)	Mgal/Day	Mgal/year	20% Reduction	25% Reduction
Per capita water use 2009 (gal)		163				
Population 2010	72,148	11,760,124	11.76	4,292.4		
Population 2020	82,057	13,375,268	13.38	4,882.0	976.4	
Population 2035	94,024	15,325,912	15.33	5,594.0		1,398.5

Electric Intensity Factors	kWh/mgal	2020 Energy Savings (kWh)	2035 Energy Savings (kWh)
Supply	2,117	2,067,027	2,960,602
Treatment	111	108,380	155,232
Distribution	1,272	1,241,974	1,778,879
Wastewater Treatment	1,911	1,865,890	2,672,513
Total		3,417,381	4,894,713

Emission Reductions from Water Use	PG&E Emissions Rate (MTCO2/MWh)	Emission Reductions (MTCO2e)
2020 Reductions	0.131	447.7
2035 Reductions	0.131	641.2

Project Reduction Potential From Land Use and Transportation Measures				Global Max Suburban Center (percent)
Land Use and Transportation		Reduction Range (percent)	Global Maximum Suburban (percent)	
Compact Development	LUT-1, LUT-2	1.5 to 30		
Mixed Use Development	LUT-3	9 to 30		
Pedestrian Orientation	LUT-4, TST-2	6.7 to 20		
Bicycle Infrastructure	LUT-8, TST-5	Not quantified		
Transit Service Enhancements	TST-3, TST-4	0.02 to 8.2		
TDM Programs at Commercial	TRT-1, TRT-2, TRT-3	1 to 21		
TDM Measures at Comm	TRT-4 through TRT-11, TRT-14, TRT-15	0.3 to 21		
Maximum Combined Reduction			15	20

Source: Reductions from CAPCOA 2010

Energy Related		
Exceed Title 24		1-100
Water Conservation		1-20
Solid Waste Reduction		
Alternative Energy Gen		0-100
Programs for Existing Sources		
Infrastructure benefiting Existing Development		
Improve Traffic Flow	RPT-2	0-45

This information represents the range of reductions that can be achieved by individual projects implementing the General Plan

Source: CAPCOA 2010 Table 6.2

Solid Waste

Reductions from Diversion and Recycling **Per Capita (lbs/day)**

2008 Waste Generation (tons)	40,413	3.6
2010 Waste Generation (tons)	36,325	2.8
Emissions MTCO ₂ e	16,525	
Emission Rate (MTCO ₂ e/ton/yr)	0.45492	
2010 Target (50% Diversion) lbs/day		5.7
2020 Target (75% Diversion) tons		3.1
2020 Waste at 75% Diversion (tons/yr)	42,680	2.85

	Population	Per capita Emission (lbs/day)	Waste Gen (lbs/day)	Waste Gen (tons/year)	Waste Emissions MTCO₂e
2014 BAU	77,270	3.6	278,172	50,766	23,094
2014 Actual (2012 report)	77,270	2.4	185,448	33,844	15,396
Emission Reduction MTCO ₂ e					7,698
2020 BAU	82,057	3.6	295,405	53,911	24,525
2020 with Mandate	82,057	3.1	254,376	46,424	21,119
Emission Reduction MTCO ₂ e					3,406
2035 BAU	94,024	3.6	338,486	61,774	28,102
2035 with Mandate	94,024	3.1	291,474	53,194	24,199
Emission Reduction MTCO ₂ e					3,903

Local Reduction Summary				
Sector			2020 (MTCO2e)	2035 MTCO2e
Motor Vehicles	Land Use and Transportation Str		7,696	12,131
Electricity	Water Conservation		448	641
Waste	75% Waste Diversion Target		3,406	3,903
Total all Sectors			11,550	16,675

Per Capita Emissior Per Service Populaton				
2020 BAU		694,234		5.283926289
2020 Adj BAU		510,287		3.883878088
2020 Local Reductions		11,550		
2020 w/all Reductions		498,737	6.08	3.795967623
Percent Reduction from BAU		28.16%		
2020 Target (21.65%)		543,932		
2020 Target Service Population				4.139956247

Per Capita Emissior Per Service Populaton				
2035 BAU		792,950		
2035 Adj BAU		528,894		
2035 Local Reductions		16,675		
2035 w/all Reductions		512,219	5.45	
Percent Reduction from BAU		35.40%		
2035 Interim Target		475,770	5.06	
Additional Reductions Needed		36,449	0.39	

	2010	2014	2020	2035
Service Population (Population + Jobs)	116,028	123,264	131,386	151,691

Reductions from State Measures**Targets based on State Reductions for AB 32**

State Inventory 2010 MTCO ₂ e	451.6
New State Inventory 2020 BAU MTCO ₂ e	545.0
State Inventory 2020 Reduced MTCO ₂ e	507.0
AB 32 target - 1990 EI MTCO ₂ e	427.0
Reductions Required from BAU MTCO ₂ e	118.0
Percent Reduction Rqd BAU	21.7
Reduction from 2010	24.6
Percent Reduction from 2010	5.4

2020 Emission Reduction Calculations				
	Emissions	Population	Per Capita	Reduction
San Ramon 2010 Inventory	588,567	72,148	8.16	
San Ramon 2020 BAU Inventory	679,152	82,057	8.28	
San Ramon 2020 Target	532,107	82,057	6.48	21.65%
Reduction Required from BAU	147,046			
Reductions Achieved	184,469			
Emissions with Reductions	494,683		6.03	27.16%

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	350,366	274,816	261,234.2	89,132
Reduction		75,549.7	13,581.8	25.44%

Light Duty Reductions in 2020	CO2 tons/year	MTCO2e/year
Light Duty Passenger Cars and Trucks	220,497.2	
LEV III 2020 Reduction 3% and Vehicle Efficiency	6,614.9	
Vehicle Efficiency Measures	6,966.9	
Total Inventory 2020	206,915.4	187,713.6

ARB estimate of LEV Reductions from 2016 to 2020 is 3% of fleet

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2020 Reductions
California Reductions in MMT CO2e	0.93
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0041
San Ramon 2020 BAU Transportation EI in MTCO2e	350,365.8
Reduction in HD emissions MTCO2e	1,446.3

Med/HDT Hybridization	2020 Reductions
California Reductions in MMT CO2e	0.5
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0022
San Ramon 2020 BAU Transportation EI in MTCO2e	350,365.8
Reduction in HD emissions MTCO2e	777.6
	2,223.8

Light Duty Vehicle Efficiency Measures	2020 Reductions	San Ramon Reduction MTCO2e
Tire Pressure Regulation	0.55	855.3
Tire Tread Standard	0.3	466.5
Low Friction Oil	2.2	3,421.2

11/21/2014

Total	3.05	4,743.1
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.013537506	
San Ramon 2020 BAU Transportation EI in MTCO2e	350,365.8	
Reduction from Vehicle Efficiency Measures in MTCO2e	4,743.1	
Total Reductions all Measures	6,966.9	

Mobile Reductions Summary

	MTCO2e/ year
LEV III	6,614.9
Vehicle Efficiency	6,966.9
	13,581.8

Energy Emissions

	2020 EI MTCO2e	2020 w/RPS	RPS Reduction
2020 Electricity Residential	52,820	25,928	26,892
2020 Electricity Commercial	51,445	25,253	26,192
Electricity - City/County/District	5,677	2,787	2,890
Total	109,942	53,967	55,975

Reductions based on independent third-party estimate of PG&E emission rate to comply with AB 32.

	2020 MTCO2e	T24 Reductions	2020 w/T24
2020 Natural Gas Residential	71,792	443	71,350
2020 Natural Gas Commercial	33,856	620	33,235
Natural gas - City/County/District	2,285	-9	2,294
	105,648	1,063	104,585

PG&E Portfolio

	Percent
2010 Percentage	17.7
2020 Mandate Percentage	33
Reduction	15.3
Included in Emission Factor from PG&E in spreadsheets	

Title 24 Reductions 2008 and 2013 Updates

	2020 BAU MTCO2e	2010 BAU MTCO2e	Increase 2010 to 2020	Emission Reduction
Electricity Residential	52,820	49,860	2,961	876
Electricity Commercial	51,445	47,240	4,205	760
Electricity - City/County/District	5,677	7,685	-2,008	-363
Total	109,942	104,784	5,158	1,273
Natural Gas Residential	71,792	65,646	6,146	443
Natural Gas Commercial	33,856	29,602	4,254	620
Natural gas - City/County/District	2,285	2,347	-62	-9
	107,933	97,595	10,338	1,054
Title 24 Totals				2,327

Commercial reductions include 3 years reductions at 2008 standard and 7 years at 2013 standard.

2008 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	648	0.227	147
Multi-Family	0.270	240	0.197	47
Total 2020 Residential Electricity Reductions				194

Housing fractions from the San Ramon Housing Element

2008 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	1,346	0.1	135
Multi-Family	0.270	498	0.07	35
Total 2020 Residential Natural Gas Reductions				169

2008 Standards provide reductions from 2010-2013
Reductions from CEC 2008

2013 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	1,513	0.364	551
Multi-Family	0.270	560	0.233	130
Total 2020 Residential Electricity Reductions				681

2013 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	3,141	0.065	204
Multi-Family	0.270	1,162	0.038	44
Total 2020 Residential Natural Gas Reductions				248

Emission Reductions from CEC 2012 Impact Analysis of 2013 T24 Standards

11/21/2014

Reductions based on development from 2014-2020.

	2020 Adj EI MTCO2e	Title 24 Reductions	2020 EI W/T24	2020 BAU	Reduction from BAU
2020 Electricity Residential	25,928	876	25,052	52,820	27,768
2020 Electricity Commercial	25,253	760	24,493	51,445	26,952
2020 Electricity City/County/D	2,787	-363	3,150	5,677	2,527
Total	51,181	1,273	49,908		57,248
2020 Nat Gas Residential	71,792	443	71,350	71,792	443
2020 Nat Gas Commercial	33,856	620	33,235	33,856	620
2020 Nat Gas City/County/Di	2,285	-9	2,294	2,285	-9
Total	105,648	1,054	104,594		1,054

Ozone Depleting Substances

	MTCO2e
2020 BAU Emissions	56,520
ARB Refrigerant Management Program Reduction 50%	0.5
2020 Reduction	28,260

Emission reductions estimates from ARB Appendix B. California Facilities and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

<i>Emissions (MTCO2e/year)</i>	2020 BAU	Reductions in 2020	Adj BAU 2020	Percent Reduction
Motor vehicles	350,366	89,132	261,234	25.44%
Electricity - residential	52,820	27,768	25,052	52.57%
Electricity - commercial	51,445	26,952	24,493	52.39%
Electricity - City/County/District	5,677	2,527	3,150	44.52%
Electricity - T&D Losses	7,520	3,932	3,588	52.29%
Natural gas - residential	71,792	443	71,350	0.62%
Natural gas - commercial	33,856	620	33,235	1.83%
Natural gas - City/County/District	2,285	-9	2,294	-0.39%
Waste	24,525	3,406	21,119	13.89%
Water Transport	7,188	1,438	5,750	20.00%
Offroad equipment	30,628	0	30,628	0.00%
ODS substitutes	56,520	28,260	28,260	50.00%
Total	694,622	184,469	510,153	26.56%

BAU assumes 2005 emission rates to eliminate the effect of controls

Source Group	State Measures	Emissions (MTCO ₂ e/year)
		2020
Motor vehicles	Pavley and Low Carbon Fuel Standard	75,550
	Low Emission Vehicle Program III	6,615
	Tire Tread Program	467
	Tire Pressure Program	855
	Low Friction Oil	3,421
	Aerodynamic Efficiency/Hybridization	2,224
	Subtotal	89,132
Electricity - residential	Renewable Portfolio Standards	26,892
	Title 24 Energy Efficiency Standards	876
Electricity – commercial	Renewable Portfolio Standards	26,192
	Title 24 Energy Efficiency Standards	760
	City/County/District RPS	2,890
	City/County/District Title 24	-363
	Subtotal	57,248
Electricity - T&D Losses	T&D Losses	3,932
Electricity - Water Transport	Green Building Code and Model Water Conservation Ord.	1,438
Natural Gas-Residential	Title 24 Energy Efficiency Standards	443
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	620
Natural gas - City/County/District		-9
	Subtotal	1,054
Waste	Waste	3,406
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	28,260
Total		184,469
Source: First Carbon Solutions		

Emission Summary BAU and Regulations All Years

Business as Usual Modeling Results

	2010 Baseline	2014 BAU	2020 BAU	2035 BAU
Motor vehicles	349,246	371,308	350,366	386,183
Electricity - residential	49,860	45,588	52,820	60,524
Electricity - commercial	47,240	44,401	51,445	58,948
Electricity - City/County/District	7,685	4,900	5,677	6,505
Electricity - T&D Losses	6,716	6,155	7,132	8,172
Natural gas - residential	65,646	67,604	71,792	82,263
Natural gas - commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,525	23,094	24,525	28,102
Water Transport	6,320	6,204	7,188	8,236
Offroad equipment	28,908	30,628	30,628	47,844
ODS substitutes	26,763	45,709	56,520	64,762
<u>Total</u>	<u>636,857</u>	<u>679,623</u>	<u>694,234</u>	<u>792,950</u>

Per Capita Emissions 8.827090917 8.282327728 8.46038655 8.4334879

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2014 Adj	2020 Adj	2035 Adj
Motor vehicles	331,821	349,501	274,816	299,602
Electricity - residential	37,285	34,545	25,928	29,709
Electricity - commercial	36,314	33,645	25,253	28,936
Electricity - City/County/District	4,007	3,713	2,787	3,193
Electricity - T&D Losses	5,034	5,640	3,501	4,011
Natural gas - residential	65,646	67,604	71,792	82,263
Natural gas - commercial	29,602	31,881	33,856	38,793
Natural gas - City/County/District	2,347	2,152	2,285	2,618
Waste	16,525	16,382	16,575	19,934
Water Transport	4,738	4,701	3,528	4,043
Offroad equipment	28,908	30,628	30,628	47,844
ODS substitutes	26,763	45,709	56,520	64,762
<u>Total</u>	<u>588,990</u>	<u>626,101</u>	<u>547,469</u>	<u>625,710</u>

Adjusted BAU with Off Model Reductions from Title 24 and LEV III

	2010 Ajd	2014 Adj	2020 Adj	2035 Adj
Motor vehicles	331,821	349,501	261,234	235,075
Electricity - residential	37,285	34,545	25,017	27,362
Electricity - commercial	36,314	33,645	24,710	28,354
Electricity - City/County/District	4,007	3,713	2,727	3,258
Electricity - T&D Losses	5,034	5,640	3,588	4,034
Natural gas - residential	65,646	67,604	71,421	79,492
Natural gas - commercial	29,602	31,881	33,568	37,719
Natural gas - City/County/District	2,347	2,152	2,266	2,587
Waste	16,525	16,382	21,119	24,199
Water Transport	4,738	4,701	5,750	6,589
Offroad equipment	28,908	30,628	30,628	47,844
ODS substitutes	26,763	22,854	28,260	32,381
<u>Total</u>	<u>588,990</u>	<u>603,246</u>	<u>510,287</u>	<u>528,894</u>

Per Capita Emissions	8.16	7.81	6.22	5.63
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Target Inventories

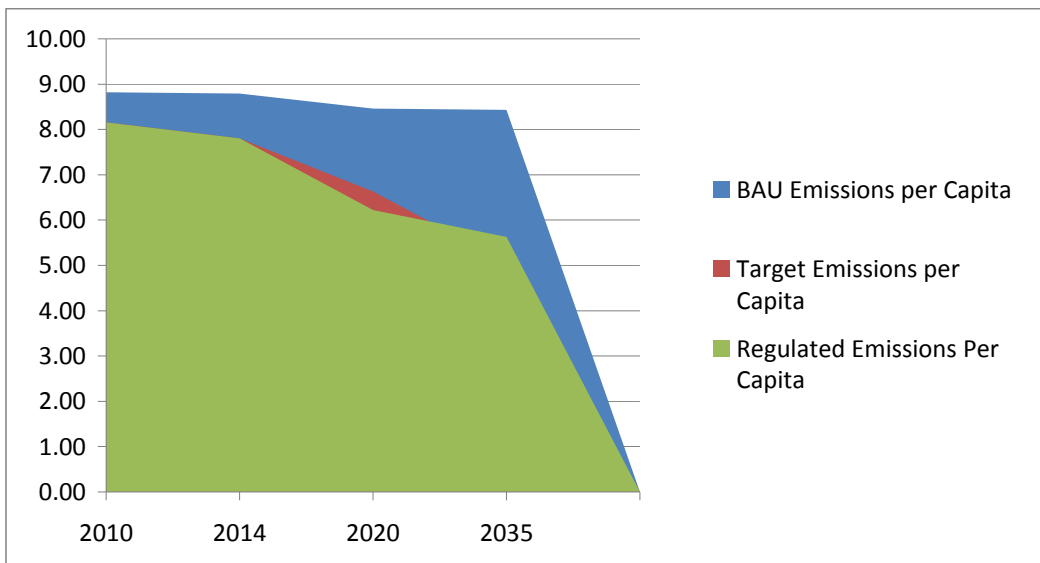
	2010	2014	2020	2035
BAU Inventory	636,857	679,623	694,234	792,950
Target Inventories			543,932 ND	
Inventories with Regulations			510,287	528,894

Population in City Limits	72,178	77,270	82,057	94,024
Employment in City Limits	43,880	45,994	49,329	57,667
Service Population	116,058	123,264	131,386	151,691

	2010	2014	2020	2035
BAU Emissions per Capita	8.82	8.80	8.46	8.43
Target Emissions per Capita	8.16	7.81	6.63	5.06
Regulated Emissions Per Capita	8.16	7.81	6.22	5.63

	2010	2014	2020	2035
BAU Emissions per Service Pop	5.49	5.51	5.28	5.23
Target Emissions per Service Pop			4.14	3.14
Regulated Emissions Per Service Pop	5.07	4.89	3.88	3.49

Population in Planning Area		78,820	83,778	96,174
City/Planning Area Adj Factor		1.020059532	1.02097323	1.0228665
BAU Emissions (MTCO _{2e})		693,256	708,794	811,082
Emissions with Regulations (MTCO _{2e})		615,347	520,990	540,988



2020 Target
2035 Target

21.6 percent below 2020 BAU
40 percent below 2020 Target (1990 levels)

2035 Emission Reduction Estimates

	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Mobile Source Emissions				
Motor Vehicles	386,182.9	299,602.4	235,075.4	151,107.5
Reduction		86,580.6	64,526.9	39.13%

LEV III Reduction Estimates

Gasoline Vehicles	Fleet VMT Fractions in 2035	MTCO _{2e} tons/year	
Light Duty Passenger Cars and Trucks		210,547.5	
LEV III 2035 Reduction 27%		56,847.8	
Total Inventory 2035		153,699.7	139,436

	MTCO _{2e} / year
LEV III Reduction	56,848
Pavley I and LCFS Reduction	86,581
Efficiency Measures	7,679
Total Reductions for Motor Vehicles	151,107

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement 2035 Reductions

California Reductions in MMT CO2e	0.93
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0041
San Ramon 2035 BAU Transportation EI in MTCO2e	386,182.9
Reduction in HD emissions MTCO2e	1,594.1

Med/HDT Hybridization 2035 Reductions

California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
San Ramon 2035 BAU Transportation EI in MTCO2e	386,182.9	
Reduction in HD emissions MTCO2e	857.0	2,451.1

		San Ramon Reduction MTCO2e
Light Duty Vehicle Efficiency Measures	2035 Reductions	

Tire Pressure Regulation MMTCO2e	0.55	942.7
Tire Tread Standard MMTCO2e	0.3	514.2
Low Friction Oil MMTCO2e	2.2	3,771.0
Total (MMTCO2e)	3.05	5,228.0
California 2020 BAU EI Transportation MMTCO2e	225.3	
Percent Reduction in Transportation	0.013537506	
San Ramon 2035 BAU Transportation EI in MTCO2e	386,182.9	
Reduction from Vehicle Efficiency Measures in MTCO2e	5,228.0	
Total Reductions all Measures	7,679.1	

Reduction based on ARB Scoping Plan reductions from Efficiency Measures

Energy Emissions						
	2035 EI MTCO₂e	2035 w/RPS	RPS Reduction	T24 Reduction	Total Reduction	
Electricity						
2035 Electricity Residential	60,524	29,709	30,814	2,348	33,162	
2035 Electricity Commercial	58,948	28,936	30,012	582	30,594	
2035 City/County/District	6,505	3,193	3,312	-65	3,247	
Total	125,976	61,838	64,138		63,756	

Reduction estimates from inventory spreadsheets and CEC Title 24 Report for 2008 and 2013

Natural Gas			
	2035 MTCO₂e	T24 Reductions	2035 w/T24
2035 Natural Gas Residential	82,263	2,770	79,492
2035 Natural Gas Commercial	38,793	1,074	37,719
2035 NG City/County/District	2,618	32	2,587
Total	121,056	3,876	121,024

Reduction estimates from inventory spreadsheets and CEC Title 24 Reports for 2008 and 2013

Title 24 Reductions						
	2010 MTCO₂e	2035 BAU MTCO₂e	Increase 2010 to 2035	Emission Reduction	Residential	Commercial
Electricity Residential	49,860	60,524	10,664	2,348	2,348	
Electricity Commercial	47,240	58,948	11,708	647		647
Electricity City/County/District	7,685	6,505	-1,180	-65		-65
Total	104,784	125,976	21,192	2,929		
Natural Gas Residential	65,646	82,263	16,616	2,770	2,770	
Natural Gas Commercial	29,602	38,793	9,191	1,074		1,074
NG City/County/District	2,347	2,618	272	32		32
Title 24 Totals	97,595	123,674	26,079	3,876	5,118	1,688

2008 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU Reduction Fraction MTCO₂e		
Single Family	0.730	934	0.227	212
Multi-Family	0.270	346	0.197	68
Total 2020 Residential Electricity Reductions				280

2008 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by		Reduction Fraction	MTCO2e
		LU			
Single Family	0.730	1,456		0.1	146
Multi-Family	0.270	538		0.07	38
Total 2020 Residential Natural Gas Reductions					183

2008 Standards provide reductions from 2010-2013
 Reductions from CEC 2008

2013 Title 24 San Ramon Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.730	6,851	0.25	1,713
Multi-Family	0.270	2,534	0.14	355
Total 2035 Residential Electricity Reductions				2,067

2013 Title 24 San Ramon Residential Development Projections Natural Gas

	Fraction	Emissions by		Reduction Fraction	MTCO2e
		LU			
Single Family	0.730	10,674		0.2	2,135
Multi-Family	0.270	3,948		0.09	355
Total 2035 Residential Natural Gas Reductions					2,490

Emission Reductions from CEC 2012
 Reductions based on development from 2014-2035.

	2035 EI MTCO2e w/RPS	Title 24 Reductions	2035 EI W/T24
2035 Electricity Residential	29,709	2,348	27,362
2035 Electricity Commercial	28,936	647	28,288
Total	58,645	2,995	55,650

Ozone Depleting Substances

	MTCO₂e
2035 BAU Emissions	64,762
ARB Refrigerant Management Program Reduction 50%	0.5
2035 Reduction	32,381

Emission reductions estimates from ARB Appendix B. California Facilities and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

Emission Reduction Summary

	<i>Emissions (MTCO₂e/year)</i>			Percent Reduction
	2035 BAU	Reductions in 2035	Adj BAU 2035	
Motor vehicles	386,183	151,107	235,075	39.13%
Electricity - residential	60,524	33,162	27,362	54.79%
Electricity - commercial	58,948	30,594	28,354	51.90%
Electricity City/County/District	6,505	3,247	3,258	49.91%
Electricity - T&D Losses	8,617	4,583	4,034	53.19%
Natural gas - residential	82,263	2,770	79,492	3.37%
Natural gas - commercial	38,793	1,074	37,719	2.77%
NG City/County/District	2,618	32	2,587	1.21%
Waste	28,102	3,903	24,199	13.89%
Electricity - Water Transpo	8,236	1,647	6,589	20.00%
Offroad equipment	47,844	0	47,844	0.00%
ODS substitutes	64,762	32,381	32,381	50.00%
<u>Total</u>	793,395	264,501	528,894	33.34%

Source Group	State Measures	Emissions (MTCO2e/year)
		2035
Motor vehicles	Pavley and Low Carbon Fuel Standard	86,581
	Low Emission Vehicle Program III	56,848
	Tire Tread Program	514
	Tire Pressure Program	943
	Low Friction Oil	3,771
	Aerodynamic Efficiency/Hybridization	2,451
	Subtotal	151,107
Electricity - residential	Renewable Portfolio Standards	30,814
	Title 24 Energy Efficiency Standards	2,348
Electricity – commercial	Renewable Portfolio Standards	30,012
	Title 24 Energy Efficiency Standards	582
	City/County/District RPS	3,312
	City/County/District Title 24	-65
	Subtotal	67,003
Electricity - T&D Losses	T&D Losses	4,583
Electricity - Water Transport	Green Building Code and Model Water Conservation Ord.	1,647
Natural Gas-Residential	Title 24 Energy Efficiency Standards	2,770
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	1,074
Natural gas - City/County/District		32
	Subtotal	3,876
Waste	Waste	3,903
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	32,381
Total		264,501
Source: First Carbon Solutions		

Transportation and Distribution Losses

Business as Usual Modeling Results

	2010 BAU	2014 BAU	2020 BAU	2035 BAU
Electricity - residential	49,860	45,588	52,820	60,524
Electricity - commercial	47,240	44,401	51,445	58,948
Electricity - City/County/E	7,685	4,900	5,677	6,505
Total E	104,784	94,888	109,942	125,976
T&D Loss	7,167	6,490	7,520	8,617

Adjusted Business as Usual Modeling RPS

	2010 Ajd	2014 Adj	2020 Adj	2035 Adj
Electricity - residential	37,285	34,545	25,017	27,362
Electricity - commercial	36,314	33,645	24,710	28,354
Electricity - City/County/E	4,007	3,713	2,727	3,258
Total E	77,606	71,903	52,454	58,974
T&D Loss	5,308	4,918	3,588	4,034
Reduction from BAU	1,859	1,572	3,932	4,583

T&D Loss for Western Region in 2010 is 6.84%

No rates were found for future years, so assumed constant rate.

T&D losses are expected to decline with increases in local production from solar or other distributed generation.

2035 Emission Reductions from Regulations

		MTCO ₂ e
	Pavley and Low Carbon Fuel Standard	902,450
	Low Emission Vehicle Program III	397,767
	Tire Tread Program	4,138
	Tire Pressure Program	7,587
	Low Friction Oil	30,347
	Aerodynamic/Efficiency	19,726
	<i>Subtotal</i>	1,362,015
RPS R	Renewable Portfolio Standards	154,774
E R	Title 24 Energy Efficiency Standards	12,810
RPS C	Renewable Portfolio Standards	160,204
E C	Title 24 Energy Efficiency Standards	4,196
	<i>Subtotal</i>	331,984
Nat Gas	Title 24 Energy Efficiency Standards	12,496
Nat Gas	Title 24 Energy Efficiency Standards	11,108
	<i>Subtotal</i>	23,604
Refrig	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	347,367
	<i>Subtotal</i>	347,367
		2,041,366

Community Greenhouse Gas Inventory BAU

Summary

Year: 2010

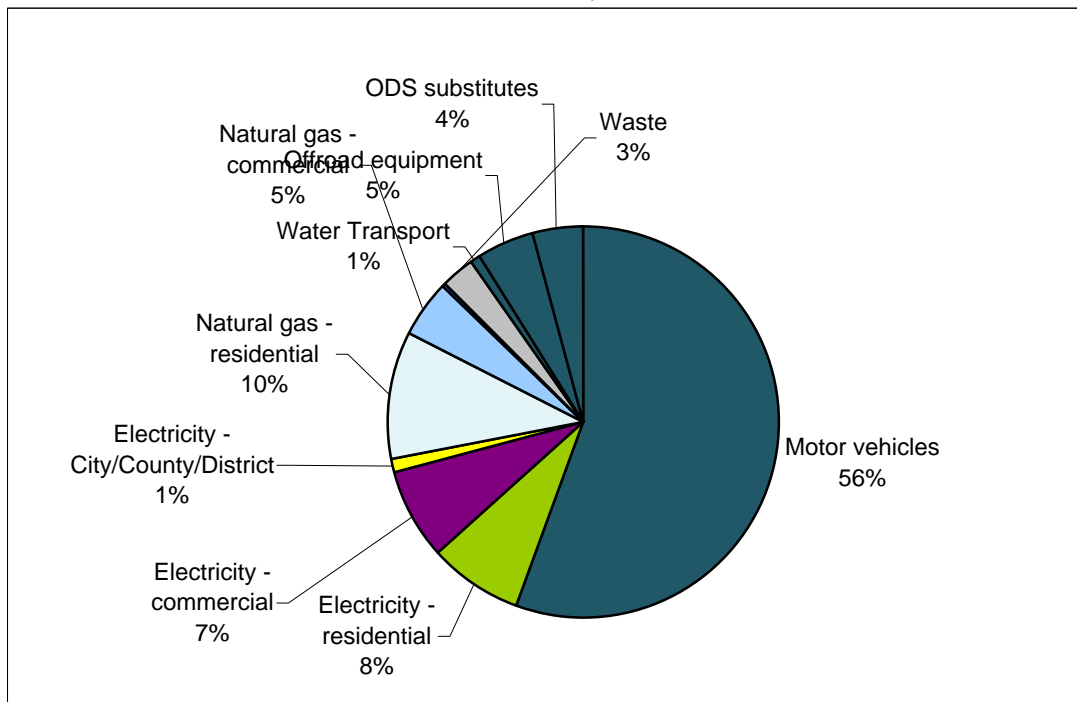
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	72,148	City of San Ramon/ DOF
Employment	43,880	City of San Ramon

County Information		
Population	1,052,211	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e
Motor vehicles	349,246
Electricity - residential	49,860
Electricity - commercial	47,240
Electricity - City/County/District	7,685
Natural gas - residential	65,646
Natural gas - commercial	29,602
Natural gas - City/County/District	2,347
Waste	16,525
Water Transport	6,320
Offroad equipment	28,908
ODS substitutes	26,763
Total	630,141



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,325

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,525	
Emissions (MTCO ₂ e/person)	0.2290	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 22, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,750,403 Source: MTC. 2014
Vehicle miles traveled / year 638,896,955 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	280,560.5	254,520.2
Non Passenger Vehicles	104,416.9	94,725.4
	384,977.4	349,245.6

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	260,601.6	236,413.8
Non Passenger Vehicles	103,563.9	93,951.6
	364,165.5	330,365.4

EMFAC Passenger Vehicle Emissions (SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT		CO2_RUNEX (gms/mile)	CO2_IDLEX (gms/vehicle/day)	CO2_STREX (gms/vehicle/day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_IDLEX(Pavley I+LCFS) (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)						
									Fraction	Trips (trips/day)												
Contra Costa	2005	Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	0	460.0964559	460.3646763	0	460.3646763						
Contra Costa	2005	Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	0	0	0	0						
Contra Costa	2005	Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	0	515.2677216	527.1606221	0	527.1606221						
Contra Costa	2005	Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	0	0	0	0						
Contra Costa	2005	Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	0	629.185079	633.3019897	0	633.3019897						
Contra Costa	2005	Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	0	0	0	0						
Contra Costa	2005	Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	0	792.1227449	570.5037165	0	792.1227449						
Contra Costa	2005	Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	0	368.5728982	0	0						
							627,174	24,468,550	1.000													
							avg miles/vehicle	39.0139465														

Emission Estimate Without Pavley and LCFS 2010

	VMT Fraction	SR VMT	CO2_RUNEX		Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day
			Miles/Day/Veh Class	(gms/mile)				
LDA	0.573	1,517,448	869,178	332.58389	289,074,626	38,895	460.0964559	17,895,458
LDA	0.002	1,517,448	3,627	362.24944	1,314,037	38,895	0	0
LDT1	0.071	1,517,448	107,925	380.64865	41,081,502	38,895	515.2677216	20,041,345
LDT1	0.000	1,517,448	137	373.58732	51,175	38,895	0	0
LDT2	0.192	1,517,448	291,848	455.82726	133,032,317	38,895	629.185079	24,472,163
LDT2	0.000	1,517,448	139	372.27263	51,626	38,895	0	0
MDV	0.161	1,517,448	244,347	570.50372	139,400,824	38,895	792.1227449	30,809,625
MDV	0.000	1,517,448	247	368.5729	90,974	38,895	0	0
Total Passenger Vehicle Emissions					604,097,081			93,218,591

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,517,448 39 38895.0141

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emis	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
604,097,081	93,218,591	697,315,672	907184.7	768.7	280,560.5

Emission Estimate With Pavley and LCFS 2010

	VMT Fraction	SR VMT	CO2_RUNEX X(Pavley I+LCFS)		Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX (Pavley I+LCFS) (gms/vehicle/day)
			Miles/Day/Veh Class	(gms/mile)				
LDA	0.573	1,517,448	869,178	300.25647	260,976,339	38,895	420.4717438	16,354,254
LDA	0.002	1,517,448	3,627	313.30139	1,136,481	38,895	0	0
LDT1	0.071	1,517,448	107,925	355.63726	38,382,148	38,895	475.6096597	18,498,844
LDT1	0.000	1,517,448	137	322.38538	44,161	38,895	0	0
LDT2	0.192	1,517,448	291,848	427.79489	124,851,125	38,895	589.6482804	22,934,378
LDT2	0.000	1,517,448	139	320.17919	44,402	38,895	0	0
MDV	0.161	1,517,448	244,347	553.19031	135,170,346	38,895	751.6158054	29,234,107
MDV	0.000	1,517,448	247	333.47098	82,310	38,895	0	0
Total Passenger Vehicle Emissions					560,687,312			87,021,584

San Ramon Vehicles

Avg Miles/Day CCC Vehicles
 1,517,448 39 38895.0141

EMFAC2011 Emission Rates

Region Type: County

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
560,687,312	87,021,584	647,708,897	907184.7	714.0	260,602

EMFAC Commercial Vehicle Emissions (Non-SB 375 Categories) 2010

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2010
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX
															(Pavley I+LCFS)	Pavley I+LCFS)	(Pavley I+LCFS)
													(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)		
													(gms/mile)	(gms/mile)	(gms/mile)		
													(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)		
Contra Costa	2010 Annual	LHD1	GAS	Aggregated	Aggregated	15,365	41.3%	686,475	32.7%	228,914	972.1094988	116.364456	819.7728342	972.1094988	116.364456	819.7728342	
Contra Costa	2010 Annual	LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	19.0%	102,207	832.3059325	141.748251	0	832.3059325	141.7482507	0	
Contra Costa	2010 Annual	LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.7%	19,696	972.1095363	116.338965	1045.68254	972.1095363	116.338965	1045.68254	
Contra Costa	2010 Annual	LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	4.1%	22,287	535.0134187	141.753311	0	535.0134187	141.7533106	0	
Contra Costa	2010 Annual	Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	7,150	0.3%	0	1745.971421	11338.6466	0	1745.971421	11338.64661	0	
Contra Costa	2010 Annual	OBUS	GAS	Aggregated	Aggregated	376	1.0%	23,638	1.1%	17,163	677.4460346	407.400915	1962.23896	677.4460346	407.4009152	1962.23896	
Contra Costa	2010 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	10,731	0.5%	0	2183.103618	0	0	2183.103618	0	0	
Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159	
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0	
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0	
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0	
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0	
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0	
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0	
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0	
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0	
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0	
Contra Costa	2010 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0	
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0	
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0	
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808	
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0	
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	
Contra Costa	2010 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	82,816	3.9%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0	
Contra Costa	2010 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	113	0.3%	26,809	1.3%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0	
Contra Costa	2010 Annual	T7 other port	DSL	Aggregated	Aggregated	58	0.2%	9,058	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0	
Contra Costa	2010 Annual	T7 PDAK	DSL	Aggregated	Aggregated	249	0.7%	28,206	1.3%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0	
Contra Costa	2010 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0	
Contra Costa	2010 Annual	T7 Public	DSL	Aggregated	Aggregated	197	0.5%	4,891	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0	
Contra Costa	2010 Annual	T7 Single	DSL	Aggregated	Aggregated	591	1.6%	44,648	2.1%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	
Contra Costa	2010 Annual	T7 single const	DSL	Aggregated	Aggregated	204	0.5%	15,416	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	
Contra Costa	2010 Annual	T7 SWCV	DSL	Aggregated	Aggregated	266	0.7%	13,310	0.6%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0	
Contra Costa	2010 Annual	T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	134,491	6.4%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0	
Contra Costa	2010 Annual	T7 tractor const	DSL	Aggregated	Aggregated	143	0.4%	11,494	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0	
Contra Costa	2010 Annual	T7 utility	DSL	Aggregated	Aggregated	30	0.1%	756	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0	
Contra Costa	2010 Annual	T7IS	GAS	Aggregated	Aggregated	74	0.2%	6,997	0.3%	1,485	584.6674163	0	2353.967488	584.6674163	0	2353.967488	
Contra Costa	2010 Annual	UBUS	GAS	Aggregated	Aggregated	64	0.2%	8,490	0.4%	255	744.1870709	0	615.0541717	744.1870709	0	615.0541717	
Contra Costa	2010 Annual	UBUS	DSL	Aggregated	Aggregated	235	0.6%	31,370	1.5%	941	2573.001593	0	0	2573.001593	0	0	
Contra Costa	2010 Annual	All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	6,973	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0	
						37,215	100.0%	2,099,212	1	409,952							
							MI/Veh	56.4075898									

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS 2010

VMT Fraction	San Ramon Miles/Day		Total Running Emissions		San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	Total Starting and Idling (g/day)							
	Non-Passenger	Miles/Day/Veh Class	(gms/mile)	(gms/day)												
LHD1	0.329	232.955	76,599	972.1095	0.427	1,856	116.3644561	819.7728342	1,737.4705							
LHD1	0.160	232.955	37,206	532.30593	0.207	901	141.7482507	901	127.6715							
LHD2	0.024	232.955	5,543	972.10954	0.031	135	116.338965	1045.68254	156.9950							
LHD2	0.042	232.955	9,752	535.01342	0.054	235	141.7533106	0	33.2675							
Motor Coach	0.003	232.955	758	1745.9714	0.001	5	11338.64661	0	59.4105							
OBUS	0.010	232.955	2,261	677.44603	0.010	44	407.4009152	1962.23896	104.1871							
PTO	0.000	232.955	93	2183.1036	0.000	0	0	0	0.0							
SBUS	0.002	232.955	482	742.11995	0.002	11	0	788.3524159	8.3655							
SBUS	0.001	232.955	348	1299.9836	0.037	163	3474.936051	0	965.1359							
T6 Ag	0.001	232.955	195	1214.0161	0.001	6	591.9178211	0	3.4349							
T6 Public	0.003	232.955	614	1210.2525	0.008	33	636.79636	0	20.8820							
T6 CAIRP heavy	0.000	232.955	14	1194.1438	0.000	0	666.3500758	0	145.8							
T6 CAIRP small	0.000	232.955	45	1187.5142	0.000	1	693.3277468	0	440.1							
T6 OOS heavy	0.000	232.955	8	1194.1438	0.000	0	666.3500758	0	83.6							
T6 OOS small	0.000	232.955	26	1187.5142	0.000	0	693.3277468	0	252.3							
T6 instate construction heavy	0.004	232.955	877	1206.7402	0.004	17	628.1342767	0	10.3690							
T6 instate construction small	0.010	232.955	2,275	1190.6752	0.008	35	671.5227753	0	23.7166							
T6 instate heavy	0.024	232.955	5,497	1206.7402	0.023	101	628.1342767	0	63.6592							
T6 instate small	0.063	232.955	14,729	1190.6752	0.052	224	671.5227753	0	150.7184							
T6 utility	0.000	232.955	102	1190.3417	0.001	5	669.3517103	0	3.4389							
T6TS	0.020	232.955	4,608	677.44602	0.023	100	251.5801036	1824.797808	207.3859							
T7 Ag	0.003	232.955	712	1780.2391	0.002	10	2354.915902	0	24.2937							
T7 CAIRP	0.039	232.955	9,118	1740.7084	0.009	39	29278.79509	0	1,154.9608							
T7 CAIRP construction	0.000	232.955	60	1740.7084	0.001	4	29278.79509	0	110.9125							
T7 NNOOS	0.044	232.955	10,257	1736.3283	0.009	38	37700.75308	0	1,428.5084							
T7 NOOS	0.014	232.955	3,321	1740.7084	0.003	14	37153.84079	0	533.7371							
T7 other port	0.004	232.955	954	1728.3376	0.001	6	4421.893594	0	26.6921							
T7 POAK	0.018	232.955	4,178	1732.4648	0.006	26	6989.078773	0	185.1874							
T7 POLA	0.000	232.955	0	0	0.000	0	0	0	0.0							
T7 Public	0.002	232.955	536	1806.7866	0.005	21	7861.899623	0	167.7901							
T7 Single	0.024	232.955	5,530	1771.2925	0.017	73	2423.170701	0	177.8835							
T7 single construction	0.010	232.955	2,243	1771.2925	0.007	30	2423.170701	0	72.7980							
T7 SWCV	0.006	232.955	1,458	1777.5297	0.007	29	8016.434181	0	231.0280							
T7 tractor	0.072	232.955	16,658	1754.4508	0.024	105	2452.592201	0	258.3470							
T7 tractor construction	0.007	232.955	1,672	1756.0931	0.005	22	2452.592201	0	53.4461							
T7 utility	0.000	232.955	88	1757.3339	0.001	3	8116.295492	0	28.2819							
T7IS	0.004	232.955	965	584.66742	0.002	8	0	2353.967488	19.0032							
UBUS	0.005	232.955	1,071	744.18707	0.002	8	0	615.0541717	4.8932							
UBUS	0.015	232.955	3,543	2573.0016	0.006	26	0	0	0.0							
All Other Buses	0.003	232.955	747	1211.582	0.003	14	615.1471436	0	8.3637							
										251,758.405	1.000	4,350				7,763.1566

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

	Avg Miles	Vehicles
VMT	CCC	
232,955	56	4,130

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
251,758,405	7,763,157	259,521,562	907184.7	286.07	104,416.9

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.93605	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2010 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2010 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.134277	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.522775	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.35171	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2010 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate With Pavley and LCFS 2010

LHD1	Fraction	San Ramon Non-Passenger		San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)		
		Miles/Day/Veh	Class (gms/mile)	gms/day	Fraction			g/day	g/day	
LHD1	0.329	232.955	76,599	972.1095	74,462,290	0.427	1,856	116.364457	844.3640322	1,783,111.8
LHD1	0.160	232.955	37,206	527.39826	19,622,590	0.207	901	141.7534111	0	127,676.2
LHD2	0.024	232.955	5,543	972.10948	5,388,376	0.031	135	116.3644473	903.4854957	137,786.9
LHD2	0.042	232.955	9,752	526.44899	5,134,120	0.054	235	141.7534184	0	33,267.5
Motor Coach	0.003	232.955	758	1742.3245	1,320,965	0.001	5	11555.74508	0	60,548.0
OBUS	0.010	232.955	2,261	677.44602	1,531,574	0.010	44	407.4009318	1761.361554	95,355.0
PTO	0.000	232.955	93	2153.9465	199,483	0.000	0	0	0	0.0
SBUS	0.002	232.955	482	742.11996	357,334	0.002	11	0	634.0321464	6,727.9
SBUS	0.001	232.955	348	1294.3814	450,813	0.037	163	3568.752088	0	580,393.4
T6 Ag	0.001	232.955	195	1205.6132	235,678	0.001	6	625.7370822	0	3,631.1
T6 Public	0.003	232.955	614	1194.0186	732,673	0.008	33	684.4317604	0	22,444.1
T6 CAIRP heavy	0.000	232.955	14	1191.3973	16,352	0.000	0	707.5576385	0	154.8
T6 CAIRP small	0.000	232.955	45	1191.1399	53,386	0.000	1	729.3957062	0	463.0
T6 OOS heavy	0.000	232.955	8	1191.3973	9,375	0.000	0	707.5576385	0	88.7
T6 OOS small	0.000	232.955	26	1191.1399	30,608	0.000	0	729.3957062	0	265.4
T6 instate construction heavy	0.004	232.955	877	1194.2524	1,047,093	0.004	17	675.6399373	0	11,153.2
T6 instate construction small	0.010	232.955	2,275	1191.6408	2,711,172	0.008	35	712.8362985	0	25,175.7
T6 instate heavy	0.024	232.955	5,497	1194.028	6,563,298	0.023	101	676.1970341	0	68,530.2
T6 instate small	0.063	232.955	14,729	1191.365	17,547,731	0.052	224	713.268798	0	160,088.0
T6 utility	0.000	232.955	102	1191.5212	121,760	0.001	5	711.4520522	0	3,655.2
T6TS	0.020	232.955	4,608	677.44602	3,121,611	0.023	100	251.5801003	1568.76771	181,813.9
T7 Ag	0.003	232.955	712	1760.1082	1,252,859	0.002	10	1995.749796	0	20,588.5
T7 CAIRP	0.039	232.955	9,118	1743.2692	15,895,237	0.009	39	13046.65123	0	514,651.3
T7 CAIRP construction	0.000	232.955	60	1743.3973	105,449	0.001	4	12949.21246	0	49,053.6
T7 NNOOS	0.044	232.955	10,257	1747.5251	17,925,203	0.009	38	22647.4898	0	858,129.5
T7 NOOS	0.014	232.955	3,321	1743.2692	5,788,641	0.003	14	16172.34489	0	232,325.4
T7 other port	0.004	232.955	954	1768.9847	1,686,746	0.001	6	5236.500333	0	31,609.3
T7 POAK	0.018	232.955	4,178	1768.133	7,387,399	0.006	26	8496.302855	0	225,123.9
T7 PCLA	0.000	232.955	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	232.955	536	1764.861	945,702	0.005	21	8094.221325	0	172,748.3
T7 Single	0.024	232.955	5,530	1747.6355	9,664,489	0.017	73	2252.773566	0	165,374.8
T7 single construction	0.010	232.955	2,243	1747.7551	3,919,472	0.007	30	2242.716935	0	67,376.7
T7 SWCV	0.006	232.955	1,458	1752.1365	2,555,252	0.007	29	8224.950353	0	237,037.3
T7 tractor	0.072	232.955	16,658	1746.9386	29,100,128	0.024	105	2284.89441	0	240,682.3
T7 tractor construction	0.007	232.955	1,672	1747.208	2,921,341	0.005	22	2269.412395	0	49,454.3
T7 utility	0.000	232.955	88	1746.1232	153,123	0.001	3	8299.924965	0	28,921.8
T7IS	0.004	232.955	955	584.86742	564,198	0.002	8	0	2034.123288	16,421.1
UBUS	0.005	232.955	1,071	744.18707	797,324	0.002	8	0	596.1314856	4,742.6
UBUS	0.015	232.955	3,543	2529.8306	8,962,606	0.006	26	0	0	0.0
All Other Buses	0.003	232.955	747	1194.5231	892,661	0.003	14	661.7570506	0	8,997.4
					251,176,111	1.000	4,350			6,225,568.1

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

San Ramon Vehicles	Avg Miles CCC	Vehicles
VMT	232,955	33,408,7957

San Ramon Motor Vehicle Emissions	Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
	251,176,111	6,225,568	257,401,680	907184.7	283.7	103,564

Community Greenhouse Gas Inventory

Energy

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.595	PG&E 2003 to 2005 Third party verified emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions MTCO2e
			CO2	CH4	N2O	
Residential	183,486,874	2,610	54,587	2.8	1.0	49,860
Commercial	173,846,782	7,503	51,719	2.7	1.0	47,240
City/County/Dist	28,280,483		8,413	0.4	0.2	7,685
Total	385,614,139		114,720	6.0	2.1	104,784

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions MTCO2e
			CO2	CH4	N2O	
Residential	12,337,947	171	72,177	6.8	0.1	65,646
Commercial	5,563,512	127	32,547	3.1	0.1	29,602
City/Co/Dist	441,076		2,580	0.2	0.0	2,347
Total	18,342,535		107,304	10.1	0.2	97,595

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: PGE Third Party Verified numbers averaged for 2003-2005.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/
Per capita rates for 2013 were used for later years.

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068567996	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT/	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.

Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.

San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,052,211	1,019	0.1600	0.0100	930
San Ramon	72,148	70	0	0	64
Percent San Ramon/Contra Costa County	6.9%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,052,211	920	0.360	0.08000	864
San Ramon	72,148	63	0	0	59
Percent San Ramon/Contra Costa County	6.9%				

Total San Ramon 123

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	13.84
Population	37,309,882
Emissions (MTCO ₂ e per person)	0.37

San Ramon

Population	72,148
Emissions (MTCO ₂ e)	26,763
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:

http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:

<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2010 Assumptions

	2008	2010
San Ramon Population	66,413	72,148
Water Usage (gallons/day)	10,840,000	11,776,073
Water Usage (million gallons/year)	3957	4298
Energy Usage (kWh)	21,409,163	23,257,920
Energy Usage (MWh)	21,409	23,258

Year 2010 Emissions

Greenhouse Gas	Electricity	2010	2010	2010
	Emission Factor (pounds per MWh)	Emissions (pounds/year)	Emissions (tons/year)	Emissions MTCO2e
Carbon dioxide	595	13,838,463	6,919	6,277.1
Methane	0.031	721.00	0.360	6.9
Nitrous oxide	0.011	255.84	0.128	36.0
				6,320.0

Source for electricity emission factor:

California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 3.1, January 2009. Table C.2.

www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Source for electricity requirements:

Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.

www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2010

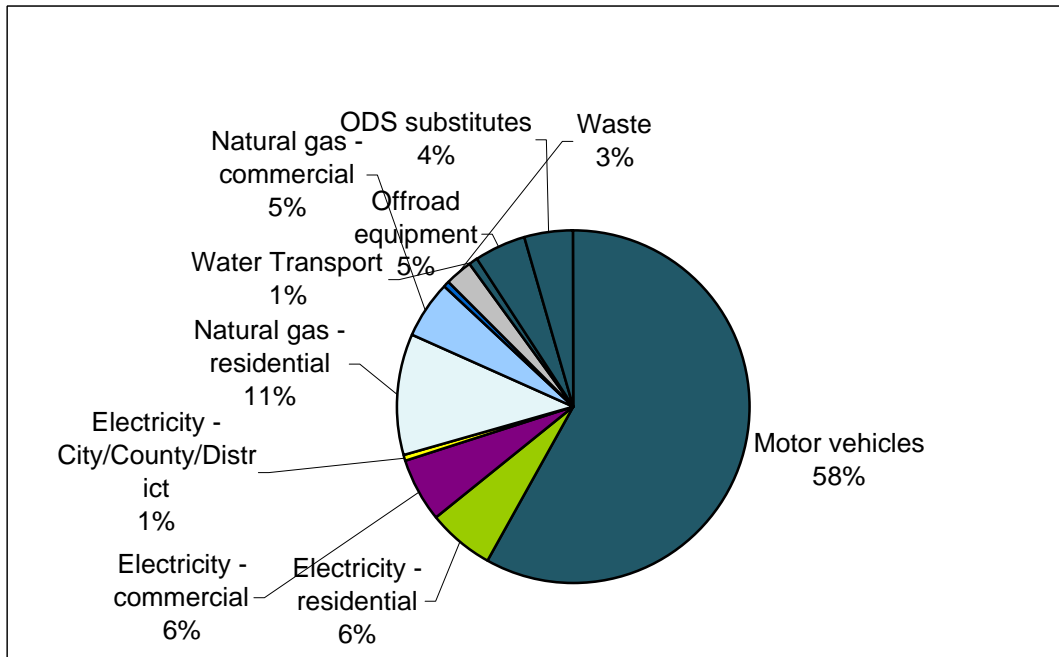
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	72,148	City of San Ramon/ DOF
Employment	43,880	City of San Ramon

County Information		
Population	1,052,211	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	353,144	331,821
Electricity - residential	37,285	37,285
Electricity - commercial	36,314	36,314
Electricity - City/County/District	4,007	4,007
Natural gas - residential	67,604	67,604
Natural gas - commercial	31,881	31,881
Natural gas - City/County/District	2,152	2,152
Waste	16,525	16,525
Water Transport	4,738	4,738
Offroad equipment	28,908	28,908
ODS substitutes	26,763	26,763
Total	609,320	587,998



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,325

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,525
Emissions (MTCO ₂ e/person)	0.2290 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed July 31, 2013.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,750,403 Source: MTC. 2014
Vehicle miles traveled / year 638,896,955 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	285,281.3	258,802.8
Non Passenger Vehicles	103,993.2	94,341.1
	389,274.5	353,143.9

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	262,206.2	237,869.5
Non Passenger Vehicles	103,563.9	93,951.6
	365,770.2	331,821.1

EMFAC Passenger Vehicle Emissions (SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2010
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT Fraction	Trips (trips/day)	CO2_RUNEX (gms/mile)	CO2_IDLEX (gms/vehicle/ day)	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pav	CO2_IDLEX(Pav	CO2_STREX(P
														ey I+LCFS) (gms/mile)	ley I+LCFS) (gms/vehicle/d ay)	avley I+LCFS) (gms/vehicle/d ay)
Contra Costa	2010 Annual	LDA	GAS	Aggregated	Aggregated	396,677	14,253,771	0.561	2,486,935	337.6421525	0	460.0964559	336.2106685	0	458.7867601	
Contra Costa	2010 Annual	LDA	DSL	Aggregated	Aggregated	1,765	54,439	0.002	10,084	358.2458548	0	0	356.0558594	0	0	
Contra Costa	2010 Annual	LDT1	GAS	Aggregated	Aggregated	49,240	1,808,596	0.071	300,790	388.0191541	0	515.2677216	386.7631415	0	514.0971248	
Contra Costa	2010 Annual	LDT1	DSL	Aggregated	Aggregated	67	1,994	0.000	354	371.8741016	0	0	370.4580719	0	0	
Contra Costa	2010 Annual	LDT2	GAS	Aggregated	Aggregated	125,485	4,946,189	0.195	793,470	462.0094945	0	629.185079	460.0808725	0	627.2394152	
Contra Costa	2010 Annual	LDT2	DSL	Aggregated	Aggregated	60	1,992	0.000	329	366.0720528	0	0	363.2496544	0	0	
Contra Costa	2010 Annual	MDV	GAS	Aggregated	Aggregated	107,457	4,327,758	0.170	681,590	583.0442306	0	791.4026944	581.5509146	0	790.0249372	
Contra Costa	2010 Annual	MDV	DSL	Aggregated	Aggregated	108	4,266	0.000	631	360.6884842	0	0	357.82839	0	0	
							680,861	25,399,004	1.000							
							avg miles/vehicle	37.3042545								

Emission Estimate Without Pavley and LCFS 2010

Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT Fraction	Trips (trips/day)	CO2_RUNEX (gms/mile)	CO2_IDLEX (gms/vehicle/ day)	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pav	CO2_IDLEX(Pav	CO2_STREX(P
											ey I+LCFS) (gms/mile)	ley I+LCFS) (gms/vehicle/d ay)	avley I+LCFS) (gms/vehicle/d ay)
LDA	GAS	Aggregated	Aggregated	396,677	14,253,771	0.561	2,486,935	337.6421525	0	460.0964559	336.2106685	0	458.7867601
LDA	DSL	Aggregated	Aggregated	1,765	54,439	0.002	10,084	358.2458548	0	0	356.0558594	0	0
LDT1	GAS	Aggregated	Aggregated	49,240	1,808,596	0.071	300,790	388.0191541	0	515.2677216	386.7631415	0	514.0971248
LDT1	DSL	Aggregated	Aggregated	67	1,994	0.000	354	371.8741016	0	0	370.4580719	0	0
LDT2	GAS	Aggregated	Aggregated	125,485	4,946,189	0.195	793,470	462.0094945	0	629.185079	460.0808725	0	627.2394152
LDT2	DSL	Aggregated	Aggregated	60	1,992	0.000	329	366.0720528	0	0	363.2496544	0	0
MDV	GAS	Aggregated	Aggregated	107,457	4,327,758	0.170	681,590	583.0442306	0	791.4026944	581.5509146	0	790.0249372
MDV	DSL	Aggregated	Aggregated	108	4,266	0.000	631	360.6884842	0	0	357.82839	0	0
				680,861	25,399,004	1.000							
				avg miles/vehicle	37.3042545								

San Ramon Vehicles

VMT	Avg Miles/Day	Vehicles
1,517,448	37	40677.6122

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
611,823,261	97,225,523	709,048,785	907184.7	781.6	285,281.3

Emission Estimate With Pavley and LCFS 2010

Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT Fraction	Trips (trips/day)	CO2_RUNEX (gms/mile)	CO2_IDLEX (gms/vehicle/ day)	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pavley	CO2_IDLEX(Pavley	CO2_STREX(Pavley
											I+LCFS) (gms/mile)	I+LCFS) (gms/vehicle/d ay)	I+LCFS) (gms/vehicl e/day)
LDA	GAS	Aggregated	Aggregated	396,677	14,253,771	0.561	2,486,935	337.6421525	0	460.0964559	336.2106685	0	458.7867601
LDA	DSL	Aggregated	Aggregated	1,765	54,439	0.002	10,084	358.2458548	0	0	356.0558594	0	0
LDT1	GAS	Aggregated	Aggregated	49,240	1,808,596	0.071	300,790	388.0191541	0	515.2677216	386.7631415	0	514.0971248
LDT1	DSL	Aggregated	Aggregated	67	1,994	0.000	354	371.8741016	0	0	370.4580719	0	0
LDT2	GAS	Aggregated	Aggregated	125,485	4,946,189	0.195	793,470	462.0094945	0	629.185079	460.0808725	0	627.2394152
LDT2	DSL	Aggregated	Aggregated	60	1,992	0.000	329	366.0720528	0	0	363.2496544	0	0
MDV	GAS	Aggregated	Aggregated	107,457	4,327,758	0.170	681,590	583.0442306	0	791.4026944	581.5509146	0	790.0249372
MDV	DSL	Aggregated	Aggregated	108	4,266	0.000	631	360.6884842	0	0	357.82839	0	0
				680,861	25,399,004	1.000							
				avg miles/vehicle	37.3042545								

San Ramon Vehicles

VMT	Avg Miles/Day	Vehicles
1,517,448	37	40677.6122

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
560,687,312	91,009,872	651,697,184	907184.7	718.4	262,206

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2010

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2010
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNE		CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX
												X	CO2_IDLEX		(Pavley I+LCFS)	Pavley I+LCFS)	(Pavley I+LCFS)
												(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)		
						(miles/hr)	(vehicles)			(trips/day)	(gms/mile)			(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2010 Annual	LHD1	GAS	Aggregated	Aggregated	17,128	44.1%	732,328	35.4%	255,179	972.1095014	116.364457	844.3640322	972.1095014	116.364457	844.3640322	
Contra Costa	2010 Annual	LHD1	DSL	Aggregated	Aggregated	8,312	21.4%	357,708	17.3%	104,553	527.3982636	141.753411	0	527.3982636	141.753411	0	
Contra Costa	2010 Annual	LHD2	GAS	Aggregated	Aggregated	1,229	3.2%	50,497	2.4%	18,306	972.109477	116.364447	903.4854957	972.109477	116.3644473	903.4854957	
Contra Costa	2010 Annual	LHD2	DSL	Aggregated	Aggregated	2,134	5.5%	93,984	4.5%	26,847	526.4489869	141.753418	0	526.4489869	141.7534184	0	
Contra Costa	2010 Annual	Motor Coach	DSL	Aggregated	Aggregated	42	0.1%	6,107	0.3%	0	1742.92454	11555.7451	0	1742.92454	11555.74508	0	
Contra Costa	2010 Annual	OBUS	GAS	Aggregated	Aggregated	406	1.0%	23,299	1.1%	18,553	677.446023	407.400932	1761.361554	677.446023	407.4009318	1761.361554	
Contra Costa	2010 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	10,099	0.5%	0	2153.946538			2153.946538			
Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464	
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0	
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0	
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0	
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0	
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0	
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0	
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0	
Contra Costa	2010 Annual	T6 instate consi	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0	
Contra Costa	2010 Annual	T6 instate consi	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0	
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0	
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0	
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0	
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771	
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0	
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0	
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0	
Contra Costa	2010 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	292	0.8%	77,900	3.8%	0	1747.525085	22647.4898	0	1747.525085	22647.4898	0	
Contra Costa	2010 Annual	T7 NOOS	DSL	Aggregated	Aggregated	106	0.3%	25,218	1.2%	0	1743.269168	16172.3449	0	1743.269168	16172.34489	0	
Contra Costa	2010 Annual	T7 other port	DSL	Aggregated	Aggregated	50	0.1%	7,764	0.4%	0	1768.984685	5236.50033	0	1768.984685	5236.500333	0	
Contra Costa	2010 Annual	T7 POAK	DSL	Aggregated	Aggregated	202	0.5%	28,001	1.4%	0	1768.133004	8496.30286	0	1768.133004	8496.302855	0	
Contra Costa	2010 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0			0			0	
Contra Costa	2010 Annual	T7 Public	DSL	Aggregated	Aggregated	172	0.4%	4,288	0.2%	0	1764.860961	8094.22132	0	1764.860961	8094.221325	0	
Contra Costa	2010 Annual	T7 Single	DSL	Aggregated	Aggregated	548	1.4%	41,997	2.0%	0	1747.635499	2252.77357	0	1747.635499	2252.773566	0	
Contra Costa	2010 Annual	T7 single const	DSL	Aggregated	Aggregated	246	0.6%	18,846	0.9%	0	1747.755062	2242.71693	0	1747.755062	2242.716935	0	
Contra Costa	2010 Annual	T7 SWCV	DSL	Aggregated	Aggregated	233	0.6%	11,671	0.6%	0	1752.136513	8224.95035	0	1752.136513	8224.950353	0	
Contra Costa	2010 Annual	T7 tractor	DSL	Aggregated	Aggregated	778	2.0%	126,506	6.1%	0	1746.938595	2284.89441	0	1746.938595	2284.89441	0	
Contra Costa	2010 Annual	T7 tractor const	DSL	Aggregated	Aggregated	179	0.5%	14,051	0.7%	0	1747.207974	2269.4124	0	1747.207974	2269.412395	0	
Contra Costa	2010 Annual	T7 utility	DSL	Aggregated	Aggregated	29	0.1%	713	0.0%	0	1746.123181	8299.92497	0	1746.123181	8299.924965	0	
Contra Costa	2010 Annual	T7IS	GAS	Aggregated	Aggregated	79	0.2%	7,442	0.4%	1,590	584.6674183	0	2034.123288	584.6674183	0	2034.123288	
Contra Costa	2010 Annual	UBUS	GAS	Aggregated	Aggregated	74	0.2%	9,930	0.5%	298	744.1870688	0	596.1314856	744.1870688	0	596.1314856	
Contra Costa	2010 Annual	UBUS	DSL	Aggregated	Aggregated	246	0.6%	32,836	1.6%	985	2529.83056	0	0	2529.83056	0	0	
Contra Costa	2010 Annual	All Other Buses	DSL	Aggregated	Aggregated	102	0.3%	6,039	0.3%	0	1194.52308	661.757051	0	1194.52308	661.7570506	0	
							38,865	100.0%	2,068,363	1	444,843						
									Mi/Veh	53.21920792							

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate consl	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate consl	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

Emission Estimate Without Pavley and LCFS 2010

	VMT Fraction	San Ramon Miles/Day Non-Passenger		San Ramon Miles/Day/Veh Class		San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day
		Miles/Day	Non-Passenger	(gms/mile)	(gms/day)	Fraction	Population				
LHD1	0.329	232.955	76,599	972.1095	74,462,290	0.427	1,856	116.3644594	844.3640322	1,783,111.8	
LHD1	0.160	232.955	37,206	527.39826	19,622,590	0.207	901	141.753403	0	127,676.2	
LHD2	0.024	232.955	5,543	972.10948	5,388,376	0.031	135	116.3644579	903.4854957	137,786.9	
LHD2	0.042	232.955	9,752	526.44899	5,134,120	0.054	235	141.7534172	0	33,267.5	
Motor Coach	0.003	232.955	758	1742.9245	1,320,965	0.001	5	11800.58058	0	61,830.9	
OBUS	0.010	232.955	2,261	677.44602	1,531,574	0.010	44	407.4009186	1761.361554	95,355.0	
PTO	0.000	232.955	93	2153.9465	199,483	0.000	0	0	0	0.0	
SBUS	0.002	232.955	482	742.11996	357,334	0.002	11	0	634.0321464	6,727.9	
SBUS	0.001	232.955	348	1294.3814	450,813	0.037	163	3744.833697	0	609,029.9	
T6 Ag	0.001	232.955	195	1205.6132	235,678	0.001	6	647.5844384	0	3,757.9	
T6 Public	0.003	232.955	614	1194.0186	732,673	0.008	33	714.8753193	0	23,442.4	
T6 CAIRP heavy	0.000	232.955	14	1191.3973	16,352	0.000	0	727.8571769	0	159.2	
T6 CAIRP small	0.000	232.955	45	1191.1399	53,386	0.000	1	738.6620329	0	468.9	
T6 OOS heavy	0.000	232.955	8	1191.3973	9,375	0.000	0	727.8571769	0	91.3	
T6 OOS small	0.000	232.955	26	1191.1399	30,608	0.000	0	738.6620329	0	268.8	
T6 instate construction heavy	0.004	232.955	877	1194.2524	1,047,093	0.004	17	706.6936954	0	11,665.8	
T6 instate construction small	0.010	232.955	2,275	1191.6408	2,711,172	0.008	35	727.319448	0	25,687.2	
T6 instate heavy	0.024	232.955	5,497	1194.028	6,563,298	0.023	101	708.2547878	0	71,779.2	
T6 instate small	0.063	232.955	14,729	1191.365	17,547,731	0.052	224	728.6662323	0	163,543.9	
T6 utility	0.000	232.955	102	1191.5212	121,760	0.001	5	742.1821582	0	3,813.0	
T6TS	0.020	232.955	4,608	677.44602	3,121,611	0.023	100	251.5801066	1568.76771	181,813.9	
T7 Ag	0.003	232.955	712	1760.1082	1,252,859	0.002	10	2297.662967	0	23,703.0	
T7 CAIRP	0.039	232.955	9,118	1743.2692	15,895,237	0.009	39	20670.35604	0	815,383.7	
T7 CAIRP construction	0.000	232.955	60	1743.3973	105,449	0.001	4	20346.17526	0	77,074.4	
T7 NNOOS	0.044	232.955	10,257	1747.5251	17,925,203	0.009	38	32190.86273	0	1,219,734.7	
T7 NOOS	0.014	232.955	3,321	1743.2692	5,788,641	0.003	14	25645.56493	0	368,413.9	
T7 other port	0.004	232.955	954	1768.9847	1,686,746	0.001	6	5714.692888	0	34,495.9	
T7 POAK	0.018	232.955	4,178	1768.133	7,387,399	0.006	26	9479.447412	0	251,174.0	
T7 POLA	0.000	232.955	0	0	0	0.000	0	0	0	0.0	
T7 Public	0.002	232.955	536	1764.861	945,702	0.005	21	8323.908963	0	177,650.4	
T7 Single	0.024	232.955	5,530	1747.6355	9,664,489	0.017	73	2889.455626	0	212,113.2	
T7 single construction	0.010	232.955	2,243	1747.7551	3,919,472	0.007	30	2842.464083	0	85,394.6	
T7 SWCV	0.006	232.955	1,458	1752.1365	2,555,252	0.007	29	8425.749797	0	242,824.2	
T7 tractor	0.072	232.955	16,658	1746.9386	29,100,128	0.024	105	3023.863461	0	318,522.5	
T7 tractor construction	0.007	232.955	1,672	1747.208	2,921,341	0.005	22	2973.208747	0	64,791.2	
T7 utility	0.000	232.955	88	1746.1232	153,123	0.001	3	8488.477903	0	29,578.8	
T7IS	0.004	232.955	965	584.66742	564,198	0.002	8	0	2034.123288	16,421.1	
UBUS	0.005	232.955	1,071	744.18707	797,324	0.002	8	0	596.1314856	4,742.6	
UBUS	0.015	232.955	3,543	2529.8306	8,962,606	0.006	26	0	0	0.0	
All Other Buses	0.003	232.955	747	1194.5231	892,661	0.003	14	680.421704	0	9,251.2	
					251,176,111	1.000	4,350			7,292,546.8	

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate cons	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate cons	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
232,955	53	4,377

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
251,176,111	7,292,547	258,468,658	907184.7	284.91	103,993.2

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate cons	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate cons	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

Emission Estimate With Pavley and LCFS 2010

	VMT Fraction	San Ramon Miles/Day			gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/d ay)	Starting Emissions (g/veh/day)	g/day
		Non-Passenger	Miles/Day/Veh Class	(gms/mile)						
LHD1	0.329	232.955	76,599	972.1095	74,462,290	0.427	1,856	116.364457	844.3640322	1,783,111.8
LHD1	0.160	232.955	37,206	527.39826	19,622,590	0.207	901	141.7534111	0	127,676.2
LHD2	0.024	232.955	5,543	972.10948	5,388,376	0.031	135	116.3644473	903.4854957	137,786.9
LHD2	0.042	232.955	9,752	526.44899	5,134,120	0.054	235	141.7534184	0	33,267.5
Motor Coach	0.003	232.955	758	1742.9245	1,320,965	0.001	5	11555.74508	0	60,548.0
OBUS	0.010	232.955	2,261	677.44602	1,531,574	0.010	44	407.4009318	1761.361554	95,355.0
PTO	0.000	232.955	93	2153.9465	199,483	0.000	0	0	0	0.0
SBUS	0.002	232.955	482	742.11996	357,334	0.002	11	0	634.0321464	6,727.9
SBUS	0.001	232.955	348	1294.3814	450,813	0.037	163	3568.752088	0	580,393.4
T6 Ag	0.001	232.955	195	1205.6132	235,678	0.001	6	625.7370822	0	3,631.1
T6 Public	0.003	232.955	614	1194.0186	732,673	0.008	33	684.4317604	0	22,444.1
T6 CAIRP heavy	0.000	232.955	14	1191.3973	16,352	0.000	0	707.5576385	0	154.8
T6 CAIRP small	0.000	232.955	45	1191.1399	53,386	0.000	1	729.3957062	0	463.0
T6 OOS heavy	0.000	232.955	8	1191.3973	9,375	0.000	0	707.5576385	0	88.7
T6 OOS small	0.000	232.955	26	1191.1399	30,608	0.000	0	729.3957062	0	265.4
T6 instate construction heavy	0.004	232.955	877	1194.2524	1,047,093	0.004	17	675.6399373	0	11,153.2
T6 instate construction small	0.010	232.955	2,275	1191.6408	2,711,172	0.008	35	712.8362985	0	25,175.7
T6 instate heavy	0.024	232.955	5,497	1194.028	6,563,298	0.023	101	676.1970341	0	68,530.2
T6 instate small	0.063	232.955	14,729	1191.3655	17,547,731	0.052	224	713.268798	0	160,088.0
T6 utility	0.000	232.955	102	1191.5212	121,760	0.001	5	711.4520522	0	3,655.2
T6TS	0.020	232.955	4,608	677.44602	3,121,611	0.023	100	251.5801003	1568.76771	181,813.9
T7 Ag	0.003	232.955	712	1760.1082	1,252,859	0.002	10	1995.749796	0	20,588.5
T7 CAIRP	0.039	232.955	9,118	1743.2692	15,895,237	0.009	39	13046.65123	0	514,651.3
T7 CAIRP construction	0.000	232.955	60	1743.3973	105,449	0.001	4	12949.21246	0	49,053.6
T7 NNOOS	0.044	232.955	10,257	1747.5251	17,925,203	0.009	38	22647.4898	0	858,129.5
T7 NOOS	0.014	232.955	3,321	1743.2692	5,788,641	0.003	14	16172.34489	0	232,325.4
T7 other port	0.004	232.955	954	1768.9847	1,686,746	0.001	6	5236.500333	0	31,609.3
T7 POAK	0.018	232.955	4,178	1768.133	7,387,399	0.006	26	8496.302855	0	225,123.9
T7 POLA	0.000	232.955	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	232.955	536	1764.861	945,702	0.005	21	8094.221325	0	172,748.3
T7 Single	0.024	232.955	5,530	1747.6355	9,664,489	0.017	73	2252.773566	0	165,374.8
T7 single construction	0.010	232.955	2,243	1747.7551	3,919,472	0.007	30	2242.716935	0	67,376.7
T7 SWCV	0.006	232.955	1,458	1752.1365	2,555,252	0.007	29	8224.950353	0	237,037.3
T7 tractor	0.072	232.955	16,658	1746.9386	29,100,128	0.024	105	2284.89441	0	240,682.3
T7 tractor construction	0.007	232.955	1,672	1747.208	2,921,341	0.005	22	2269.412395	0	49,454.3
T7 utility	0.000	232.955	88	1746.1232	153,123	0.001	3	8299.924965	0	28,921.8
T7IS	0.004	232.955	965	584.66742	564,198	0.002	8	0	2034.123288	16,421.1
UBUS	0.005	232.955	1,071	744.18707	797,324	0.002	8	0	596.1314856	4,742.6
UBUS	0.015	232.955	3,543	2529.8306	8,962,606	0.006	26	0	0	0.0
All Other Buses	0.003	232.955	747	1194.5231	892,661	0.003	14	661.7570506	0	8,997.4
					251,176,111	1.000	4,350			6,225,568.1

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2010 Annual	SBUS	GAS	Aggregated	Aggregated	99	0.3%	4,463	0.2%	397	742.1199561	0	634.0321464	742.1199561	0	634.0321464
Contra Costa	2010 Annual	SBUS	DSL	Aggregated	Aggregated	1,446	3.7%	55,333	2.7%	0	1294.381422	3568.75209	0	1294.381422	3568.752088	0
Contra Costa	2010 Annual	T6 Ag	DSL	Aggregated	Aggregated	49	0.1%	1,727	0.1%	0	1205.613151	625.737082	0	1205.613151	625.7370822	0
Contra Costa	2010 Annual	T6 Public	DSL	Aggregated	Aggregated	263	0.7%	4,945	0.2%	0	1194.018619	684.43176	0	1194.018619	684.4317604	0
Contra Costa	2010 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	109	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	5	0.0%	369	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	62	0.0%	0	1191.397293	707.557639	0	1191.397293	707.5576385	0
Contra Costa	2010 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	212	0.0%	0	1191.139912	729.395706	0	1191.139912	729.3957062	0
Contra Costa	2010 Annual	T6 instate consl	DSL	Aggregated	Aggregated	122	0.3%	6,872	0.3%	0	1194.252393	675.639937	0	1194.252393	675.6399373	0
Contra Costa	2010 Annual	T6 instate consl	DSL	Aggregated	Aggregated	295	0.8%	19,616	0.9%	0	1191.640799	712.836299	0	1191.640799	712.8362985	0
Contra Costa	2010 Annual	T6 instate heav	DSL	Aggregated	Aggregated	771	2.0%	43,415	2.1%	0	1194.027975	676.197034	0	1194.027975	676.1970341	0
Contra Costa	2010 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,866	4.8%	124,439	6.0%	0	1191.364957	713.268798	0	1191.364957	713.268798	0
Contra Costa	2010 Annual	T6 utility	DSL	Aggregated	Aggregated	42	0.1%	837	0.0%	0	1191.521199	711.452052	0	1191.521199	711.4520522	0
Contra Costa	2010 Annual	T6TS	GAS	Aggregated	Aggregated	906	2.3%	35,963	1.7%	18,134	677.4460157	251.5801	1568.76771	677.4460157	251.5801003	1568.76771
Contra Costa	2010 Annual	T7 Ag	DSL	Aggregated	Aggregated	87	0.2%	6,244	0.3%	0	1760.108204	1995.7498	0	1760.108204	1995.749796	0
Contra Costa	2010 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	290	0.7%	69,247	3.3%	0	1743.269168	13046.6512	0	1743.269168	13046.65123	0
Contra Costa	2010 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	30	0.1%	7,285	0.4%	0	1743.397282	12949.2125	0	1743.397282	12949.21246	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
232,955	6,039	38,5723709

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
251,176,111	6,225,568	257,401,680	907184.7	283.7	103,564

Community Greenhouse Gas Inventory

Energy

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	PG&E 2010 Third party verified emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	183,043,283	2,610	40727	2.8	1.0	37,285
Commercial	178,277,122	7,503	39667	2.8	1.0	36,314
City/County/Dist	19,672,661		4377	0.3	0.1	4,007
Total	380,993,066		84,771	5.9	2.1	77,606

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,705,919	176	74,330	7.0	0.1	67,604
Commercial	5,991,826	137	35,052	3.3	0.1	31,881
City/Co/Dist	404,430		2,366	0.2	0.0	2,152
Total	19,102,174		111,748	10.5	0.2	101,637

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068567996	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT/	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,052,211	1,019	0.1600	0.0100	930
San Ramon	72,148	70	0	0	64
Percent San Ramon/Contra Costa County	6.9%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,052,211	920	0.360	0.08000	864
San Ramon	72,148	63	0	0	59
Percent San Ramon/Contra Costa County	6.9%				

Total San Ramon 123

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	13.84
Population	37,309,882
Emissions (MTCO ₂ e per person)	0.37

Fresno

Population	72,148
Emissions (MTCO ₂ e per person)	26,763
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2010 Assumptions

	2008	2010
San Ramon Population	66,413	72,148
Water Usage (gallons/day)	10,840,000	11,776,073
Per Capita Water Use	163	163
Water Usage (million gallons/year)	3957	4298
Energy Usage (kWh)	21,409,163	23,257,920
Energy Usage (MWh)	21,409	23,258

Year 2010 Emissions

Greenhouse Gas	Electricity	2010	2010	2010
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO2e
	(pounds per MWh)			
Carbon dioxide	445	10,349,775	5,175	4,694.7
Methane	0.031	721.00	0.360	6.9
Nitrous oxide	0.011	255.84	0.128	36.0
				4,737.5

Source for electricity emission factor:
PG&E Third Party Verified Emission Factor Report, April 2013

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.
www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2014

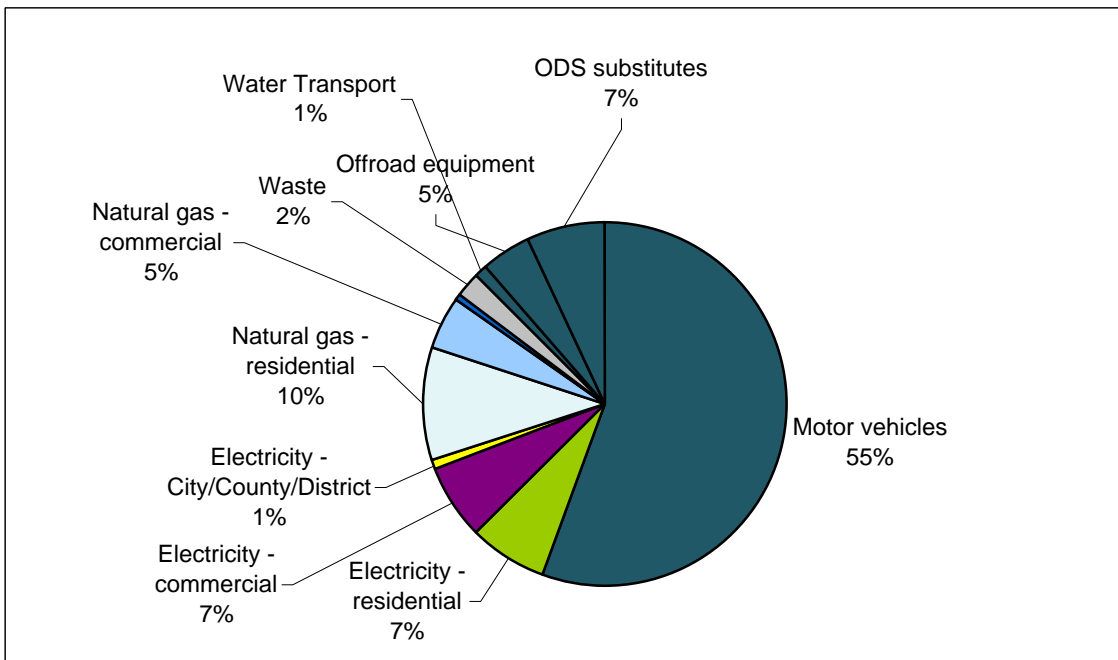
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	77,270	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,087,008	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e
Motor vehicles	371,308
Electricity - residential	45,588
Electricity - commercial	44,401
Electricity - City/County/District	4,900
Natural gas - residential	67,604
Natural gas - commercial	31,881
Natural gas - City/County/District	2,152
Waste	16,382
Water Transport	6,204
Offroad equipment	30,628
ODS substitutes	45,709
<u>Total</u>	<u>666,756</u>



Community Greenhouse Gas Inventory

Waste

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,012

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,382
Emissions (MTCO ₂ e/person)	0.2120 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 28, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,774,193 Source: MTC. 2014
Vehicle miles traveled / year 647,580,547 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS BAU

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	305,902.6	277,510.2
Non Passenger Vehicles	103,394.8	93,798.1
	409,297.3	371,308.3

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	283,867.0	257,519.8
Non Passenger Vehicles	101,391.8	91,981.1
	385,258.8	349,500.9

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2014

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac>

EMFAC2011 Emission Rates

Region Type: County

Region: Contra Costa

Calendar Year: 2005

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pavley I+LCFS)	CO2_IDLEX(Pavley I+LCFS)	CO2_STREX(Pavley I+LCFS)
						(miles/hr)	(vehicles)	(miles/day)		(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2005	Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	0	460.3646763	332.5838917	0	460.3646763
Contra Costa	2005	Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	0	362.249441	0	0
Contra Costa	2005	Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	0	527.1606221	380.6486469	0	527.1606221
Contra Costa	2005	Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	0	373.5873232	0	0
Contra Costa	2005	Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	0	633.3019897	455.8272576	0	633.3019897
Contra Costa	2005	Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	0	372.2726309	0	0
Contra Costa	2005	Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	0	792.1227449	570.5037165	0	792.1227449
Contra Costa	2005	Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	0	368.5728982	0	0
							627,174	24,468,550	1.000							
						avg miles/vehicle		39.0139465								

Emission Estimate Without Pavley and LCFS 2014

VMT Fraction	SR VMT	CO2_RUN EX	Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day	
Miles/Day	Miles/Day	Miles/Day/Veh Class	(gms/mile)	(gms/day)	(gms/vehicle/day)	(g/day)	
0.573	1,543,590	884,152	332.58389	294,054,614	60,423	460.3646763	27,816,615
0.002	1,543,590	3,690	362.24944	1,336,675	60,423	0	0
0.071	1,543,590	109,784	380.64865	41,789,227	60,423	527.1606221	31,852,626
0.000	1,543,590	139	373.58732	52,056	60,423	0	0
0.192	1,543,590	296,876	455.82726	135,324,110	60,423	633.3019897	38,266,006
0.000	1,543,590	141	372.27263	52,516	60,423	0	0
0.161	1,543,590	248,556	570.50372	141,802,330	60,423	792.1227449	47,862,433
0.000	1,543,590	251	368.57229	92,541	60,423	0	0
Total Passenger Vehicle Emissions				614,504,069			145,797,680

San Ramon Vehicles

VMT	Avg Miles/Day CCC	Vehicles
1,543,590	39	39565.072

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
614,504,069	145,797,680	760,301,749	907184.7	838.1	305,902.6

Emission Estimate With Pavley and LCFS 2014

VMT Fraction	SR VMT	CO2_RUN EX(Pavley I+LCFS)	Run Emissions	Vehicle Population	CO2_STREX (Pavley I+LCFS)		
Miles/Day	Miles/Day	Miles/Day/Veh Class	(gms/mile)	(gms/day)	(gms/vehicle/day)		
0.573	1,543,590	884,152	300.25647	265,472,268	60,423	420.4717438	25,406,164
0.002	1,543,590	3,690	313.30139	1,156,060	60,423	0	0
0.071	1,543,590	109,784	355.63726	39,043,370	60,423	475.6096597	28,737,762
0.000	1,543,590	139	322.38538	44,922	60,423	0	0
0.192	1,543,590	296,876	427.79489	127,001,978	60,423	589.6482804	35,628,318
0.000	1,543,590	141	320.17919	45,167	60,423	0	0
0.161	1,543,590	248,556	553.19031	137,498,973	60,423	751.6158054	45,414,882
0.000	1,543,590	251	333.47098	83,728	60,423	0	0
Total Passenger Vehicle Emissions				570,346,466			135,187,127

San Ramon Vehicles

VMT	Avg Miles/Day CCC	Vehicles
1,543,590	39	39565.072

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
570,346,466	135,187,127	705,533,592	907184.7	777.7	283,867

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2014 BAU

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2 RUNEX			CO2_RUNEX	CO2_IDLEX(CO2_STREX	
												X	CO2_IDLEX	CO2_STREX	(Pavley I+LCFS)	Pavley I+LCFS)	(Pavley I+LCFS)	
												(gms/vehicle/day)			(gms/vehicle/day)	(gms/vehicle/day)		
												(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)				
												(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	
												(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2014 Annual	LHD1	GAS	Aggregated	Aggregated	15,365	41.3%	686,475	32.7%	228,914	972.1094988	116.364456	819.7728342	972.1094988	116.3644561	819.7728342		
Contra Costa	2014 Annual	LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	19.0%	102,207	532.3059325	141.748251	0	532.3059325	141.7482507	0		
Contra Costa	2014 Annual	LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.7%	19,696	972.1095363	116.338965	1045.68254	972.1095363	116.3389654	1045.68254		
Contra Costa	2014 Annual	LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	4.1%	22,287	535.0134187	141.753311	0	535.0134187	141.7533106	0		
Contra Costa	2014 Annual	Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	7,150	0.3%	0	1745.971421	11338.6466	0	1745.971421	11338.64661	0		
Contra Costa	2014 Annual	OBUS	GAS	Aggregated	Aggregated	376	1.0%	23,638	1.1%	17,163	677.4460346	407.400915	1962.23896	677.4460346	407.4009152	1962.23896		
Contra Costa	2014 Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	10,731	0.5%	0	2183.103618	0	0	2183.103618	0	0		
Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159		
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0		
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0		
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0		
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0		
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0		
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0		
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0		
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0		
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0		
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0		
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0		
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0		
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808		
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0		
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0		
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0		
Contra Costa	2014 Annual	T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	82,816	3.9%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0		
Contra Costa	2014 Annual	T7 NOOS	DSL	Aggregated	Aggregated	113	0.3%	26,809	1.3%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0		
Contra Costa	2014 Annual	T7 other port	DSL	Aggregated	Aggregated	58	0.2%	9,058	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0		
Contra Costa	2014 Annual	T7 POAK	DSL	Aggregated	Aggregated	249	0.7%	28,206	1.3%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0		
Contra Costa	2014 Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0		
Contra Costa	2014 Annual	T7 Public	DSL	Aggregated	Aggregated	197	0.5%	4,891	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0		
Contra Costa	2014 Annual	T7 Single	DSL	Aggregated	Aggregated	591	1.6%	44,648	2.1%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0		
Contra Costa	2014 Annual	T7 single constr	DSL	Aggregated	Aggregated	204	0.5%	15,416	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0		
Contra Costa	2014 Annual	T7 SWCV	DSL	Aggregated	Aggregated	266	0.7%	13,310	0.6%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0		
Contra Costa	2014 Annual	T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	134,491	6.4%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0		
Contra Costa	2014 Annual	T7 tractor const	DSL	Aggregated	Aggregated	143	0.4%	11,494	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0		
Contra Costa	2014 Annual	T7 utility	DSL	Aggregated	Aggregated	30	0.1%	756	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0		
Contra Costa	2014 Annual	TTIS	GAS	Aggregated	Aggregated	74	0.2%	6,997	0.3%	1,485	584.6674163	0	2353.967488	584.6674163	0	2353.967488		
Contra Costa	2014 Annual	UBUS	GAS	Aggregated	Aggregated	64	0.2%	8,490	0.4%	255	744.1870709	0	615.0541717	744.1870709	0	615.0541717		
Contra Costa	2014 Annual	UBUS	DSL	Aggregated	Aggregated	235	0.6%	31,370	1.5%	941	2573.001593	0	0	2573.001593	0	0		
Contra Costa	2014 Annual	All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	6,973	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0		
							37,215	100.0%	2,099,212	1	409,952							
									MI/Veh	56.4075898								

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS 2014

VMT Fraction	San Ramon			gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions		
	Passenger	Miles/Day/Veh Class	(gms/mile)					(g/veh/day)	g/day	
LHD1	0.329	230.604	75,826	972,1095	73,710,931	0.427	1,856	116,3644561	819,7728342	1,737,470.5
LHD1	0.160	230.604	36,831	532,30593	19,605,343	0.207	901	141,7482507	0	127,671.5
LHD2	0.024	230.604	5,487	972,10954	5,334,005	0.031	135	116,338965	1045,68254	156,995.0
LHD2	0.042	230.604	9,654	535,01342	5,164,995	0.054	235	141,7533106	0	33,267.5
Motor Coach	0.003	230.604	750	1745,9714	1,309,922	0.001	5	11338,64661	0	59,410.5
OBUS	0.010	230.604	2,238	677,44603	1,516,119	0.010	44	407,4009152	1962,23896	104,187.1
PTO	0.000	230.604	92	2183,1036	200,143	0.000	0	0	0	0.0
SBUS	0.002	230.604	477	742,11995	353,729	0.002	11	0	788,3524159	8,365.5
SBUS	0.001	230.604	345	1299,9836	448,195	0.037	163	3474,936051	0	565,135.9
T6 Ag	0.001	230.604	194	1214,0161	234,926	0.001	6	591,9178211	0	3,434.9
T6 Public	0.003	230.604	607	1210,2525	735,141	0.008	33	636,79636	0	20,882.0
T6 CAIRP heavy	0.000	230.604	14	1194,1438	16,224	0.000	0	666,3500758	0	145.8
T6 CAIRP small	0.000	230.604	44	1187,5142	52,687	0.000	1	693,3277468	0	440.1
T6 OOS heavy	0.000	230.604	8	1194,1438	9,302	0.000	0	666,3500758	0	83.6
T6 OOS small	0.000	230.604	25	1187,5142	30,207	0.000	0	693,3277468	0	252.3
T6 instate construction heavy	0.004	230.604	868	1206,7402	1,047,366	0.004	17	628,1342767	0	10,369.0
T6 instate construction small	0.010	230.604	2,252	1190,6752	2,681,640	0.008	35	671,5227753	0	23,716.6
T6 instate heavy	0.024	230.604	5,441	1206,7402	6,566,243	0.023	101	628,1342767	0	63,659.2
T6 instate small	0.063	230.604	14,580	1190,6752	17,360,609	0.052	224	671,5227753	0	150,718.4
T6 utility	0.000	230.604	101	1190,3417	120,412	0.001	5	669,3517103	0	3,438.9
T6TS	0.020	230.604	4,561	677,44602	3,090,112	0.023	100	251,5801036	1824,797808	207,385.9
T7 Ag	0.003	230.604	705	1780,2391	1,254,402	0.002	10	2354,915902	0	24,293.7
T7 CAIRP	0.039	230.604	9,026	1740,7084	15,711,734	0.009	39	29278,79509	0	1,154,960.8
T7 CAIRP construction	0.000	230.604	60	1740,7084	104,223	0.001	4	29278,79509	0	110,912.5
T7 NNOOS	0.044	230.604	10,154	1736,3283	17,630,637	0.009	38	37700,75308	0	1,428,508.4
T7 NOOS	0.014	230.604	3,287	1740,7084	5,721,814	0.003	14	37153,84079	0	533,737.1
T7 other port	0.004	230.604	944	1728,3376	1,631,359	0.001	6	4421,893594	0	26,692.1
T7 POAK	0.018	230.604	4,136	1732,4648	7,165,336	0.006	26	6989,078773	0	185,187.4
T7 POLA	0.000	230.604	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	230.604	530	1806,7866	958,399	0.005	21	7861,899623	0	167,790.1
T7 Single	0.024	230.604	5,474	1771,2925	9,696,474	0.017	73	2423,170701	0	177,883.5
T7 single construction	0.010	230.604	2,220	1771,2925	3,932,174	0.007	30	2423,170701	0	72,798.0
T7 SWCV	0.006	230.604	1,444	1777,5297	2,566,127	0.007	29	8016,434181	0	231,028.0
T7 tractor	0.072	230.604	16,490	1754,4508	28,930,369	0.024	105	2452,592201	0	258,347.0
T7 tractor construction	0.007	230.604	1,655	1756,0931	2,906,570	0.005	22	2452,592201	0	53,446.1
T7 utility	0.000	230.604	87	1757,3339	152,551	0.001	3	8116,295492	0	28,281.9
T7IS	0.004	230.604	955	584,66742	558,505	0.002	8	0	2353,967488	19,003.2
UBUS	0.005	230.604	1,061	744,18707	789,278	0.002	8	0	615,0541717	4,893.2
UBUS	0.015	230.604	3,507	2573,0016	9,023,571	0.006	26	0	0	0.0
All Other Buses	0.003	230.604	740	1211,582	896,274	0.003	14	615,1471436	0	8,363.7
					249,218,049	1.000	4,350			7,763,156.6

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.91959	0	1780.239104	2354.9195902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

	Avg Miles	
VMT	CCC	Vehicles
230,604	56	4,088

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
249,218,049	7,763,157	256,981,205	907184.7	283.27	103,394.8

Emission Estimate With Pavley and LCFS 2014

	VMT Fraction	San Ramon Miles/Day		San Ramon Miles/Day/Veh		San Ramon Pop		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	
		Passenger	Non-Passenger	Class	(gms/mile)	gms/day	Fraction			g/day	g/day
LHD1	0.329	230.604	75.826	957.62784	72.605,266	0.427	1,856	114.6189925	842.2743379	1,775,993.7	
LHD1	0.160	230.604	36.831	517.05582	19,043,667	0.207	901	139.627102	0	125,761.0	
LHD2	0.024	230.604	5.487	957.62787	5,253,995	0.031	135	114.618991	864.7695195	132,320.3	
LHD2	0.042	230.604	9.654	516.0264	4,981,696	0.054	235	139.6271159	0	32,768.5	
Motor Coach	0.003	230.604	750	1730.5227	1,298,332	0.001	5	11623.57187	0	60,903.4	
OBUS	0.010	230.604	2,238	667.28433	1,493,377	0.010	44	401.2899048	1702.807416	92,511.9	
PTO	0.000	230.604	92	2124.946	194,811	0.000	0	0	0	0.0	
SBUS	0.002	230.604	477	730.98815	348,423	0.002	11	0	565.5514923	6,001.3	
SBUS	0.001	230.604	345	1280.4586	441,464	0.037	163	3688.661192	0	599,894.5	
T6 Ag	0.001	230.604	194	1180.81	228,500	0.001	6	637.6706719	0	3,701.5	
T6 Public	0.003	230.604	607	1183.6362	718,973	0.008	33	704.1521895	0	23,090.8	
T6 CAIRP heavy	0.000	230.604	14	1171.5463	15,917	0.000	0	716.9393193	0	156.8	
T6 CAIRP small	0.000	230.604	44	1165.0714	51,691	0.000	1	727.5821024	0	461.8	
T6 OOS heavy	0.000	230.604	8	1171.5463	9,126	0.000	0	716.9393193	0	89.9	
T6 OOS small	0.000	230.604	25	1165.0714	29,636	0.000	0	727.5821024	0	264.8	
T6 instate construction heavy	0.004	230.604	868	1179.4564	1,023,686	0.004	17	696.0932899	0	11,490.8	
T6 instate construction small	0.010	230.604	2,252	1167.9583	2,630,477	0.008	35	716.4096563	0	25,301.9	
T6 instate heavy	0.024	230.604	5,441	1177.8538	6,409,063	0.023	101	697.630966	0	70,702.5	
T6 instate small	0.063	230.604	14,580	1166.6673	17,010,564	0.052	224	717.7362388	0	161,090.7	
T6 utility	0.000	230.604	101	1177.2739	119,090	0.001	5	731.0494258	0	3,755.9	
T6TS	0.020	230.604	4,561	667.28434	3,043,761	0.023	100	247.806405	1271.156632	151,712.0	
T7 Ag	0.003	230.604	705	1739.4447	1,225,657	0.002	10	2263.198023	0	20,347.5	
T7 CAIRP	0.039	230.604	9,026	1723.4705	15,556,143	0.009	39	20360.3007	0	803,152.9	
T7 CAIRP construction	0.000	230.604	60	1724.7107	103,266	0.001	4	20040.98263	0	75,918.2	
T7 NNOOS	0.044	230.604	10,154	1706.4274	17,327,024	0.009	38	31707.99979	0	1,201,438.7	
T7 NOOS	0.014	230.604	3,287	1723.7778	5,666,162	0.003	14	25260.88146	0	362,887.6	
T7 other port	0.004	230.604	944	1745.645	1,647,696	0.001	6	5628.972495	0	33,978.4	
T7 POAK	0.018	230.604	4,136	1745.645	7,219,848	0.006	26	9337.255701	0	247,406.3	
T7 POLA	0.000	230.604	0	0	0	0.000	0	0	0	0.0	
T7 Public	0.002	230.604	530	1757.0538	932,019	0.005	21	8199.050329	0	174,985.6	
T7 Single	0.024	230.604	5,474	1724.1055	9,438,161	0.017	73	2846.113792	0	208,931.5	
T7 single construction	0.010	230.604	2,220	1724.9318	3,829,256	0.007	30	2799.827122	0	84,113.7	
T7 SWCV	0.006	230.604	1,444	1737.596	2,508,477	0.007	29	8299.36355	0	239,181.8	
T7 tractor	0.072	230.604	16,490	1729.3992	28,517,276	0.024	105	2978.505509	0	313,744.7	
T7 tractor construction	0.007	230.604	1,655	1727.7773	2,859,703	0.005	22	2928.610616	0	63,819.3	
T7 utility	0.000	230.604	87	1729.0255	150,093	0.001	3	8361.150734	0	29,135.1	
T7IS	0.004	230.604	955	575.89742	550,128	0.002	8	0	1465.141483	11,827.8	
UBUS	0.005	230.604	1,061	733.02426	777,439	0.002	8	0	587.1895261	4,671.5	
UBUS	0.015	230.604	3,507	2481.4034	8,702,334	0.006	26	0	0	0.0	
All Other Buses	0.003	230.604	740	1183.1801	875,263	0.003	14	670.2153785	0	9,112.4	
					244,837,458	1.000	4,350			7,165,627.2	

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,159	0.2%	370	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	74,263	3.5%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	2,180	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	5,565	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	120	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 CAIRP smal	DSL	Aggregated	Aggregated	6	0.0%	410	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	69	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	235	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	5,807	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	16,522	0.8%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	45,041	2.1%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	128,152	6.1%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	876	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	32,479	1.5%	16,634	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	7,987	0.4%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	73,617	3.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2014 Annual	T7 CAIRP cons	DSL	Aggregated	Aggregated	25	0.1%	5,959	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

San Ramon Vehicles

VMT	Avg Miles	
	CCC	Vehicles
230,604	6,973	33.0716859

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
244,837,458	7,165,627	252,003,085	907184.7	277.8	101,392

Community Greenhouse Gas Inventory

Energy

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.545	PG&E 2013 emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	183,043,283	2,610	49879	2.8	1.0	45,588
Commercial	178,277,122	7,503	48581	2.8	1.0	44,401
City/County/Dist	19,672,661		5361	0.3	0.1	4,900
Total	380,993,066		103,821	5.9	2.1	94,888

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,705,919	164	74,330	7.0	0.1	67,604
Commercial	5,991,826	130	35,052	3.3	0.1	31,881
City/Co/Dist	404,430		2,366	0.2	0.0	2,152
Total	19,102,174		111,748	10.5	0.2	101,637

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: PG&E Third Party Verified Rate for 2013.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,087,008	1,019	0.1600	0.0100	930
San Ramon	77,270	72	0	0	66
Percent San Ramon/Contra Costa County	7.1%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,087,008	920	0.360	0.08000	864
San Ramon	77,270	65	0	0	61
Percent San Ramon/Contra Costa County	7.1%				

Total San Ramon 128

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	22.68
Population	38,340,074
Emissions (MTCO ₂ e per person)	0.59

San Ramon

Population	77,270
Emissions (MTCO ₂ e per person)	45,709
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population from: DOF Report E-2

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2014 Assumptions

	2008	2014
San Ramon Population	66,413	77,270
Water Usage (gallons/day)	10,840,000	12,612,091
Water Usage (million gallons/year)	3957	4603
Energy Usage (kWh)	21,409,163	24,909,069
Energy Usage (MWh)	21,409	24,909

Year 2014 Emissions

Greenhouse Gas	Electricity Emission Factor	2014 Emissions	2014 Emissions	2014 Emissions
	(pounds per MWh)	(pounds/year)	(tons/year)	MTCO _{2e}
Carbon dioxide	545	13,575,443	6,788	6,157.8
Methane	0.031	772.18	0.386	7.4
Nitrous oxide	0.011	274.00	0.137	38.5
				6,203.7

Source for electricity emission factor:
PG&E 2013 Third Party Verified Emission Rates

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.
www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for 2008 and 2030 population estimates: City of San Ramon General Plan (2010). Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2014

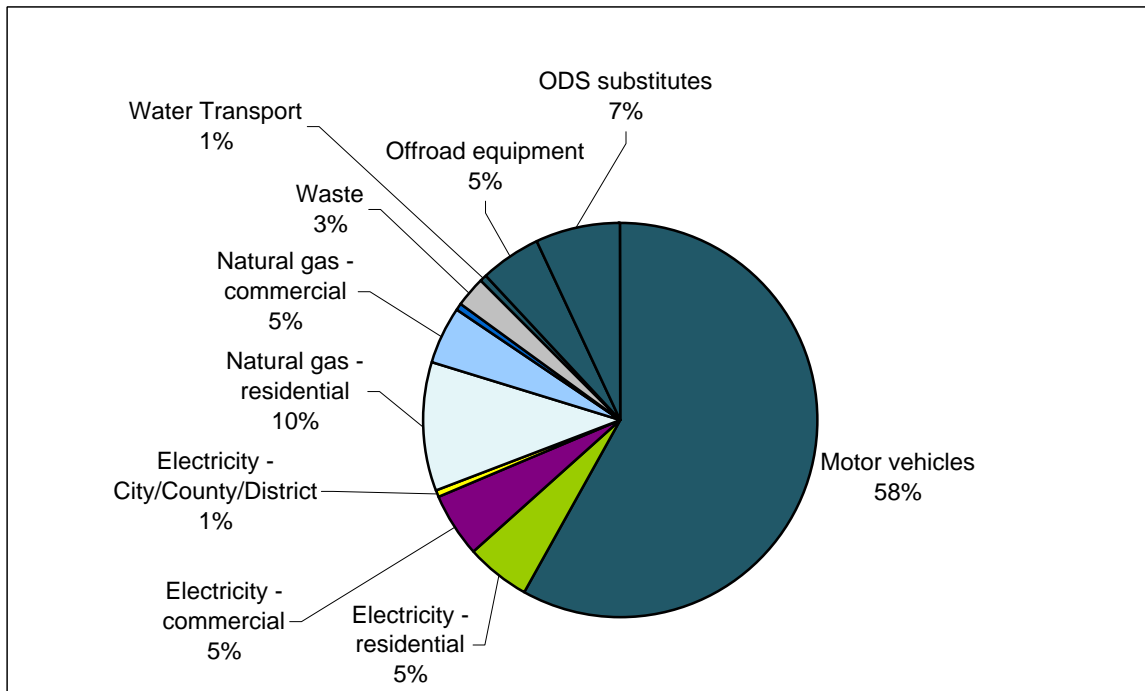
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	77,270	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,087,008	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	374,636	349,501
Electricity - residential	34,545	34,545
Electricity - commercial	33,645	33,645
Electricity - City/County/District	3,713	3,713
Natural gas - residential	67,604	67,604
Natural gas - commercial	31,881	31,881
Natural gas - City/County/District	2,152	2,152
Waste	16,382	16,382
Water Transport	4,701	4,701
Offroad equipment	30,628	30,628
ODS substitutes	45,709	45,709
<u>Total</u>	<u>645,596</u>	<u>620,461</u>



Community Greenhouse Gas Inventory

Waste

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,012

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,382
Emissions (MTCO ₂ e/person)	0.2120 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 28, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,774,193 Source: MTC. 2014
Vehicle miles traveled / year 647,580,547 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	310,029.3	281,253.8
Non Passenger Vehicles	102,935.9	93,381.9
	412,965.2	374,635.7

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	283,867.0	257,519.8
Non Passenger Vehicles	101,391.8	91,981.1
	385,258.8	349,500.9

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2014

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2014
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT Fraction	Trips (trips/day)	CO2_RUNEX (gms/mile)	CO2_IDLEX (gms/vehicle/ day)	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pav	CO2_IDLEX(Pav	CO2_STREX(P
														ey I+LCFS)	ley I+LCFS)	avley I+LCFS)
Contra Costa	2014 Annual	LDA	GAS	Aggregated	Aggregated	407,602	15,023,836	0.573	2,566,347	338.3375631	0	462.8898936	300.2564693	0	420.4717438	
Contra Costa	2014 Annual	LDA	DSL	Aggregated	Aggregated	1,814	62,701	0.002	10,692	356.5923105	0	0	313.3013911	0	0	
Contra Costa	2014 Annual	LDT1	GAS	Aggregated	Aggregated	50,198	1,865,495	0.071	305,857	389.8398291	0	513.2390757	355.6372588	0	475.6096597	
Contra Costa	2014 Annual	LDT1	DSL	Aggregated	Aggregated	69	2,368	0.000	362	364.8191684	0	0	322.3853757	0	0	
Contra Costa	2014 Annual	LDT2	GAS	Aggregated	Aggregated	128,565	5,044,626	0.192	809,629	461.7543514	0	629.2618965	427.7948941	0	589.6482804	
Contra Costa	2014 Annual	LDT2	DSL	Aggregated	Aggregated	62	2,397	0.000	357	359.0723607	0	0	320.1791932	0	0	
Contra Costa	2014 Annual	MDV	GAS	Aggregated	Aggregated	110,479	4,223,563	0.161	691,392	585.3547658	0	786.638138	553.1903087	0	751.6158054	
Contra Costa	2014 Annual	MDV	DSL	Aggregated	Aggregated	111	4,266	0.000	646	359.131059	0	0	333.4709771	0	0	
								698,899	26,229,251	1.000						
								avg miles/vehicle	37.5293844							

Emission Estimate Without Pavley and LCFS 2014

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pav	CO2_IDLEX(Pav	CO2_STREX(P
														ey I+LCFS)	ley I+LCFS)	avley I+LCFS)
LDA	0.573	1,543,590	884,152	338.33756	299,141,732	60,423	462.8898936	27,969,196								
LDA	0.002	1,543,590	3,690	356.59231	1,315,800	60,423	0	0								
LDT1	0.071	1,543,590	109,784	389.83983	42,798,274	60,423	513.2390757	31,011,445								
LDT1	0.000	1,543,590	139	364.81917	50,834	60,423	0	0								
LDT2	0.192	1,543,590	296,876	461.75435	137,083,721	60,423	629.2618965	38,021,892								
LDT2	0.000	1,543,590	141	359.07236	50,654	60,423	0	0								
MDV	0.161	1,543,590	248,556	585.35477	145,493,653	60,423	786.638138	47,531,036								
MDV	0.000	1,543,590	251	359.13106	90,170	60,423	0	0								
Total Passenger Vehicle Emissions								626,024,840	144,533,568							

San Ramon Vehicles

VMT	Avg Miles/Day	Vehicles
1,543,590	38	41130.1604

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
626,024,840	144,533,568	770,558,408	907184.7	849.4	310,029.3

Emission Estimate With Pavley and LCFS 2014

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX(Pavley	CO2_IDLEX(Pavley	CO2_STREX(Pavley
														I+LCFS)	I+LCFS)	I+LCFS)
LDA	0.573	1,543,590	884,152	300.25647	265,472,268	60,423	420.4717438	25,406,164								
LDA	0.002	1,543,590	3,690	313.30139	1,156,060	60,423	0	0								
LDT1	0.071	1,543,590	109,784	355.63726	39,043,370	60,423	475.6096597	28,737,762								
LDT1	0.000	1,543,590	139	322.38538	44,922	60,423	0	0								
LDT2	0.192	1,543,590	296,876	427.79489	127,001,978	60,423	589.6482804	35,628,318								
LDT2	0.000	1,543,590	141	320.17919	45,167	60,423	0	0								
MDV	0.161	1,543,590	248,556	553.19031	137,498,973	60,423	751.6158054	45,414,882								
MDV	0.000	1,543,590	251	333.47098	83,728	60,423	0	0								
Total Passenger Vehicle Emissions								570,346,466	135,187,127							

San Ramon Vehicles

VMT	Avg Miles/Day	Vehicles
1,543,590	38	41130.1604

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
570,346,466	135,187,127	705,533,592	907184.7	777.7	283,867

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories) 2014

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2014
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX			
															(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)			
												(gms/vehicle/day)	(gms/vehicle/day)	(gms/vehicle/day)						
												(gms/mile)	(gms/vehicle/day)	(gms/mile)						
												(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)
Contra Costa	2014	Annual	LHD1	GAS	Aggregated	Aggregated	17,415	42.7%	711,448	32.9%	259,452	972.109478	116.364459	855.1008506	957.527836	114.6189925	842.274338			
Contra Costa	2014	Annual	LHD1	DSL	Aggregated	Aggregated	8,451	20.7%	345,573	16.0%	106,304	524.929762	141.753403	0	517.0558156	139.627102	0			
Contra Costa	2014	Annual	LHD2	GAS	Aggregated	Aggregated	1,268	3.1%	51,483	2.4%	18,886	972.109516	116.364458	877.9385985	957.5278736	114.618991	864.76952			
Contra Costa	2014	Annual	LHD2	DSL	Aggregated	Aggregated	2,202	5.4%	90,580	4.2%	27,699	523.884668	141.753417	0	516.0263983	139.6271159	0			
Contra Costa	2014	Annual	Motor Coach	DSL	Aggregated	Aggregated	49	0.1%	7,039	0.3%	0	1756.87586	11800.5806	0	1730.52272	11623.57187	0			
Contra Costa	2014	Annual	OBUS	GAS	Aggregated	Aggregated	413	1.0%	20,998	1.0%	18,840	677.446016	407.400919	1728.738493	667.284326	401.2899048	1702.80742			
Contra Costa	2014	Annual	PTO	DSL	Aggregated	Aggregated	0	0.0%	12,329	0.6%	0	2157.30559			2124.946005					
Contra Costa	2014	Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.119952	0	574.1639516	730.9881523	0	565.551492			
Contra Costa	2014	Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0			
Contra Costa	2014	Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.79189	647.584438	0	1180.81001	637.8706719	0			
Contra Costa	2014	Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.66111	714.875319	0	1183.63619	704.1521895	0			
Contra Costa	2014	Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0			
Contra Costa	2014	Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0			
Contra Costa	2014	Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0			
Contra Costa	2014	Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0			
Contra Costa	2014	Annual	T6 instate const	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.41768	706.693695	0	1179.456412	696.0932899	0			
Contra Costa	2014	Annual	T6 instate const	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.74448	727.319448	0	1167.95831	716.4096563	0			
Contra Costa	2014	Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.79067	708.254788	0	1177.853814	697.630966	0			
Contra Costa	2014	Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.43385	728.666232	0	1166.667338	717.7362388	0			
Contra Costa	2014	Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.2019	742.182158	0	1177.273874	731.0494258	0			
Contra Costa	2014	Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.446028	251.580107	1290.514347	667.2843377	247.806405	1271.15663			
Contra Costa	2014	Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.93374	2297.66297	0	1739.444736	2263.198023	0			
Contra Costa	2014	Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.71624	20670.356	0	1723.470494	20360.3007	0			
Contra Costa	2014	Annual	T7 CAIRP consi	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.97534	20346.1753	0	1724.710709	20040.98263	0			
Contra Costa	2014	Annual	T7 NNOOS	DSL	Aggregated	Aggregated	356	0.9%	95,271	4.4%	0	1732.41362	32190.8627	0	1706.427415	31707.99979	0			
Contra Costa	2014	Annual	T7 NOOS	DSL	Aggregated	Aggregated	135	0.3%	30,841	1.4%	0	1750.02825	25645.5649	0	1723.777826	25260.88146	0			
Contra Costa	2014	Annual	T7 other port	DSL	Aggregated	Aggregated	57	0.1%	8,856	0.4%	0	1772.22838	5714.69289	0	1745.644956	5628.972495	0			
Contra Costa	2014	Annual	T7 POAK	DSL	Aggregated	Aggregated	249	0.6%	38,806	1.8%	0	1772.22838	9479.44741	0	1745.644956	9337.255701	0			
Contra Costa	2014	Annual	T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0			0			0			
Contra Costa	2014	Annual	T7 Public	DSL	Aggregated	Aggregated	200	0.5%	4,977	0.2%	0	1783.81099	8323.90896	0	1757.053824	8199.050329	0			
Contra Costa	2014	Annual	T7 Single	DSL	Aggregated	Aggregated	689	1.7%	51,363	2.4%	0	1750.36091	2889.45563	0	1724.105499	2846.113792	0			
Contra Costa	2014	Annual	T7 single constr	DSL	Aggregated	Aggregated	282	0.7%	20,829	1.0%	0	1751.19979	2842.46408	0	1724.931789	2799.827122	0			
Contra Costa	2014	Annual	T7 SWCV	DSL	Aggregated	Aggregated	270	0.7%	13,545	0.6%	0	1764.05687	8425.7498	0	1737.596016	8299.36355	0			
Contra Costa	2014	Annual	T7 tractor	DSL	Aggregated	Aggregated	988	2.4%	154,717	7.2%	0	1755.73524	3023.86346	0	1729.399208	2978.505509	0			
Contra Costa	2014	Annual	T7 tractor const	DSL	Aggregated	Aggregated	204	0.5%	15,530	0.7%	0	1754.08865	2973.20875	0	1727.777324	2928.610616	0			
Contra Costa	2014	Annual	T7 utility	DSL	Aggregated	Aggregated	33	0.1%	814	0.0%	1,516	1755.35581	8488.4779	0	1729.025476	8361.150734	0			
Contra Costa	2014	Annual	T7IS	GAS	Aggregated	Aggregated	76	0.2%	8,963	0.4%	1,516	584.667431	0	1487.453283	575.8974192	0	1465.14148			
Contra Costa	2014	Annual	UBUS	GAS	Aggregated	Aggregated	75	0.2%	9,951	0.5%	299	744.187067	0	596.1314986	733.0242614	0	587.189526			
Contra Costa	2014	Annual	UBUS	DSL	Aggregated	Aggregated	247	0.6%	32,905	1.5%	987	2519.19128	0	0	2481.403415	0	0			
Contra Costa	2014	Annual	All Other Buses	DSL	Aggregated	Aggregated	128	0.3%	6,941	0.3%	0	1201.1981	680.421704	0	1183.180129	670.2153785	0			
							40,816	100.0%	2,163,682	1	453,132									
									Mi/Veh	53.01120191										

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.119952	0	574.1639516	730.9881523	0	565.551492
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.79189	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.66111	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.41768	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.74448	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.79067	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.43385	728.666232	0	1176.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.2019	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.446028	251.580107	1290.514347	667.2843377	247.806405	1271.15663
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.93374	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.71624	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.97534	20346.1753	0	1724.710709	20040.98263	0

Emission Estimate Without Pavley and LCFS 2014

	San Ramon				San Ramon		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions	
	VMT Fraction	Miles/Day Non-Passenger	Miles/Day/Veh Class	(gms/mile)	gms/day	Pop Fraction			(g/veh/day)	g/day
LHD1	0.329	230,604	75,826	972.10948	73,710,930	0.427	1,856	116.3644594	855.1008506	1,803,039.3
LHD1	0.160	230,604	36,831	524.92976	19,333,672	0.207	901	141.753403	0	127,676.2
LHD2	0.024	230,604	5,487	972.10952	5,334,005	0.031	135	116.3644579	877.9385985	134,335.4
LHD2	0.042	230,604	9,654	523.88467	5,057,559	0.054	235	141.7534172	0	33,267.5
Motor Coach	0.003	230,604	750	1756.8759	1,318,103	0.001	5	11800.58058	0	61,830.9
OBUS	0.010	230,604	2,238	677.44602	1,516,119	0.010	44	407.4009186	1728.738493	93,920.7
PTO	0.000	230,604	92	2157.3056	197,778	0.000	0	0	0	0.0
SBUS	0.002	230,604	477	742.11995	353,729	0.002	11	0	574.1639516	6,092.6
SBUS	0.001	230,604	345	1299.958	448,187	0.037	163	3744.833697	0	609,029.9
T6 Ag	0.001	230,604	194	1198.7919	231,980	0.001	6	647.5844384	0	3,757.9
T6 Public	0.003	230,604	607	1201.6611	729,922	0.008	33	714.8753193	0	23,442.4
T6 CAIRP heavy	0.000	230,604	14	1189.3871	16,159	0.000	0	727.8571769	0	159.2
T6 CAIRP small	0.000	230,604	44	1182.8136	52,478	0.000	1	738.6620329	0	468.9
T6 OOS heavy	0.000	230,604	8	1189.3871	9,264	0.000	0	727.8571769	0	91.3
T6 OOS small	0.000	230,604	25	1182.8136	30,087	0.000	0	738.6620329	0	268.8
T6 instate construction heavy	0.004	230,604	868	1197.4177	1,039,275	0.004	17	706.6936954	0	11,665.8
T6 instate construction small	0.010	230,604	2,252	1185.7445	2,670,535	0.008	35	727.319448	0	25,687.2
T6 instate heavy	0.024	230,604	5,441	1195.7907	6,506,663	0.023	101	708.2547878	0	71,779.2
T6 instate small	0.063	230,604	14,580	1184.4338	17,269,608	0.052	224	728.6662323	0	163,543.9
T6 utility	0.000	230,604	101	1195.2019	120,904	0.001	5	742.1821582	0	3,813.0
T6TS	0.020	230,604	4,561	677.44603	3,090,112	0.023	100	251.5801066	1290.514347	154,022.4
T7 Ag	0.003	230,604	705	1765.9337	1,244,322	0.002	10	2297.662967	0	23,703.0
T7 CAIRP	0.039	230,604	9,026	1749.7162	15,793,039	0.009	39	20670.35604	0	815,383.7
T7 CAIRP construction	0.000	230,604	60	1750.9753	104,838	0.001	4	20346.17526	0	77,074.4
T7 NNOOS	0.044	230,604	10,154	1732.4136	17,590,888	0.009	38	32190.86273	0	1,219,734.7
T7 NOOS	0.014	230,604	3,287	1750.0283	5,752,449	0.003	14	25645.56493	0	368,413.9
T7 other port	0.004	230,604	944	1772.2284	1,672,787	0.001	6	5714.692888	0	34,495.9
T7 POAK	0.018	230,604	4,136	1772.2284	7,329,795	0.006	26	9479.447412	0	251,174.0
T7 POLA	0.000	230,604	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	230,604	530	1783.811	946,212	0.005	21	8323.908963	0	177,650.4
T7 Single	0.024	230,604	5,474	1750.3609	9,581,889	0.017	73	2889.455626	0	212,113.2
T7 single construction	0.010	230,604	2,220	1751.1998	3,887,570	0.007	30	2842.464083	0	85,394.6
T7 SWCV	0.006	230,604	1,444	1764.0569	2,546,677	0.007	29	8425.749797	0	242,824.2
T7 tractor	0.072	230,604	16,490	1755.7352	28,951,549	0.024	105	3023.863461	0	318,522.5
T7 tractor construction	0.007	230,604	1,655	1754.0887	2,903,252	0.005	22	2973.208747	0	64,791.2
T7 utility	0.000	230,604	87	1755.3558	152,379	0.001	3	8488.477903	0	29,578.8
T7IS	0.004	230,604	955	584.66743	558,505	0.002	8	0	1487.453283	12,007.9
UBUS	0.005	230,604	1,061	744.18707	789,278	0.002	8	0	596.1314986	4,742.6
UBUS	0.015	230,604	3,507	2519.1913	8,834,857	0.006	26	0	0	0.0
All Other Buses	0.003	230,604	740	1201.1981	888,592	0.003	14	680.421704	0	9,251.2
					248,565,947	1.000	4,350			7,274,748.4

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.119952	0	574.1639516	730.9881523	0	565.551492
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.79189	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.66111	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.41768	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.74448	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.79067	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.43385	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.2019	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.446028	251.580107	1290.514347	667.2843377	247.806405	1271.15663
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.93374	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.71624	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.97534	20346.1753	0	1724.710709	20040.98263	0

San Ramon Vehicles

Avg Miles		
VMT	CCC	Vehicles
230,604	53	4,350

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
248,565,947	7,274,748	255,840,696	907184.7	282.02	102,935.9

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.119952	0	574.1639516	730.9881523	0	565.551492
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.79189	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.66111	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.41768	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.74448	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.79067	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.43385	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.2019	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.446028	251.580107	1290.514347	667.2843377	247.806405	1271.15663
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.93374	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.71624	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.97534	20346.1753	0	1724.710709	20040.98263	0

Emission Estimate With Pavley and LCFS 2014

	VMT Fraction	San Ramon Miles/Day			San Ramon		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions	
		Non-Passenger	Miles/Day/Veh Class	(gms/mile)	gms/day	Pop Fraction			(g/veh/day)	g/day
LHD1	0.329	230,604	75,826	957.52784	72,605,266	0.427	1,856	114.6189925	842.2743379	1,775,993.7
LHD1	0.160	230,604	36,831	517.05582	19,043,667	0.207	901	139.627109	0	125,761.0
LHD2	0.024	230,604	5,487	957.52787	5,253,995	0.031	135	114.618991	864.7695195	132,320.3
LHD2	0.042	230,604	9,654	516.0264	4,981,696	0.054	235	139.6271159	0	32,768.5
Motor Coach	0.003	230,604	750	1730.5227	1,298,332	0.001	5	11623.57187	0	60,903.4
OBUS	0.010	230,604	2,238	667.28433	1,493,377	0.010	44	401.2899048	1702.807416	92,511.9
PTO	0.000	230,604	92	2124.946	194,811	0.000	0	0	0	0.0
SBUS	0.002	230,604	477	730.98815	348,423	0.002	11	0	565.5514923	6,001.3
SBUS	0.001	230,604	345	1280.4586	441,464	0.037	163	3688.661192	0	599,894.5
T6 Ag	0.001	230,604	194	1180.81	228,500	0.001	6	637.8706719	0	3,701.5
T6 Public	0.003	230,604	607	1183.6362	718,973	0.008	33	704.1521895	0	23,090.8
T6 CAIRP heavy	0.000	230,604	14	1171.5463	15,917	0.000	0	716.9393193	0	156.8
T6 CAIRP small	0.000	230,604	44	1165.0714	51,691	0.000	1	727.5821024	0	461.8
T6 OOS heavy	0.000	230,604	8	1171.5463	9,126	0.000	0	716.9393193	0	89.9
T6 OOS small	0.000	230,604	25	1165.0714	29,636	0.000	0	727.5821024	0	264.8
T6 instate construction heavy	0.004	230,604	868	1179.4564	1,023,686	0.004	17	696.0932899	0	11,490.8
T6 instate construction small	0.010	230,604	2,252	1167.9583	2,630,477	0.008	35	716.4096563	0	25,301.9
T6 instate heavy	0.024	230,604	5,441	1177.8538	6,409,063	0.023	101	697.630966	0	70,702.5
T6 instate small	0.063	230,604	14,580	1166.6673	17,010,564	0.052	224	717.7362388	0	161,090.7
T6 utility	0.000	230,604	101	1177.2739	119,090	0.001	5	731.0494258	0	3,755.9
T6TS	0.020	230,604	4,561	667.28434	3,043,761	0.023	100	247.806405	1271.156632	151,712.0
T7 Ag	0.003	230,604	705	1739.4447	1,225,657	0.002	10	2263.198023	0	23,347.5
T7 CAIRP	0.039	230,604	9,026	1723.4705	15,556,143	0.009	39	20360.3007	0	803,152.9
T7 CAIRP construction	0.000	230,604	60	1724.7107	103,266	0.001	4	20040.98263	0	75,918.2
T7 NNOOS	0.044	230,604	10,154	1706.4274	17,327,024	0.009	38	31707.99979	0	1,201,438.7
T7 NOOS	0.014	230,604	3,287	1723.7778	5,686,162	0.003	14	25260.88146	0	362,887.6
T7 other port	0.004	230,604	944	1745.645	1,647,696	0.001	6	5628.972495	0	33,978.4
T7 POAK	0.018	230,604	4,136	1745.645	7,219,848	0.006	26	9337.255701	0	247,406.3
T7 POLA	0.000	230,604	0	0	0	0.000	0	0	0	0.0
T7 Public	0.002	230,604	530	1757.0538	932,019	0.005	21	8199.050329	0	174,985.6
T7 Single	0.024	230,604	5,474	1724.1055	9,438,161	0.017	73	2846.113792	0	208,931.5
T7 single construction	0.010	230,604	2,220	1724.9318	3,829,256	0.007	30	2799.827122	0	84,113.7
T7 SWCV	0.006	230,604	1,444	1737.596	2,508,477	0.007	29	8299.36355	0	239,181.8
T7 tractor	0.072	230,604	16,490	1729.3992	28,517,276	0.024	105	2978.505509	0	313,744.7
T7 tractor construction	0.007	230,604	1,655	1727.7773	2,859,703	0.005	22	2928.610616	0	63,819.3
T7 utility	0.000	230,604	87	1729.0255	150,093	0.001	3	8361.150734	0	29,135.1
T7IS	0.004	230,604	955	575.89742	550,128	0.002	8	0	1465.141483	11,827.8
UBUS	0.005	230,604	1,061	733.02426	777,439	0.002	8	0	587.1895261	4,671.5
UBUS	0.015	230,604	3,507	2481.4034	8,702,334	0.006	26	0	0	0.0
All Other Buses	0.003	230,604	740	1183.1801	875,263	0.003	14	670.2153785	0	9,112.4
					244,837,458	1.000	4,350			7,165,627.2

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2014 Annual	SBUS	GAS	Aggregated	Aggregated	100	0.2%	4,472	0.2%	398	742.119952	0	574.1639516	730.9881523	0	565.551492
Contra Costa	2014 Annual	SBUS	DSL	Aggregated	Aggregated	1,526	3.7%	56,846	2.6%	0	1299.95799	3744.8337	0	1280.45862	3688.661192	0
Contra Costa	2014 Annual	T6 Ag	DSL	Aggregated	Aggregated	54	0.1%	1,816	0.1%	0	1198.79189	647.584438	0	1180.81001	637.8706719	0
Contra Costa	2014 Annual	T6 Public	DSL	Aggregated	Aggregated	308	0.8%	5,699	0.3%	0	1201.66111	714.875319	0	1183.63619	704.1521895	0
Contra Costa	2014 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	127	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	416	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	73	0.0%	0	1189.38712	727.857177	0	1171.546317	716.9393193	0
Contra Costa	2014 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	239	0.0%	0	1182.81361	738.662033	0	1165.07141	727.5821024	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	155	0.4%	8,144	0.4%	0	1197.41768	706.693695	0	1179.456412	696.0932899	0
Contra Costa	2014 Annual	T6 instate const	DSL	Aggregated	Aggregated	331	0.8%	21,132	1.0%	0	1185.74448	727.319448	0	1167.95831	716.4096563	0
Contra Costa	2014 Annual	T6 instate heav	DSL	Aggregated	Aggregated	951	2.3%	51,054	2.4%	0	1195.79067	708.254788	0	1177.853814	697.630966	0
Contra Costa	2014 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,106	5.2%	136,804	6.3%	0	1184.43385	728.666232	0	1166.667338	717.7362388	0
Contra Costa	2014 Annual	T6 utility	DSL	Aggregated	Aggregated	48	0.1%	949	0.0%	0	1195.2019	742.182158	0	1177.273874	731.0494258	0
Contra Costa	2014 Annual	T6TS	GAS	Aggregated	Aggregated	937	2.3%	42,798	2.0%	18,751	677.446028	251.580107	1290.514347	667.2843377	247.806405	1271.15663
Contra Costa	2014 Annual	T7 Ag	DSL	Aggregated	Aggregated	97	0.2%	6,611	0.3%	0	1765.93374	2297.66297	0	1739.444736	2263.198023	0
Contra Costa	2014 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	370	0.9%	84,689	3.9%	0	1749.71624	20670.356	0	1723.470494	20360.3007	0
Contra Costa	2014 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	36	0.1%	8,052	0.4%	0	1750.97534	20346.1753	0	1724.710709	20040.98263	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
230,604	6,941	33.2240443

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
244,837,458	7,165,627	252,003,085	907184.7	277.8	101,392

Community Greenhouse Gas Inventory

Energy

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.412	PG&E 2014 emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	183,043,283	2,610	37707	2.8	1.0	34,545
Commercial	178,277,122	7,503	36725	2.8	1.0	33,645
City/County/Dist	19,672,661		4053	0.3	0.1	3,713
Total	380,993,066		78,485	5.9	2.1	71,903

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	12,705,919	164	74,330	7.0	0.1	67,604
Commercial	5,991,826	130	35,052	3.3	0.1	31,881
City/Co/Dist	404,430		2,366	0.2	0.0	2,152
Total	19,102,174		111,748	10.5	0.2	101,637

Notes and Sources:

*The Industrial kWh/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: PG&E Third Party Verified Rate for 2013.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,087,008	1,019	0.1600	0.0100	930
San Ramon	77,270	72	0	0	66
Percent San Ramon/Contra Costa County	7.1%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,087,008	920	0.360	0.08000	864
San Ramon	77,270	65	0	0	61
Percent San Ramon/Contra Costa County	7.1%				

Total San Ramon 128

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2014

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	22.68
Population	38,340,074
Emissions (MTCO ₂ e per person)	0.59

San Ramon

Population	77,270
Emissions (MTCO ₂ e per person)	45,709
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:

http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

Accessed August 19, 2013.

California Population from: DOF Report E-2

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2014 Assumptions

	2008	2014
San Ramon Population	66,413	77,270
Water Usage (gallons/day)	10,840,000	12,612,091
Water Usage (million gallons/year)	3957	4603
Energy Usage (kWh)	21,409,163	24,909,069
Energy Usage (MWh)	21,409	24,909

Year 2014 Emissions

Greenhouse Gas	Electricity	2014	2014	2014
	Emission Factor (pounds per MWh)	Emissions (pounds/year)	Emissions (tons/year)	Emissions MTCO _{2e}
Carbon dioxide	412	10,262,536	5,131	4,655.1
Methane	0.031	772.18	0.386	7.4
Nitrous oxide	0.011	274.00	0.137	38.5
				4,701.0

Source for electricity emission factor:

California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 3.1, January 2009. Table C.2.

www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Source for electricity requirements:

Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.

www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for 2008 and 2030 population estimates: City of San Ramon General Plan (2010). Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory BAU

Summary

Year: 2020

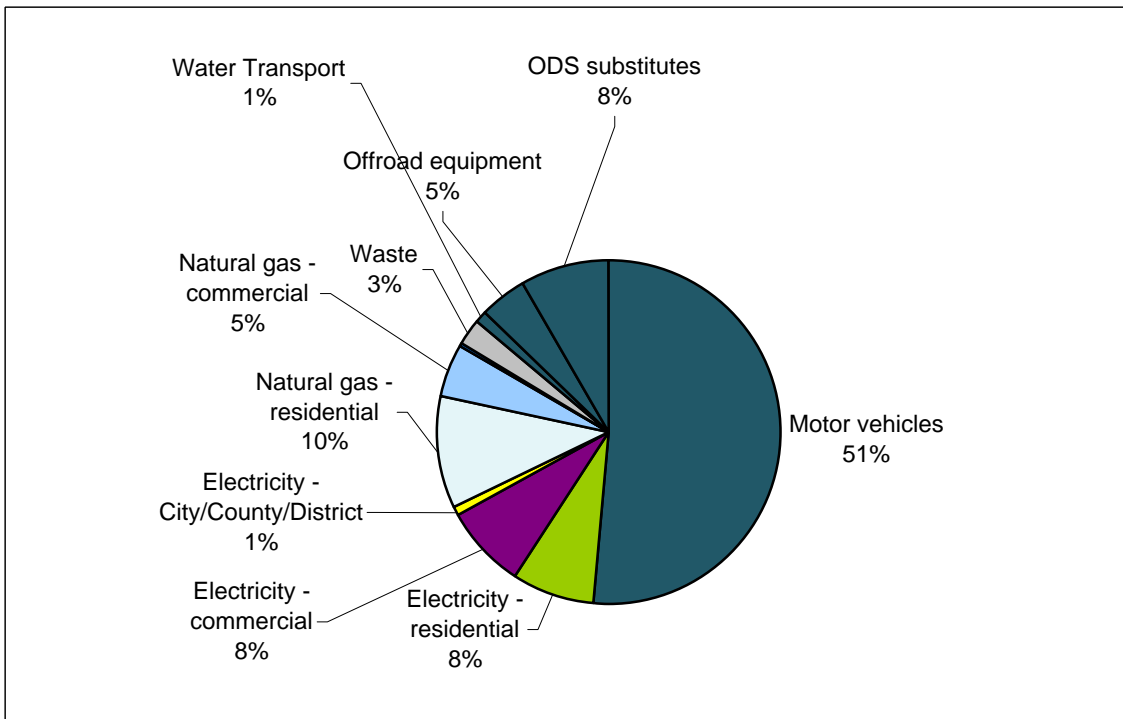
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	82,057	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,147,399	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e
Motor vehicles	350,366
Electricity - residential	52,820
Electricity - commercial	51,445
Electricity - City/County/District	5,677
Natural gas - residential	71,792
Natural gas - commercial	33,856
Natural gas - City/County/District	2,285
Waste	17,397
Water Transport	7,188
Offroad equipment	30,628
ODS substitutes	56,520
<u>Total</u>	<u>679,974</u>



Community Greenhouse Gas Inventory

Waste BAU

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 38,242

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	17,397	
Emissions (MTCO ₂ e/person)	0.2120	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 22, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,807,324 Source: MTC. 2014
Vehicle miles traveled / year 659,673,260 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	292,436.7	265,294.1
Non Passenger Vehicles	93,775.5	85,071.7
	386,212.2	350,365.8

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	292,436.7	265,294.1
Non Passenger Vehicles	92,035.9	83,493.5
	384,472.6	348,787.7

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2020 BAU

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2005
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT		CO2_RUNEX	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/d ay)
									Fraction	Trips				
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)				
Contra Costa	2005 Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	460.3646763	332.5838917	460.3646763	
Contra Costa	2005 Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	362.249441	0	
Contra Costa	2005 Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	527.1606221	380.6486469	527.1606221	
Contra Costa	2005 Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	373.5873232	0	
Contra Costa	2005 Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	633.3019897	455.8272576	633.3019897	
Contra Costa	2005 Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	372.2726309	0	
Contra Costa	2005 Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	792.1227449	570.5037165	792.1227449	
Contra Costa	2005 Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	368.5728982	0	
						627,174	24,468,550	1.000						
						avg miles/vehicle	39.0139465							

Emission Estimate Without Pavley and LCFS

	VMT Fraction	SR VMT	CO2_RUN EX		Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day
			Miles/Day/Veh	Class				
LDA	0.573	1,580,247	905,149	332.58389	301,037,867	40,505	460.3646763	18,646,919
LDA	0.002	1,580,247	3,778	362.24944	1,368,418	40,505	0	0
LDT1	0.071	1,580,247	112,391	380.64865	42,781,644	40,505	527.1606221	21,352,467
LDT1	0.000	1,580,247	143	373.58732	53,292	40,505	0	0
LDT2	0.192	1,580,247	303,926	455.82726	138,537,808	40,505	633.3019897	25,651,688
LDT2	0.000	1,580,247	144	372.27263	53,763	40,505	0	0
MDV	0.161	1,580,247	254,459	570.50372	145,169,874	40,505	792.1227449	32,084,670
MDV	0.000	1,580,247	257	368.5729	94,739	40,505	0	0
Total Passenger Vehicle Emissions					629,097,405			97,735,743

San Ramon Vehicles 2020

VMT	Avg Miles/Day	CCC	Vehicles
1,580,247	39		40,505

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
629,097,405	97,735,743	726,833,148	907184.7	801.2	292,436.7

Emission Estimate With Pavley and LCFS

	VMT Fraction	SR VMT	CO2_RUN EX(Pavley I+LCFS)		Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicl e/day)
			Miles/Day/Veh	Class				
LDA	0.573	1,580,247	905,149	332.58389	301,037,867	40,505	460.3646763	18,646,919
LDA	0.002	1,580,247	3,778	362.24944	1,368,418	40,505	0	0
LDT1	0.071	1,580,247	112,391	380.64865	42,781,644	40,505	527.1606221	21,352,467
LDT1	0.000	1,580,247	143	373.58732	53,292	40,505	0	0
LDT2	0.192	1,580,247	303,926	455.82726	138,537,808	40,505	633.3019897	25,651,688
LDT2	0.000	1,580,247	144	372.27263	53,763	40,505	0	0
MDV	0.161	1,580,247	254,459	570.50372	145,169,874	40,505	792.1227449	32,084,670
MDV	0.000	1,580,247	257	368.5729	94,739	40,505	0	0
Total Passenger Vehicle Emissions					629,097,405			97,735,743

San Ramon Vehicles

VMT	Avg Miles/Day	CCC	Vehicles
1,580,247	39		40,505

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
629,097,405	97,735,743	726,833,148	907184.7	801.2	292,437

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2020 BAU
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop			CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX	
								Fraction	VMT	VMT Fraction				(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)	
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)		
Contra Costa	2005 Annual		LHD1	GAS	Aggregated	Aggregated	15,365	41.3%	686,475	29.5%	269,190	972.109499	116.364456	819.7728342	972.1094988	116.3644561	819.772834
Contra Costa	2005 Annual		LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	17.2%	110,294	532.305932	141.748251	0	532.3059325	141.7482507	0
Contra Costa	2005 Annual		LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.4%	19,711	972.109536	116.338965	1045.68254	972.1095363	116.338965	1045.68254
Contra Costa	2005 Annual		LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	3.7%	28,908	535.013419	141.753311	0	535.0134187	141.7533106	0
Contra Costa	2005 Annual		Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	8,163	0.4%	0	1745.97142	11338.6466	0	1745.971421	11338.64661	0
Contra Costa	2005 Annual		OBUS	GAS	Aggregated	Aggregated	376	1.0%	20,858	0.9%	20,022	677.446035	407.400915	1962.23896	677.4460346	407.4009152	1962.23896
Contra Costa	2005 Annual		PTO	DSL	Aggregated	Aggregated	0	0.0%	15,087	0.6%	0	2183.10362			2183.103618		
Contra Costa	2005 Annual		SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.11995	0	788.3524159	742.1199498	0	788.352416
Contra Costa	2005 Annual		SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.98362	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual		T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.01608	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual		T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.25247	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual		T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual		T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual		T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual		T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual		T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual		T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual		T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual		T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual		T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.34167	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual		T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.44602	251.580104	1824.797808	677.4460202	251.5801036	1824.79781
Contra Costa	2005 Annual		T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.2391	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual		T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual		T7 CAIRP consi	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual		T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	116,836	5.0%	0	1736.32832	37700.7531	0	1736.328325	37700.75308	0
Contra Costa	2005 Annual		T7 NOOS	DSL	Aggregated	Aggregated	113	0.3%	37,822	1.6%	0	1740.70843	37153.8408	0	1740.708429	37153.84079	0
Contra Costa	2005 Annual		T7 other port	DSL	Aggregated	Aggregated	58	0.2%	10,077	0.4%	0	1728.33757	4421.89359	0	1728.337572	4421.893594	0
Contra Costa	2005 Annual		T7 POAK	DSL	Aggregated	Aggregated	249	0.7%	54,852	2.4%	0	1732.46476	6989.07877	0	1732.464758	6989.078773	0
Contra Costa	2005 Annual		T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0			0			0
Contra Costa	2005 Annual		T7 Public	DSL	Aggregated	Aggregated	197	0.5%	5,803	0.2%	0	1806.78662	7861.89962	0	1806.786624	7861.899623	0
Contra Costa	2005 Annual		T7 Single	DSL	Aggregated	Aggregated	591	1.6%	62,989	2.7%	0	1771.29251	2423.1707	0	1771.292515	2423.170701	0
Contra Costa	2005 Annual		T7 single constr	DSL	Aggregated	Aggregated	204	0.5%	16,908	0.7%	0	1771.29251	2423.1707	0	1771.292515	2423.170701	0
Contra Costa	2005 Annual		T7 SWCV	DSL	Aggregated	Aggregated	266	0.7%	15,794	0.7%	0	1777.52967	8016.43418	0	1777.529674	8016.434181	0
Contra Costa	2005 Annual		T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	189,737	8.2%	0	1754.4508	2452.5922	0	1754.450796	2452.592201	0
Contra Costa	2005 Annual		T7 tractor const	DSL	Aggregated	Aggregated	143	0.4%	12,606	0.5%	0	1756.09307	2452.5922	0	1756.093074	2452.592201	0
Contra Costa	2005 Annual		T7 utility	DSL	Aggregated	Aggregated	30	0.1%	931	0.0%	0	1757.33385	8116.29549	0	1757.333853	8116.295492	0
Contra Costa	2005 Annual		T7IS	GAS	Aggregated	Aggregated	74	0.2%	8,511	0.4%	1,411	584.667416	0	2353.967488	584.6674163	0	2353.96749
Contra Costa	2005 Annual		UBUS	GAS	Aggregated	Aggregated	64	0.2%	10,312	0.4%	309	744.187071	0	615.0541717	744.1870709	0	615.054172
Contra Costa	2005 Annual		UBUS	DSL	Aggregated	Aggregated	235	0.6%	34,097	1.5%	1,023	2573.00159	0	0	2573.001593	0	0
Contra Costa	2005 Annual		All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	7,975	0.3%	0	1211.58205	615.147144	0	1211.582049	615.1471436	0
							37,215	100.0%	2,326,162	1	470,931						
								Mi/Veh	62.50593239								

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.11995	0	788.3524159	742.1199498	0	788.352416
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.98362	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.01608	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.25247	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.34167	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.44602	251.580104	1824.797808	677.4460202	251.5801036	1824.79781
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.2391	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS

	VMT Fraction	San Ramon Miles/Day		Run Emis (gms/mile)	Run Emis gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	
		Non-Passenger	Miles/Day/Veh Class						g/day	g/day
LHD1	0.423	227.077	96,159	972.1095	93,477,110	42.3%	1,840	116.3644561	819.7728342	1,722,535.8
LHD1	0.206	227.077	46,665	532.30593	24,839,905	11.2%	489	141.7482507	0	69,309.2
LHD2	0.031	227.077	7,041	972.10954	6,844,698	3.1%	135	116.338965	1045.68254	156,564.0
LHD2	0.054	227.077	12,231	535.01342	6,543,636	3.0%	129	141.7533106	0	18,258.9
Motor Coach	0.001	227.077	303	1745.9714	529,389	0.2%	10	11338.64661	0	118,157.1
OBUS	0.010	227.077	2,333	677.44603	1,580,637	0.7%	31	407.4009152	1962.23896	73,728.9
PTO	0.000	227.077	0	2183.1036	0	0.0%	0	0	0	0.0
SBUS	0.002	227.077	549	742.11995	407,482	0.2%	8	0	788.3524159	6,323.4
SBUS	0.036	227.077	8,095	1299.9836	10,523,493	4.8%	207	3474.936051	0	719,830.4
T6 Ag	0.001	227.077	294	1214.0161	357,347	0.2%	7	591.9178211	0	4,163.7
T6 Public	0.008	227.077	1,901	1210.2525	2,300,537	1.0%	45	636.79636	0	28,837.2
T6 CAIRP heavy	0.000	227.077	11	1194.1438	13,724	0.0%	0	666.3500758	0	180.0
T6 CAIRP small	0.000	227.077	35	1187.5142	41,759	0.0%	1	693.3277468	0	569.9
T6 OOS heavy	0.000	227.077	7	1194.1438	7,868	0.0%	0	666.3500758	0	103.2
T6 OOS small	0.000	227.077	20	1187.5142	23,941	0.0%	0	693.3277468	0	326.7
T6 instate construction heavy	0.003	227.077	638	1206.7402	770,068	0.3%	15	628.1342767	0	9,521.5
T6 instate construction small	0.006	227.077	1,386	1190.6752	1,650,663	0.7%	32	671.5227753	0	21,819.4
T6 instate heavy	0.023	227.077	5,271	1206.7402	6,361,029	2.9%	125	628.1342767	0	78,650.8
T6 instate small	0.054	227.077	12,161	1190.6752	14,479,506	6.6%	285	671.5227753	0	191,398.2
T6 utility	0.001	227.077	290	1190.3417	344,800	0.2%	7	669.3517103	0	4,543.0
T6TS	0.023	227.077	5,227	677.44602	3,541,101	1.6%	70	251.5801036	1824.797808	144,733.2
T7 Ag	0.002	227.077	533	1780.2391	949,030	0.4%	19	2354.915902	0	43,992.5
T7 CAIRP	0.010	227.077	2,243	1740.7084	3,904,222	1.8%	77	29278.79509	0	2,250,148.5
T7 CAIRP construction	0.001	227.077	142	1740.7084	246,583	0.1%	5	29278.79509	0	142,114.9
T7 NNOOS	0.010	227.077	2,210	1736.3283	3,837,338	1.7%	76	37700.75308	0	2,847,760.6
T7 NQOS	0.004	227.077	817	1740.7084	1,421,819	0.6%	28	37153.84079	0	1,039,851.5
T7 other port	0.002	227.077	343	1728.3376	592,815	0.3%	12	4421.893594	0	51,600.1
T7 POAK	0.007	227.077	1,601	1732.4648	2,774,051	1.3%	55	6989.078773	0	381,643.4
T7 POLA	0.000	227.077	0	0	0	0.0%	0	0	0	0.0
T7 Public	0.005	227.077	1,243	1806.7866	2,246,027	1.0%	44	7861.899623	0	347,588.9
T7 Single	0.019	227.077	4,319	1771.2925	7,650,879	3.5%	151	2423.170701	0	364,937.7
T7 single construction	0.005	227.077	1,171	1771.2925	2,074,513	0.9%	41	2423.170701	0	98,951.8
T7 SWCV	0.007	227.077	1,678	1777.5297	2,982,862	1.3%	59	8016.434181	0	470,693.1
T7 tractor	0.027	227.077	6,193	1754.4508	10,865,625	4.9%	214	2452.592201	0	524,570.0
T7 tractor construction	0.004	227.077	851	1756.0931	1,494,674	0.7%	29	2452.592201	0	72,159.8
T7 utility	0.001	227.077	199	1757.3339	349,429	0.2%	7	8116.295492	0	55,826.5
T7IS	0.002	227.077	375	584.66742	219,378	0.1%	4	0	2353.967488	10,165.2
UBUS	0.002	227.077	412	744.18707	306,353	0.1%	6	0	615.0541717	3,709.0
UBUS	0.006	227.077	1,361	2573.0016	3,502,434	1.6%	69	0	0	0.0
All Other Buses	0.003	227.077	767	1211.582	929,820	0.4%	18	615.1471436	0	11,259.0
		227.077			220,986,545	1.000	4,350			12,086,527.3

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.11995	0	788.3524159	742.1199498	0	788.352416
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.98362	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.01608	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.25247	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.34167	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.44602	251.580104	1824.797808	677.4460202	251.5801036	1824.79781
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.2391	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

Avg Miles

VMT	CCC	Vehicles
227,077	63	3,633

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
220,986,545	12,086,527	233,073,072	907184.7	256.92	93,775.5

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.11995	0	788.3524159	742.1199498	0	788.352416
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.98362	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.01608	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.25247	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.34167	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.44602	251.580104	1824.797808	677.4460202	251.5801036	1824.79781
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.2391	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate With Pavley and LCFS

	San Ramon Miles/Day		Miles/Day/Veh Class	Run Emis (gms/mile)	gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions	
	VMT Fraction	Non-Passenger							(g/veh/day)	g/day
LHD1	0.423	227.077	96,159	972.1095	93,476,997	0.427	1,856	116.3644561	819.7728342	1,737,470.5
LHD1	0.206	227.077	46,665	532.30593	24,839,875	0.207	901	141.7482507	0	127,671.5
LHD2	0.031	227.077	7,041	972.10954	6,844,690	0.031	135	116.338965	1045.68254	156,995.0
LHD2	0.054	227.077	12,231	535.01342	6,543,628	0.054	235	141.7533106	0	33,267.5
Motor Coach	0.001	227.077	303	1745.9714	529,389	0.001	5	11338.64661	0	59,410.5
OBUS	0.010	227.077	2,333	677.44603	1,580,635	0.010	44	407.4009152	1962.23896	104,187.1
PTO	0.000	227.077	0	2183.1036	0	0.000	0	0	0	0.0
SBUS	0.002	227.077	549	742.11995	407,481	0.002	11	0	788.3524159	8,365.5
SBUS	0.036	227.077	8,095	1299.9836	10,523,481	0.037	163	3474.936051	0	565,135.9
T6 Ag	0.001	227.077	294	1214.0161	357,346	0.001	6	591.9178211	0	3,434.9
T6 Public	0.008	227.077	1,901	1210.2525	2,300,534	0.008	33	636.79636	0	20,882.0
T6 CAIRP heavy	0.000	227.077	11	1194.1438	13,724	0.000	0	666.3500758	0	145.8
T6 CAIRP small	0.000	227.077	35	1187.5142	41,759	0.000	1	693.3277468	0	440.1
T6 OOS heavy	0.000	227.077	7	1194.1438	7,868	0.000	0	666.3500758	0	83.6
T6 OOS small	0.000	227.077	20	1187.5142	23,941	0.000	0	693.3277468	0	252.3
T6 instate construction heavy	0.003	227.077	638	1206.7402	770,067	0.004	17	628.1342767	0	10,369.0
T6 instate construction small	0.006	227.077	1,386	1190.6752	1,650,661	0.008	35	671.5227753	0	23,716.6
T6 instate heavy	0.023	227.077	5,271	1206.7402	6,361,022	0.023	101	628.1342767	0	63,659.2
T6 instate small	0.054	227.077	12,161	1190.6752	14,479,488	0.052	224	671.5227753	0	150,718.4
T6 utility	0.001	227.077	290	1190.3417	344,800	0.001	5	669.3517103	0	3,438.9
T6TS	0.023	227.077	5,227	677.44602	3,541,097	0.023	100	251.5801036	1824.797808	207,385.9
T7 Ag	0.002	227.077	533	1780.2391	949,029	0.002	10	2354.915902	0	24,293.7
T7 CAIRP	0.010	227.077	2,243	1740.7084	3,904,218	0.009	39	29278.79509	0	1,154,960.8
T7 CAIRP construction	0.001	227.077	142	1740.7084	246,583	0.001	4	29278.79509	0	110,912.5
T7 NNOOS	0.010	227.077	2,210	1736.3283	3,837,333	0.009	38	37700.75308	0	1,428,508.4
T7 NOOS	0.004	227.077	817	1740.7084	1,421,817	0.003	14	37153.84079	0	533,737.1
T7 other port	0.002	227.077	343	1728.3376	592,814	0.001	6	4421.893594	0	26,692.1
T7 POAK	0.007	227.077	1,601	1732.4648	2,774,047	0.006	26	6989.078773	0	185,187.4
T7 POLA	0.000	227.077	0	0	0	0.000	0	0	0	0.0
T7 Public	0.005	227.077	1,243	1806.7866	2,246,024	0.005	21	7861.899623	0	167,790.1
T7 Single	0.019	227.077	4,319	1771.2925	7,650,870	0.017	73	2423.170701	0	177,883.5
T7 single construction	0.005	227.077	1,171	1771.2925	2,074,510	0.007	30	2423.170701	0	72,798.0
T7 SWCV	0.007	227.077	1,678	1777.5297	2,982,858	0.007	29	8016.434181	0	231,028.0
T7 tractor	0.027	227.077	6,193	1754.4508	10,865,612	0.024	105	2452.592201	0	258,347.0
T7 tractor construction	0.004	227.077	851	1756.0931	1,494,672	0.005	22	2452.592201	0	53,446.1
T7 utility	0.001	227.077	199	1757.3339	349,429	0.001	3	8116.295492	0	28,281.9
T7IS	0.002	227.077	375	584.66742	219,378	0.002	8	0	2353.967488	19,003.2
UBUS	0.002	227.077	412	744.18707	306,352	0.002	8	0	615.0541717	4,893.2
UBUS	0.006	227.077	1,361	2573.0016	3,502,429	0.006	26	0	0	0.0
All Other Buses	0.003	227.077	767	1211.582	929,819	0.003	14	615.1471436	0	8,363.7
					220,986,278	1.000	4,350			7,763,156.6

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.11995	0	788.3524159	742.1199498	0	788.352416
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.98362	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.01608	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.25247	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.14382	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.74018	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.67515	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.34167	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.44602	251.580104	1824.797808	677.4460202	251.5801036	1824.79781
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.2391	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.70843	29278.7951	0	1740.708429	29278.79509	0

San Ramon Vehicles

	Avg Miles	
VMT	CCC	Vehicles
227,077	7,975	28.4739308

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
220,986,278	7,763,157	228,749,434	907184.7	252.2	92,036

Community Greenhouse Gas Inventory

Energy

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.595	PG&E Avg emission factor for 2003-2005
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	194,382,769	2,369	57829	3.0	1.1	52,820
Commercial	189,321,345	4,117	56323	2.9	1.0	51,445
City/County/Dist	20,891,377		6215	0.3	0.1	5,677
Total	404,595,491		120,367	6.3	2.2	109,942

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	13,493,048	164	78,934	7.4	0.1	71,792
Commercial	6,363,018	138	37,224	3.5	0.1	33,856
City/Co/Dist	429,484		2,512	0.2	0.0	2,285
Total	20,285,549		118,670	11.2	0.2	107,933

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,147,399	1,019	0.1600	0.0100	930
San Ramon	82,057	73	0	0	67
Percent San Ramon/Contra Costa County	7.2%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,147,399	920	0.360	0.08000	864
San Ramon	82,057	66	0	0	62
Percent San Ramon/Contra Costa County	7.2%				

Total San Ramon 128

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	82,057
Emissions (MTCO ₂ e per person)	56,520
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:

http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:

<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2020 Assumptions

	2008	2020
San Ramon Population	66,413	82,057
Water Usage (gallons/day)	10,840,000	13,393,430
Water Usage (million gallons/year)	3957	4889
Energy Usage (kWh)	21,409,163	26,452,226
Energy Usage (MWh)	21,409	26,452

Year 2020 Emissions

Greenhouse Gas	Electricity	2020	2020	2020
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO2e
	(pounds per MWh)			
Carbon dioxide	595	15,739,074	7,870	7,139.2
Methane	0.031	820.02	0.410	7.8
Nitrous oxide	0.011	290.97	0.145	40.9
				7,188.0

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118.
www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update. Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2020

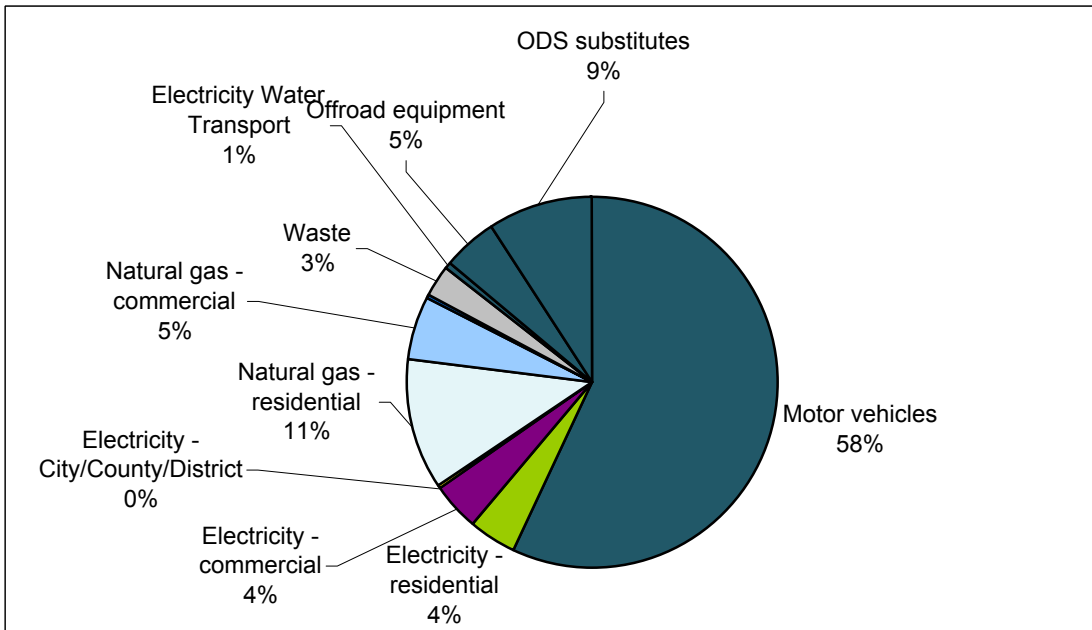
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	82,057	City of San Ramon/ DOF
Employment	45,984	City of San Ramon

County Information		
Population	1,147,399	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	356,254	274,816
Electricity - residential	25,928	25,928
Electricity - commercial	25,253	25,253
Electricity - City/County/District	2,787	2,787
Natural gas - residential	71,792	71,792
Natural gas - commercial	33,856	33,856
Natural gas - City/County/District	2,285	2,285
Waste	16,575	16,575
Electricity Water Transport	3,528	3,528
Offroad equipment	30,628	30,628
ODS substitutes	56,520	56,520
Total	625,406	543,968



Community Greenhouse Gas Inventory

Waste

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 36,436

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	16,575	
Emissions (MTCO ₂ e/person)	0.2020	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2014. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 22, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tons)	CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,807,324 Source: MTC. 2014
Vehicle miles traveled / year 659,673,260 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	299,102.5	271,341.3
Non Passenger Vehicles	93,599.8	84,912.3
	392,702.3	356,253.5

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	220,497.2	200,031.7
Non Passenger Vehicles	82,435.7	74,784.4
	302,932.8	274,816.0

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2020

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2020
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_STREX (gms/vehicle/day)	CO2_RUNEX(Pavley I+LCFS)	CO2_STREX(Pavley I+LCFS)	
													(gms/mile)	(gms/vehicle/day)	
						(miles/hr)	(vehicles)	(miles/day)		(trips/day)	(gms/mile)				
Contra Costa	2020 Annual	LDA	GAS	Aggregated	Aggregated		424,964	15,739,591	0.574	2,683,845	339,207,283	466,907,945	234,101,192	331,594,062	
Contra Costa	2020 Annual	LDA	DSL	Aggregated	Aggregated		1,891	66,079	0.002	11,610	356,196,340	0	251,814,254	0	
Contra Costa	2020 Annual	LDT1	GAS	Aggregated	Aggregated		52,604	1,965,850	0.072	318,897	391,929,888	513,725,087	288,222,549	385,843,539	
Contra Costa	2020 Annual	LDT1	DSL	Aggregated	Aggregated		72	2,710	0.000	414	359,839,688	0	249,626,618	0	
Contra Costa	2020 Annual	LDT2	GAS	Aggregated	Aggregated		133,815	5,293,642	0.193	841,716	461,717,162	632,120,644	350,807,208	487,703,750	
Contra Costa	2020 Annual	LDT2	DSL	Aggregated	Aggregated		64	2,506	0.000	397	356,662,723	0	266,157,947	0	
Contra Costa	2020 Annual	MDV	GAS	Aggregated	Aggregated		115,068	4,329,382	0.158	709,064	588,534,492	783,876,782	466,458,928	635,445,368	
Contra Costa	2020 Annual	MDV	DSL	Aggregated	Aggregated		115	4,387	0.000	694	357,701,845	0	280,132,654	0	
							728,594	27,404,150	1.000						
								avg miles/vehicle							
								37.6123898							

Emission Estimate Without Pavley and LCFS

Veh_Class	VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX	Run Emissions	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day
								g/day
LDA	0.573	1,580,247	905,148	339,207,283	307,032,957	42,014	466,907,945	19,616,667
LDA	0.002	1,580,247	3,778	356,196,340	1,345,552	42,014	0	0
LDT1	0.071	1,580,247	112,391	391,929,888	44,049,548	42,014	513,725,087	21,583,642
LDT1	0.000	1,580,247	143	359,839,688	51,331	42,014	0	0
LDT2	0.192	1,580,247	303,926	461,717,162	140,327,874	42,014	632,120,644	26,557,912
LDT2	0.000	1,580,247	144	356,662,723	51,509	42,014	0	0
MDV	0.161	1,580,247	254,459	588,534,5	149,757,939	42,014	783,876,782	32,933,793
MDV	0.000	1,580,247	257	357,701,84	91,944	42,014	0	0
Total Passenger Vehicle Emissions								100,692,015

San Ramon Vehicles 2020

VMT	Avg Miles/Day	CCC	Vehicles
1,580,247	38		42,014

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emis	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
642,708,655	100,692,015	743,400,669	907184.7	819.5	299,102.5

Emission Estimate With Pavley and LCFS

Veh_Class	VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX(Pavley I+LCFS)	Run Emissions	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS)
								(gms/vehicl e/day)
LDA	0.573	1,580,247	905,148	234,101,192	211,896,338	42,014	331,594,062	13,931,591
LDA	0.002	1,580,247	3,778	251,814,255	951,243	42,014	0	0
LDT1	0.071	1,580,247	112,391	288,222,555	32,393,736	42,014	385,843,539	16,210,828
LDT1	0.000	1,580,247	143	249,626,622	35,609	42,014	0	0
LDT2	0.192	1,580,247	303,926	350,807,211	106,619,450	42,014	487,703,750	20,490,382
LDT2	0.000	1,580,247	144	266,157,955	38,438	42,014	0	0
MDV	0.161	1,580,247	254,459	466,458,933	118,694,703	42,014	635,445,368	26,697,604
MDV	0.000	1,580,247	257	280,132,655	72,006	42,014	0	0
Total Passenger Vehicle Emissions								77,330,404

San Ramon Vehicles

VMT	Avg Miles/Day	CCC	Vehicles
1,580,247	38		42,014

Convert Grams to Tons

Running Emiss	Start Emis	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
470,701,524	77,330,404	548,031,928	907184.7	604.1	220,497

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2020
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop			Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX						
								Fraction	VMT	VMT Fraction					(Pavley I+LCFS)	(Pavley I+LCFS)	(Pavley I+LCFS)						
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)								
Contra Costa	2020 Annual		LHD1	GAS	Aggregated	Aggregated	18,068	42.3%	728,377	31.3%	269,190	972.109486	116.36445	871.8606874	874.8985371	104.7280049	784.674619						
Contra Costa	2020 Annual		LHD1	DSL	Aggregated	Aggregated	8,768	20.6%	354,279	15.2%	110,294	521.898241	141.753402	0	469.7084166	127.5780619	0						
Contra Costa	2020 Annual		LHD2	GAS	Aggregated	Aggregated	1,323	3.1%	53,254	2.3%	19,711	972.109507	116.36445	876.0096681	874.8985564	104.7280048	788.408701						
Contra Costa	2020 Annual		LHD2	DSL	Aggregated	Aggregated	2,298	5.4%	91,285	3.9%	28,908	521.414086	141.7534	0	469.2726776	127.5780601	0						
Contra Costa	2020 Annual		Motor Coach	DSL	Aggregated	Aggregated	57	0.1%	8,163	0.4%	0	1728.6409	11909.0408	0	1555.776812	10718.13672	0						
Contra Costa	2020 Annual		OBUS	GAS	Aggregated	Aggregated	438	1.0%	20,858	0.9%	20,022	677.446005	407.400932	1666.886337	609.7014044	366.6608391	1500.1977						
Contra Costa	2020 Annual		PTO	DSL	Aggregated	Aggregated	0	0.0%	15,087	0.6%	0	2139.04517	0	1925.140652	0	0							
Contra Costa	2020 Annual		SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.119932	0	520.3885556	667.9079385	0	468.3497						
Contra Costa	2020 Annual		SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.21042	3863.95333	0	1162.089374	3477.557995	0						
Contra Costa	2020 Annual		T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.79809	697.966312	0	1062.718279	628.1696804	0						
Contra Costa	2020 Annual		T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.58473	737.309388	0	1067.926258	663.5784488	0						
Contra Costa	2020 Annual		T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0						
Contra Costa	2020 Annual		T6 CAIRP small	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0						
Contra Costa	2020 Annual		T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0						
Contra Costa	2020 Annual		T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0						
Contra Costa	2020 Annual		T6 instate const	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.28234	746.389164	0	1064.954108	671.7502475	0						
Contra Costa	2020 Annual		T6 instate const	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.72227	745.784124	0	1056.350045	671.2057114	0						
Contra Costa	2020 Annual		T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.70288	746.5901	0	1063.532588	671.9310897	0						
Contra Costa	2020 Annual		T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.14764	745.784124	0	1055.832873	671.2057114	0						
Contra Costa	2020 Annual		T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.71582	746.821193	0	1060.844236	672.1390733	0						
Contra Costa	2020 Annual		T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.446002	251.58011	1104.516667	609.701402	226.422099	994.065						
Contra Costa	2020 Annual		T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.82116	3701.15219	0	1563.139048	3331.036973	0						
Contra Costa	2020 Annual		T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.33215	29375.1139	0	1549.198935	26437.60249	0						
Contra Costa	2020 Annual		T7 CAIRP consi	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.58602	29235.2631	0	1549.427417	26311.73675	0						
Contra Costa	2020 Annual		T7 NNOOS	DSL	Aggregated	Aggregated	415	1.0%	116,836	5.0%	0	1718.65726	38191.7299	0	1546.791536	34372.55693	0						
Contra Costa	2020 Annual		T7 NOOS	DSL	Aggregated	Aggregated	153	0.4%	37,822	1.6%	0	1721.33957	36440.9893	0	1549.205616	32796.8904	0						
Contra Costa	2020 Annual		T7 other port	DSL	Aggregated	Aggregated	64	0.2%	10,077	0.4%	0	1773.31023	6461.49074	0	1595.979205	5815.341668	0						
Contra Costa	2020 Annual		T7 POAK	DSL	Aggregated	Aggregated	301	0.7%	54,852	2.4%	0	1773.77873	11096.7178	0	1596.400854	9987.045991	0						
Contra Costa	2020 Annual		T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0	0	0	0	0	0	0						
Contra Costa	2020 Annual		T7 Public	DSL	Aggregated	Aggregated	234	0.5%	5,803	0.2%	0	1763.25138	8395.98652	0	1586.92624	7556.387872	0						
Contra Costa	2020 Annual		T7 Single	DSL	Aggregated	Aggregated	812	1.9%	62,989	2.7%	0	1735.54506	4374.10715	0	1561.990552	3936.696431	0						
Contra Costa	2020 Annual		T7 single constr	DSL	Aggregated	Aggregated	220	0.5%	16,908	0.7%	0	1736.41436	4325.52739	0	1562.772926	3892.974652	0						
Contra Costa	2020 Annual		T7 SWCV	DSL	Aggregated	Aggregated	315	0.7%	15,794	0.7%	0	1740.90918	8454.80385	0	1566.818262	7609.323467	0						
Contra Costa	2020 Annual		T7 tractor	DSL	Aggregated	Aggregated	1,164	2.7%	189,737	8.2%	0	1730.41354	4688.37442	0	1557.372189	4219.53698	0						
Contra Costa	2020 Annual		T7 tractor const	DSL	Aggregated	Aggregated	160	0.4%	12,606	0.5%	0	1732.30547	4627.43927	0	1559.074919	4164.695339	0						
Contra Costa	2020 Annual		T7 utility	DSL	Aggregated	Aggregated	37	0.1%	931	0.0%	0	1736.73557	8474.95502	0	1563.062013	7627.459522	0						
Contra Costa	2020 Annual		T7IS	GAS	Aggregated	Aggregated	71	0.2%	8,511	0.4%	1,411	584.667448	0	1130.650402	526.2007028	0	1017.58536						
Contra Costa	2020 Annual		UBUS	GAS	Aggregated	Aggregated	77	0.2%	10,312	0.4%	309	744.187079	0	596.1315348	669.7683707	0	536.518381						
Contra Costa	2020 Annual		UBUS	DSL	Aggregated	Aggregated	256	0.6%	34,097	1.5%	1,023	2492.05378	0	0	2242.848405	0	0						
Contra Costa	2020 Annual		All Other Buses	DSL	Aggregated	Aggregated	144	0.3%	7,975	0.3%	0	1179.72799	744.586627	0	1061.755195	670.1279642	0						
							42,668	100.0%	2,324,831	1	470,931												
								Mi/Veh	54.48695267														

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.119932	0	520.3885556	667.9079385	0	468.3497
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.21042	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.79809	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.58473	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.28234	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.72227	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.70288	746.5901	0	1065.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.14764	745.784124	0	1053.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.71582	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.446002	251.58011	1104.516667	609.701402	226.422099	994.065
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.82116	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.33215	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.58602	29235.2631	0	1549.427417	26311.73675	0

Emission Estimate Without Pavley and LCFS

	San Ramon		Miles/Day/Veh Class	Run Emis (gms/mile)	Run Emis gms/day	San Ramon Pop Fraction	San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions	
	VMT Fraction	Non-Passenger							(g/veh/day)	g/day
LHD1	0.423	227.077	96,159	972.10949	93,477,109	42.7%	1,855	116.3644499	871.8606874	1,833,584.6
LHD1	0.206	227.077	46,665	521.89824	24,354,233	11.1%	483	141.7534021	0	68,524.8
LHD2	0.031	227.077	7,041	972.10951	6,844,698	3.1%	136	116.3644497	876.0096681	134,824.7
LHD2	0.054	227.077	12,231	521.41409	6,377,306	2.9%	127	141.7534001	0	17,943.6
Motor Coach	0.001	227.077	303	1728.6409	524,135	0.2%	10	11909.0408	0	123,896.6
OBUS	0.010	227.077	2,333	677.446	1,580,637	0.7%	31	407.4009324	1666.886337	65,079.0
PTO	0.000	227.077	0	2139.0452	0	0.0%	0	0	0	0.0
SBUS	0.002	227.077	549	742.11993	407,482	0.2%	8	0	520.3885556	4,209.0
SBUS	0.036	227.077	8,095	1291.2104	10,452,473	4.8%	207	3863.953327	0	801,661.0
T6 Ag	0.001	227.077	294	1180.7981	347,569	0.2%	7	697.9663116	0	4,815.2
T6 Public	0.008	227.077	1,901	1186.5847	2,255,547	1.0%	45	737.3093876	0	33,009.7
T6 CAIRP heavy	0.000	227.077	11	1175.9558	13,515	0.0%	0	746.3730425	0	200.2
T6 CAIRP small	0.000	227.077	35	1171.3733	41,192	0.0%	1	745.7841238	0	609.8
T6 OOS heavy	0.000	227.077	7	1175.9558	7,749	0.0%	0	746.3730425	0	114.8
T6 OOS small	0.000	227.077	20	1171.3733	23,616	0.0%	0	745.7841238	0	349.6
T6 instate construction heavy	0.003	227.077	638	1183.2823	755,099	0.3%	15	746.3891639	0	11,186.9
T6 instate construction small	0.006	227.077	1,386	1173.7223	1,627,161	0.7%	32	745.7841238	0	24,087.0
T6 instate heavy	0.023	227.077	5,271	1181.7029	6,229,051	2.8%	124	746.5900996	0	92,309.0
T6 instate small	0.054	227.077	12,161	1173.1476	14,266,358	6.5%	283	745.7841238	0	211,186.4
T6 utility	0.001	227.077	290	1178.7158	341,433	0.2%	7	746.8211926	0	5,061.3
T6TS	0.023	227.077	5,227	677.446	3,541,101	1.6%	70	251.58011	1104.516667	95,316.7
T7 Ag	0.002	227.077	533	1736.8212	925,884	0.4%	18	3701.152193	0	68,019.5
T7 CAIRP	0.010	227.077	2,243	1721.3322	3,860,763	1.8%	77	29375.11388	0	2,251,088.4
T7 CAIRP construction	0.001	227.077	142	1721.586	243,874	0.1%	5	29235.26306	0	141,518.3
T7 NNOOS	0.010	227.077	2,210	1718.6573	3,798,284	1.7%	75	38191.72993	0	2,879,364.0
T7 NOOS	0.004	227.077	817	1721.3396	1,405,998	0.6%	28	36440.98934	0	1,016,985.3
T7 other port	0.002	227.077	343	1773.3102	608,240	0.3%	12	6461.490742	0	78,009.5
T7 POAK	0.007	227.077	1,601	1773.7787	2,840,203	1.3%	56	11096.71777	0	625,581.3
T7 POLA	0.000	227.077	0	0	0	0.0%	0	0	0	0.0
T7 Public	0.005	227.077	1,243	1763.2514	2,191,908	1.0%	44	8395.986524	0	365,286.7
T7 Single	0.019	227.077	4,319	1735.5451	7,496,472	3.4%	149	4374.107146	0	650,857.9
T7 single construction	0.005	227.077	1,171	1736.4144	2,033,664	0.9%	40	4325.527391	0	174,605.6
T7 SWCV	0.007	227.077	1,678	1740.9092	2,921,409	1.3%	58	8454.803852	0	490,270.5
T7 tractor	0.027	227.077	6,193	1730.4135	10,716,758	4.9%	213	4688.374422	0	997,299.3
T7 tractor construction	0.004	227.077	851	1732.3055	1,474,428	0.7%	29	4627.439266	0	135,426.6
T7 utility	0.001	227.077	199	1736.7356	345,334	0.2%	7	8474.955024	0	58,092.0
T7IS	0.002	227.077	375	584.66745	219,378	0.1%	4	0	1130.650402	4,923.4
UBUS	0.002	227.077	412	744.18708	306,353	0.1%	6	0	596.1315348	3,625.0
UBUS	0.006	227.077	1,361	2492.0538	3,392,245	1.5%	67	0	0	0.0
All Other Buses	0.003	227.077	767	1179.728	905,374	0.4%	18	744.5866269	0	13,380.8
		227.077			219,154,032	1.000	4,350			13,482,303.7

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.119932	0	520.3885556	667.9079385	0	468.3497
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.21042	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.79809	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.58473	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.28234	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.72227	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.70288	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.14764	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.71582	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.446002	251.58011	1104.516667	609.701402	226.422099	994.065
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.82116	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.33215	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.58602	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

Avg Miles		
VMT	CCC	Vehicles
227,077	54	4,168

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

Convert Grams to Tons

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
219,154,032	13,482,304	232,636,336	907184.7	256.44	93,599.8

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.119932	0	520.3885556	667.9079385	0	468.3497
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.21042	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.79809	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.58473	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.28234	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.72227	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.70288	746.5901	0	1065.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.14764	745.784124	0	1053.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.71582	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.446002	251.58011	1104.516667	609.701402	226.422099	994.065
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.82116	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.33215	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.58602	29235.2631	0	1549.427417	26311.73675	0

Emission Estimate With Pavley and LCFS

	VMT Fraction	San Ramon Miles/Day		San Ramon		San Ramon Vehicle Population	Idling (gms/vehicle/day)	Starting Emissions (g/veh/day)	g/day	
		Non-Passenger	Miles/Day/Veh Class	Run Emis (gms/mile)	gms/day					
LHD1	0.423	227.077	96,159	874.89854	84,129,296	0.427	1,856	104.7280049	784.6746186	1,650,731.0
LHD1	0.206	227.077	46,665	469.70842	21,918,783	0.207	901	127.5780619	0	114,908.5
LHD2	0.031	227.077	7,041	874.89856	6,160,221	0.031	135	104.7280048	788.4087013	120,667.3
LHD2	0.054	227.077	12,231	469.27268	5,739,568	0.054	235	127.5780601	0	29,940.8
Motor Coach	0.001	227.077	303	1555.7768	471,721	0.001	5	10718.13672	0	56,159.2
OBUS	0.010	227.077	2,333	609.7014	1,422,571	0.010	44	366.6608391	1500.197704	82,081.1
PTO	0.000	227.077	0	1925.1407	0	0.000	0	0	0	0.0
SBUS	0.002	227.077	549	667.90794	366,733	0.002	11	0	468.3497001	4,969.8
SBUS	0.036	227.077	8,095	1162.0894	9,407,215	0.037	163	3477.557995	0	565,562.3
T6 Ag	0.001	227.077	294	1062.7183	312,812	0.001	6	628.1696804	0	3,645.2
T6 Public	0.008	227.077	1,901	1067.9263	2,029,990	0.008	33	663.5784488	0	21,760.3
T6 CAIRP heavy	0.000	227.077	11	1058.3603	12,164	0.000	0	671.7357382	0	147.0
T6 CAIRP small	0.000	227.077	35	1054.236	37,072	0.000	1	671.2057114	0	426.1
T6 OOS heavy	0.000	227.077	7	1058.3603	6,974	0.000	0	671.7357382	0	84.3
T6 OOS small	0.000	227.077	20	1054.236	21,254	0.000	0	671.2057114	0	244.3
T6 instate construction heavy	0.003	227.077	638	1064.9541	679,588	0.004	17	671.7502475	0	11,089.0
T6 instate construction small	0.006	227.077	1,386	1056.35	1,464,443	0.008	35	671.2057114	0	23,705.4
T6 instate heavy	0.023	227.077	5,271	1063.5326	5,606,139	0.023	101	671.9310897	0	68,097.9
T6 instate small	0.054	227.077	12,161	1055.8329	12,839,707	0.052	224	671.2057114	0	150,647.3
T6 utility	0.001	227.077	290	1060.8442	307,289	0.001	5	672.1390733	0	3,453.2
T6TS	0.023	227.077	5,227	609.7014	3,186,987	0.023	100	226.422099	994.0650001	121,900.6
T7 Ag	0.002	227.077	533	1563.139	833,295	0.002	10	3331.036973	0	34,363.5
T7 CAIRP	0.010	227.077	2,243	1549.1989	3,474,683	0.009	39	26437.60249	0	1,042,884.3
T7 CAIRP construction	0.001	227.077	142	1549.4274	219,486	0.001	4	26311.73675	0	99,672.8
T7 NNOOS	0.010	227.077	2,210	1546.7915	3,418,452	0.009	38	34372.55693	0	1,302,400.7
T7 NOOS	0.004	227.077	817	1549.2056	1,265,397	0.003	14	32796.8904	0	471,146.9
T7 other port	0.002	227.077	343	1595.9792	547,415	0.001	6	5815.341668	0	35,103.4
T7 POAK	0.007	227.077	1,601	1596.4009	2,556,180	0.006	26	9987.045991	0	264,623.6
T7 POLA	0.000	227.077	0	0	0	0.000	0	0	0	0.0
T7 Public	0.005	227.077	1,243	1586.9262	1,972,715	0.005	21	7556.387872	0	161,269.8
T7 Single	0.019	227.077	4,319	1561.9906	6,746,817	0.017	73	3936.696431	0	288,990.5
T7 single construction	0.005	227.077	1,171	1562.7729	1,830,295	0.007	30	3892.974652	0	116,954.5
T7 SWCV	0.007	227.077	1,678	1566.8183	2,629,265	0.007	29	7609.323467	0	219,295.3
T7 tractor	0.027	227.077	6,193	1557.3722	9,645,071	0.024	105	4219.53698	0	444,470.4
T7 tractor construction	0.004	227.077	851	1559.0749	1,326,983	0.005	22	4164.695339	0	90,755.6
T7 utility	0.001	227.077	199	1563.062	310,800	0.001	3	7627.459522	0	26,578.5
T7IS	0.002	227.077	375	526.2007	197,440	0.002	8	0	1017.585361	8,214.8
UBUS	0.002	227.077	412	669.76837	275,717	0.002	8	0	536.5183813	4,268.4
UBUS	0.006	227.077	1,361	2242.8484	3,053,017	0.006	26	0	0	0.0
All Other Buses	0.003	227.077	767	1061.7552	814,836	0.003	14	670.1279642	0	9,111.2
					197,238,390	1.000	4,350			7,650,324.6

San Ramon VMT estimates from MTC data provided by H. Brazil, October 2014.

Contra Costa	2020 Annual	SBUS	GAS	Aggregated	Aggregated	103	0.2%	4,634	0.2%	413	742.119932	0	520.3885556	667.9079385	0	468.3497
Contra Costa	2020 Annual	SBUS	DSL	Aggregated	Aggregated	1,521	3.6%	55,009	2.4%	0	1291.21042	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2020 Annual	T6 Ag	DSL	Aggregated	Aggregated	55	0.1%	1,855	0.1%	0	1180.79809	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2020 Annual	T6 Public	DSL	Aggregated	Aggregated	357	0.8%	6,680	0.3%	0	1186.58473	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2020 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	7	0.0%	479	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1175.95584	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2020 Annual	T6 OOS small	DSL	Aggregated	Aggregated	4	0.0%	275	0.0%	0	1171.37335	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	120	0.3%	6,430	0.3%	0	1183.28234	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2020 Annual	T6 instate const	DSL	Aggregated	Aggregated	260	0.6%	17,335	0.7%	0	1173.72227	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2020 Annual	T6 instate heav	DSL	Aggregated	Aggregated	990	2.3%	54,842	2.4%	0	1181.70288	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2020 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,285	5.4%	154,803	6.7%	0	1173.14764	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2020 Annual	T6 utility	DSL	Aggregated	Aggregated	54	0.1%	1,090	0.0%	0	1178.71582	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2020 Annual	T6TS	GAS	Aggregated	Aggregated	982	2.3%	47,516	2.0%	19,651	677.446002	251.58011	1104.516667	609.701402	226.422099	994.065
Contra Costa	2020 Annual	T7 Ag	DSL	Aggregated	Aggregated	100	0.2%	6,717	0.3%	0	1736.82116	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2020 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	421	1.0%	103,857	4.5%	0	1721.33215	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2020 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	27	0.1%	6,536	0.3%	0	1721.58602	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

VMT	Avg Miles CCC	Vehicles
227,077	7,975	28.4739308

San Ramon Motor Vehicle Emissions

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
197,238,390	7,650,325	204,888,715	907184.7	225.9	82,436

Community Greenhouse Gas Inventory

Energy

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	PG&E 2020 Emission Factor Forecast
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	194,382,769	2,369	28186	3.0	1.1	25,928
Commercial	189,321,345	4,117	27452	2.9	1.0	25,253
City/County/Dist	20,891,377		3029	0.3	0.1	2,787
Total	404,595,491		58,666	6.3	2.2	53,967

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	13,493,048	164	78,934	7.4	0.1	71,792
Commercial	6,363,018	138	37,224	3.5	0.1	33,856
City/Co/Dist	429,484		2,512	0.2	0.0	2,285
Total	20,285,549		118,670	11.2	0.2	107,933

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

BAU

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	47,020	49,933	57,215
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.608516	0.608516	0.6085155	0.608516	0.608516

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,147,399	1,019	0.1600	0.0100	930
San Ramon	82,057	73	0	0	67
Percent San Ramon/Contra Costa County	7.2%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,147,399	920	0.360	0.08000	864
San Ramon	82,057	66	0	0	62
Percent San Ramon/Contra Costa County	7.2%				

Total San Ramon 128

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	82,057
Emissions (MTCO ₂ e per person)	56,520
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:

http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:

<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2020 Assumptions

	2008	2020
San Ramon Population	66,413	82,057
Water Usage (gallons/day)	10,840,000	13,393,430
Water Usage (million gallons/year)	3957	4889
Energy Usage (kWh)	21,409,163	26,452,226
Energy Usage (MWh)	21,409	26,452

Year 2020 Emissions

Greenhouse Gas	Electricity	2020	2020	2020
	Emission	Emissions	Emissions	Emissions
	Factor	(pounds/year)	(tons/year)	MTCO _{2e}
	(pounds per MWh)			
Carbon dioxide	290	7,671,145	3,836	3,479.6
Methane	0.031	820.02	0.410	7.8
Nitrous oxide	0.011	290.97	0.145	40.9
				3,528.4

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update. Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory BAU

Summary

Year: 2035

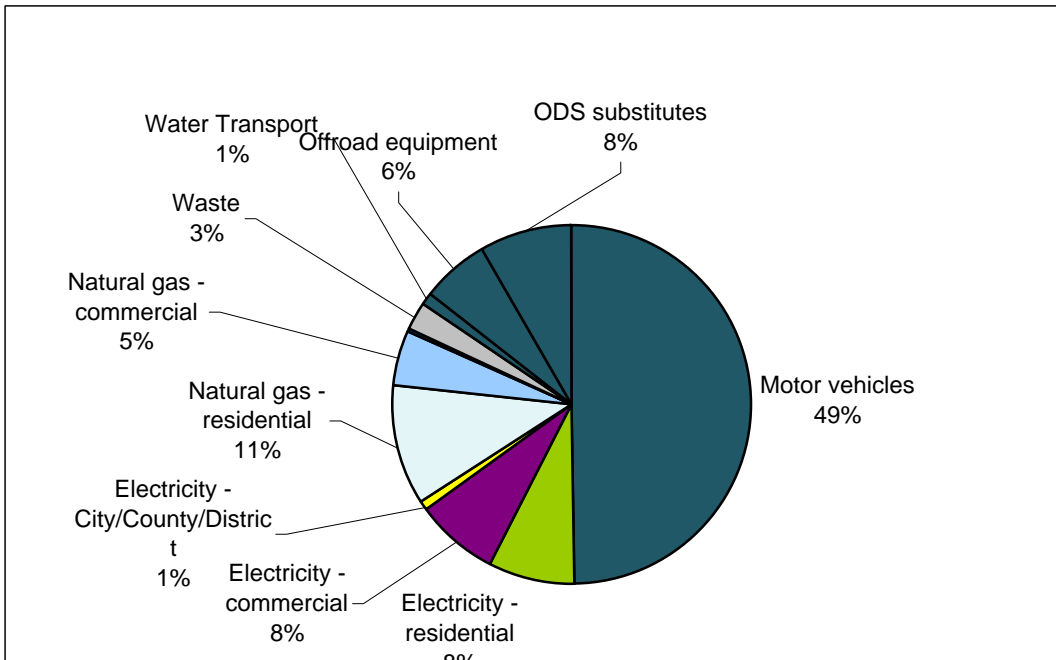
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	94,024	City of San Ramon/ DOF
Employment	57,667	City of San Ramon

County Information		
Population	1,324,740	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e		
Motor vehicles	386,183		
Electricity - residential	60,524		
Electricity - commercial	58,948		
Electricity - City/County/District	6,505		
Natural gas - residential	82,263		
Natural gas - commercial	38,793		
Natural gas - City/County/District	2,618		
Waste	19,934		
Water Transport	8,236		
Offroad equipment	47,844		
ODS substitutes	64,762		
<u>Total</u>	<u>776,611</u>	8,172	784,783



Community Greenhouse Gas Inventory

Waste BAU

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 43,820

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	19,934
Emissions (MTCO ₂ e/person)	0.2120 Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 23, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,967,407 Source: MTC. 2014
Vehicle miles traveled / year 718,103,488 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	313,731.5	284,612.4
Non Passenger Vehicles	111,962.3	101,570.5
	425,693.8	386,182.9

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	313,731.5	284,612.4
Non Passenger Vehicles	108,776.9	98,680.7
	422,508.4	383,293.1

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2035 BAU

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	VMT		CO2_RUNEX	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
								Fraction	Trips				
						(miles/hr)	(vehicles)	(miles/day)	(trips/day)	(gms/mile)			
Contra Costa	2005 Annual	LDA	GAS	Aggregated	Aggregated	364,791	13,297,779	0.543	2,291,334	332.5838917	460.3646763	332.5838917	460.3646763
Contra Costa	2005 Annual	LDA	DSL	Aggregated	Aggregated	2,017	55,051	0.002	11,729	362.249441	0	362.249441	0
Contra Costa	2005 Annual	LDT1	GAS	Aggregated	Aggregated	45,393	1,668,570	0.068	278,461	380.6486469	527.1606221	380.6486469	527.1606221
Contra Costa	2005 Annual	LDT1	DSL	Aggregated	Aggregated	103	3,050	0.000	590	373.5873232	0	373.5873232	0
Contra Costa	2005 Annual	LDT2	GAS	Aggregated	Aggregated	115,717	4,868,196	0.199	736,797	455.8272576	633.3019897	455.8272576	633.3019897
Contra Costa	2005 Annual	LDT2	DSL	Aggregated	Aggregated	87	2,732	0.000	496	372.2726309	0	372.2726309	0
Contra Costa	2005 Annual	MDV	GAS	Aggregated	Aggregated	98,972	4,570,428	0.187	635,720	570.5037165	792.1227449	570.5037165	792.1227449
Contra Costa	2005 Annual	MDV	DSL	Aggregated	Aggregated	95	2,745	0.000	550	368.5728982	0	368.5728982	0
						627,174	24,468,550	1.000					
						avg miles/vehicle	39.0139465						

Emission Estimate Without Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX (gms/mile)	Run Emissions (gms/day)	SR Vehicle Population	CO2_STREX (gms/vehicle/day)	Start Emis/Day (g/day)
LDA	0.573	1,695,318	971,060	332,583,892	43,454	460.3646763	20,004,757
LDA	0.002	1,695,318	4,053	362,249,441	43,454	0	0
LDT1	0.071	1,695,318	120,576	380,648,665	43,454	527.1606221	22,907,318
LDT1	0.000	1,695,318	153	373,587,323	43,454	0	0
LDT2	0.192	1,695,318	326,058	455,827,263	43,454	633.3019897	27,519,602
LDT2	0.000	1,695,318	155	372,272,630	43,454	0	0
MDV	0.161	1,695,318	272,988	570,503,723	43,454	792.1227449	34,421,023
MDV	0.000	1,695,318	276	368,572,898	43,454	0	0
Total Passenger Vehicle Emissions				674,907,248			104,852,700

San Ramon Vehicles 2035

VMT	Avg Miles/Day CCC	Vehicles
1,695,318	39	43,454

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
674,907,248	104,852,700	779,759,948	907184.7	859.5	313,731.5

Emission Estimate With Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh	CO2_RUN EX(Pavley I+LCFS) (gms/mile)	Run Emissions (gms/day)	Vehicle Population	CO2_STREX (gms/vehicle/day)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
LDA	0.573	1,695,318	971,060	332,583,892	43,454	460.3646763	20,004,757
LDA	0.002	1,695,318	4,053	362,249,441	43,454	0	0
LDT1	0.071	1,695,318	120,576	380,648,665	43,454	527.1606221	22,907,318
LDT1	0.000	1,695,318	153	373,587,323	43,454	0	0
LDT2	0.192	1,695,318	326,058	455,827,263	43,454	633.3019897	27,519,602
LDT2	0.000	1,695,318	155	372,272,630	43,454	0	0
MDV	0.161	1,695,318	272,988	570,503,723	43,454	792.1227449	34,421,023
MDV	0.000	1,695,318	276	368,572,898	43,454	0	0
Total Passenger Vehicle Emissions				674,907,248			104,852,700

San Ramon Vehicles

VMT	Avg Miles/Day CCC	Vehicles
1,695,318	39	43,454

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
674,907,248	104,852,700	779,759,948	907184.7	859.5	313,731

EMFAC Passenger Vehicle Emissions (Non-SB 375 Categories)

EMFAC2011: EMFAC Emission Rates Database. Website: <http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates
 Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed	Population	Vehicle Pop Fraction	VMT	VMT Fraction	Trips	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_RUNEX (Pavley I+LCFS)	CO2_IDLEX (Pavley I+LCFS)	CO2_STREX (Pavley I+LCFS)	
						(miles/hr)	(vehicles)	(miles/day)		(trips/day)		(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	(gms/mile)	(gms/vehicle/day)	(gms/vehicle/day)	
Contra Costa	2005 Annual		LHD1	GAS	Aggregated		15,365	41.3%	686,475	29.5%	269,190	972.1094988	116.364456	819.7728342	972.1094988	116.364456	819.7728342	
Contra Costa	2005 Annual		LHD1	DSL	Aggregated	Aggregated	8,125	21.8%	399,468	17.2%	110,294	532.3059325	141.748251	0	532.3059325	141.748251	0	
Contra Costa	2005 Annual		LHD2	GAS	Aggregated	Aggregated	1,322	3.6%	56,240	2.4%	19,711	972.1095363	116.338965	1045.68254	972.1095363	116.338965	1045.68254	
Contra Costa	2005 Annual		LHD2	DSL	Aggregated	Aggregated	1,772	4.8%	86,342	3.7%	28,908	535.0134187	141.753311	0	535.0134187	141.753311	0	
Contra Costa	2005 Annual		Motor Coach	DSL	Aggregated	Aggregated	48	0.1%	8,163	0.4%	0	1745.971421	11338.6466	0	1745.971421	11338.6466	0	
Contra Costa	2005 Annual		OBUS	GAS	Aggregated	Aggregated	376	1.0%	20,858	0.9%	20,022	677.4460346	407.400915	1962.23896	677.4460346	407.400915	1962.23896	
Contra Costa	2005 Annual		PTO	DSL	Aggregated	Aggregated	0	0.0%	15,087	0.6%	0	2183.103618		0	2183.103618		0	
Contra Costa	2005 Annual		SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159	
Contra Costa	2005 Annual		SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.93605	0	
Contra Costa	2005 Annual		T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.917821	0	
Contra Costa	2005 Annual		T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0	
Contra Costa	2005 Annual		T6 CAIRP heavy	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0	
Contra Costa	2005 Annual		T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0	
Contra Costa	2005 Annual		T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.350076	0	
Contra Costa	2005 Annual		T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.327747	0	
Contra Costa	2005 Annual		T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.134277	0	
Contra Costa	2005 Annual		T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0	
Contra Costa	2005 Annual		T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.134277	0	
Contra Costa	2005 Annual		T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.522775	0	
Contra Costa	2005 Annual		T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.35171	0	
Contra Costa	2005 Annual		T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808	
Contra Costa	2005 Annual		T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0	
Contra Costa	2005 Annual		T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	
Contra Costa	2005 Annual		T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0	
Contra Costa	2005 Annual		T7 NNOOS	DSL	Aggregated	Aggregated	306	0.8%	116,836	5.0%	0	1736.328325	37700.7531	0	1736.328325	37700.75308	0	
Contra Costa	2005 Annual		T7 NOOS	DSL	Aggregated	Aggregated	113	0.3%	37,822	1.6%	0	1740.708429	37153.8408	0	1740.708429	37153.84079	0	
Contra Costa	2005 Annual		T7 other port	DSL	Aggregated	Aggregated	58	0.2%	10,077	0.4%	0	1728.337572	4421.89359	0	1728.337572	4421.893594	0	
Contra Costa	2005 Annual		T7 POAK	DSL	Aggregated	Aggregated	249	0.7%	54,852	2.4%	0	1732.464758	6989.07877	0	1732.464758	6989.078773	0	
Contra Costa	2005 Annual		T7 POLA	DSL	Aggregated	Aggregated	0	0.0%	0	0.0%	0			0			0	
Contra Costa	2005 Annual		T7 Public	DSL	Aggregated	Aggregated	197	0.5%	5,803	0.2%	0	1806.786624	7861.89962	0	1806.786624	7861.899623	0	
Contra Costa	2005 Annual		T7 Single	DSL	Aggregated	Aggregated	591	1.6%	62,989	2.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	
Contra Costa	2005 Annual		T7 single const	DSL	Aggregated	Aggregated	204	0.5%	16,908	0.7%	0	1771.292515	2423.1707	0	1771.292515	2423.170701	0	
Contra Costa	2005 Annual		T7 SWCV	DSL	Aggregated	Aggregated	286	0.7%	15,794	0.7%	0	1777.529674	8016.43418	0	1777.529674	8016.434181	0	
Contra Costa	2005 Annual		T7 tractor	DSL	Aggregated	Aggregated	811	2.2%	189,737	8.2%	0	1754.450796	2452.5922	0	1754.450796	2452.592201	0	
Contra Costa	2005 Annual		T7 tractor const	DSL	Aggregated	Aggregated	143	0.4%	12,606	0.5%	0	1756.093074	2452.5922	0	1756.093074	2452.592201	0	
Contra Costa	2005 Annual		T7 utility	DSL	Aggregated	Aggregated	30	0.1%	931	0.0%	0	1757.333853	8116.29549	0	1757.333853	8116.295492	0	
Contra Costa	2005 Annual		T7IS	GAS	Aggregated	Aggregated	74	0.2%	8,511	0.4%	1,411	584.6674163	0	2353.967488	584.6674163	0	2353.967488	
Contra Costa	2005 Annual		UBUS	GAS	Aggregated	Aggregated	64	0.2%	10,312	0.4%	309	744.1870709	0	615.0541717	744.1870709	0	615.0541717	
Contra Costa	2005 Annual		UBUS	DSL	Aggregated	Aggregated	235	0.6%	34,097	1.5%	1,023	2573.001593	0	0	2573.001593	0	0	
Contra Costa	2005 Annual		All Other Buses	DSL	Aggregated	Aggregated	121	0.3%	7,975	0.3%	0	1211.582049	615.147144	0	1211.582049	615.1471436	0	
							37,215	100.0%	2,326,162	1	470,931							
									Mi/Veh	62.50593239								

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Emission Estimate Without Pavley and LCFS 2035

	San Ramon Miles/Day			San Ramon		San Ramon	Idling (g/veh/day)	Starting Emissions (g/veh/day)	g/day	
	VMT Fraction	Non-Passenger	Miles/Day/Veh Class	Run Emis (gms/mile)	Run Emis (gms/day)	Pop Fraction				Vehicle Population
LHD1	0.423	272,089	115,220	972.1095	112,006,260	42.3%	1,840	116.3644499	819.7728342	1,722,535.8
LHD1	0.206	272,089	55,915	532.30593	29,763,702	11.2%	489	141.7534021	0	69,311.7
LHD2	0.031	272,089	8,437	972.10954	8,201,463	3.1%	135	116.3644497	1045.68254	156,567.4
LHD2	0.054	272,089	14,655	535.01342	7,840,724	3.0%	129	141.7534001	0	18,259.0
Motor Coach	0.001	272,089	363	1745.9714	634,326	0.2%	10	11909.0408	0	124,101.0
OBUS	0.010	272,089	2,796	677.44603	1,893,953	0.7%	31	407.4009324	1962.23896	73,728.9
PTO	0.000	272,089	0	2183.1036	0	0.0%	0	0	0	0.0
SBUS	0.002	272,089	658	742.11995	488,253	0.2%	8	0	788.3524159	6,323.4
SBUS	0.036	272,089	9,700	1299.9836	12,609,473	4.8%	207	3863.953327	0	800,415.0
T6 Ag	0.001	272,089	353	1214.0161	428,180	0.2%	7	697.9663116	0	4,909.6
T6 Public	0.008	272,089	2,278	1210.2525	2,756,552	1.0%	45	737.3093876	0	33,388.9
T6 CAIRP heavy	0.000	272,089	14	1194.1438	16,445	0.0%	0	746.3730425	0	201.6
T6 CAIRP small	0.000	272,089	42	1187.5142	50,037	0.0%	1	745.7841238	0	613.0
T6 OOS heavy	0.000	272,089	8	1194.1438	9,428	0.0%	0	746.3730425	0	115.6
T6 OOS small	0.000	272,089	24	1187.5142	28,687	0.0%	0	745.7841238	0	351.5
T6 instate construction heavy	0.003	272,089	765	1206.7402	922,712	0.3%	15	746.3891639	0	11,314.0
T6 instate construction small	0.006	272,089	1,661	1190.6752	1,977,859	0.7%	32	745.7841238	0	24,232.3
T6 instate heavy	0.023	272,089	6,316	1206.7402	7,621,920	2.9%	125	746.5900996	0	93,483.1
T6 instate small	0.054	272,089	14,571	1190.6752	17,349,652	6.6%	285	745.7841238	0	212,564.3
T6 utility	0.001	272,089	347	1190.3417	413,147	0.2%	7	746.8211926	0	5,068.8
T6TS	0.023	272,089	6,263	677.44602	4,243,022	1.6%	70	251.58011	1824.797808	144,733.2
T7 Ag	0.002	272,089	639	1780.2391	1,137,148	0.4%	19	3701.152193	0	69,141.7
T7 CAIRP	0.010	272,089	2,687	1740.7084	4,678,122	1.8%	77	29375.11388	0	2,257,550.8
T7 CAIRP construction	0.001	272,089	170	1740.7084	295,461	0.1%	5	29235.26306	0	141,903.6
T7 NNOOS	0.010	272,089	2,648	1736.3283	4,597,980	1.7%	76	38191.72993	0	2,884,847.0
T7 NOOS	0.004	272,089	979	1740.7084	1,703,653	0.6%	28	36440.98934	0	1,019,900.4
T7 other port	0.002	272,089	411	1728.3376	710,323	0.3%	12	6461.490742	0	75,400.6
T7 POAK	0.007	272,089	1,919	1732.4648	3,323,927	1.3%	55	11096.71777	0	605,943.8
T7 POLA	0.000	272,089	0	0	0	0.0%	0	0	0	0.0
T7 Public	0.005	272,089	1,490	1806.7866	2,691,238	1.0%	44	8395.986524	0	371,201.9
T7 Single	0.019	272,089	5,176	1771.2925	9,167,446	3.5%	151	4374.107146	0	658,755.4
T7 single construction	0.005	272,089	1,403	1771.2925	2,485,725	0.9%	41	4325.527391	0	176,635.8
T7 SWCV	0.007	272,089	2,011	1777.5297	3,574,129	1.3%	59	8454.803852	0	496,432.4
T7 tractor	0.027	272,089	7,421	1754.4508	13,019,423	4.9%	214	4688.374422	0	1,002,767.9
T7 tractor construction	0.004	272,089	1,020	1756.0931	1,790,950	0.7%	29	4627.439266	0	136,147.8
T7 utility	0.001	272,089	238	1757.3339	418,694	0.2%	7	8474.955024	0	58,293.5
T7IS	0.002	272,089	450	584.66742	262,863	0.1%	4	0	2353.967488	10,165.2
UBUS	0.002	272,089	493	744.18707	367,078	0.1%	6	0	615.0541717	3,709.0
UBUS	0.006	272,089	1,631	2573.0016	4,196,690	1.6%	69	0	0	0.0
All Other Buses	0.003	272,089	920	1211.582	1,114,130	0.4%	18	744.5866269	0	13,628.2
Total	1.000		272,089		264,790,775	1.000	4,350			13,484,643.4

San Ramon VMT estimates from MTC data provided by H. Brazil October 2014.

San Ramon Vehicles

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

Avg Miles

VMT CCC Vehicles

272,089 63 4,353

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and vehicle population for Contra Costa

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
264,790,775	13,484,643	278,275,418	907184.7	306.75	111,962.3

Contra Costa	2005 Annual	SBUS	GAS	Aggregated	Aggregated	93	0.2%	4,634	0.2%	413	742.1199498	0	788.3524159	742.1199498	0	788.3524159
Contra Costa	2005 Annual	SBUS	DSL	Aggregated	Aggregated	1,881	5.1%	55,009	2.4%	0	1299.983622	3474.93605	0	1299.983622	3474.936051	0
Contra Costa	2005 Annual	T6 Ag	DSL	Aggregated	Aggregated	62	0.2%	1,855	0.1%	0	1214.016077	591.917821	0	1214.016077	591.9178211	0
Contra Costa	2005 Annual	T6 Public	DSL	Aggregated	Aggregated	297	0.8%	6,680	0.3%	0	1210.252468	636.79636	0	1210.252468	636.79636	0
Contra Costa	2005 Annual	T6 CAIRP heav	DSL	Aggregated	Aggregated	2	0.0%	140	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	6	0.0%	479	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	1	0.0%	80	0.0%	0	1194.143823	666.350076	0	1194.143823	666.3500758	0
Contra Costa	2005 Annual	T6 OOS small	DSL	Aggregated	Aggregated	3	0.0%	275	0.0%	0	1187.51424	693.327747	0	1187.51424	693.3277468	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	105	0.3%	6,430	0.3%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate const	DSL	Aggregated	Aggregated	247	0.7%	17,335	0.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 instate heav	DSL	Aggregated	Aggregated	811	2.2%	54,842	2.4%	0	1206.740176	628.134277	0	1206.740176	628.1342767	0
Contra Costa	2005 Annual	T6 instate small	DSL	Aggregated	Aggregated	1,915	5.1%	154,803	6.7%	0	1190.675151	671.522775	0	1190.675151	671.5227753	0
Contra Costa	2005 Annual	T6 utility	DSL	Aggregated	Aggregated	43	0.1%	1,090	0.0%	0	1190.341673	669.35171	0	1190.341673	669.3517103	0
Contra Costa	2005 Annual	T6TS	GAS	Aggregated	Aggregated	831	2.2%	47,516	2.0%	19,651	677.4460202	251.580104	1824.797808	677.4460202	251.5801036	1824.797808
Contra Costa	2005 Annual	T7 Ag	DSL	Aggregated	Aggregated	112	0.3%	6,717	0.3%	0	1780.239104	2354.9159	0	1780.239104	2354.915902	0
Contra Costa	2005 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	311	0.8%	103,857	4.5%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0
Contra Costa	2005 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	25	0.1%	6,536	0.3%	0	1740.708429	29278.7951	0	1740.708429	29278.79509	0

VMT	Avg Miles CCC	Vehicles
272,089	7,975	34,1181103

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
262,595,019	7,763,157	270,358,176	907184.7	298.0	108,777

Community Greenhouse Gas Inventory

Energy

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.595	PG&E 2003-2005 average emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	222,731,483	2,369	66,263	3.5	1.2	60,524
Commercial	216,931,902	3,762	64,537	3.4	1.2	58,948
City/County/Dist	23,938,168		7,122	0.4	0.1	6,505
Total	463,601,553		137,921	7.2	2.5	125,976

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	15,460,869	164	90,446	8.5	0.2	82,263
Commercial	7,290,998	126	42,652	4.0	0.1	38,793
City/Co/Dist	492,120		2,879	0.3	0.0	2,618
Total	23,243,987		135,977	12.8	0.3	123,674

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,324,740	1,019	0.1600	0.0100	930
San Ramon	94,024	72	0	0	66
Percent San Ramon/Contra Costa County	7.1%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,324,740	920	0.360	0.08000	864
San Ramon	94,024	65	0	0	61
Percent San Ramon/Contra Costa County	7.1%				

Total San Ramon 127

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	94,024
Emissions (MTCO ₂ e per person)	64,762
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon, Business as Usual

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2035 Assumptions

	2008	2035
San Ramon Population	66,413	94,024
Water Usage (gallons/day)	10,840,000	15,346,697
Water Usage (million gallons/year)	3957	5602
Energy Usage (kWh)	21,409,163	30,309,956
Energy Usage (MWh)	21,409	30,310

Year 2035 Emissions

Greenhouse Gas	Electricity	2035 Emissions (pounds/year)	2035 Emissions (tons/year)	2035 Emissions MTCO _{2e}
	Emission Factor (pounds per MWh)			
Carbon dioxide	595	18,034,424	9,017	8,180.4
Methane	0.031	939.61	0.470	9.0
Nitrous oxide	0.011	333.41	0.167	46.9
				8,236.2

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update. Year 2020 is interpolated from that data.

Source for water usage: City of San Ramon General Plan (2010).

Community Greenhouse Gas Inventory

Summary

Year: 2035

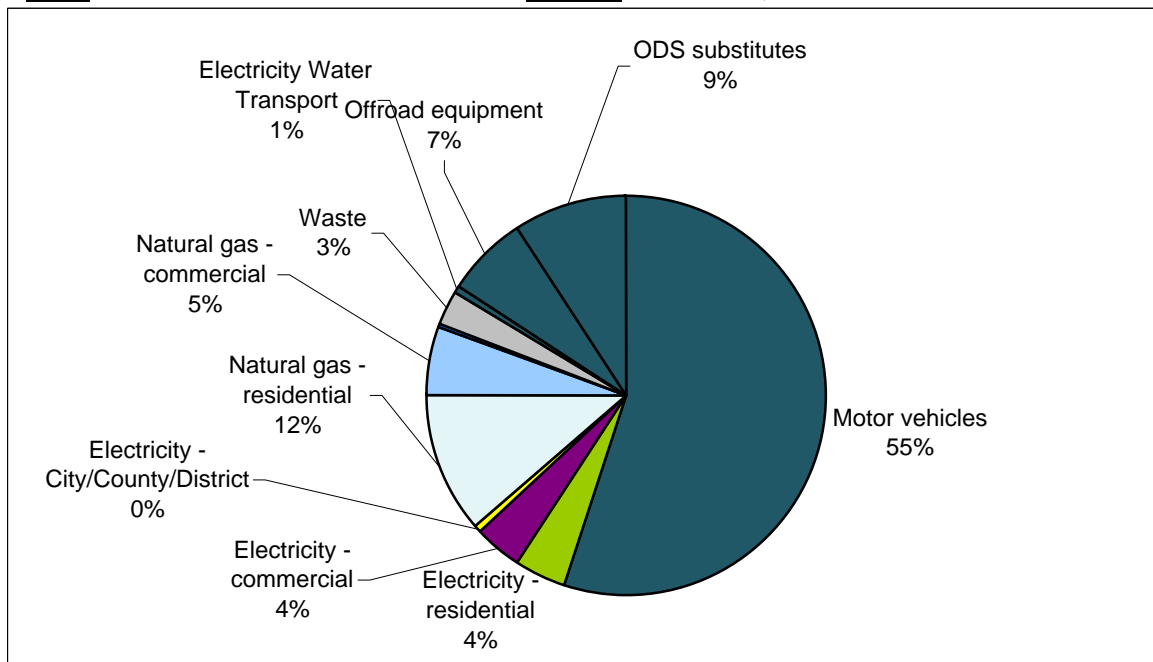
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	94,024	City of San Ramon/ DOF
Employment	57,667	City of San Ramon

County Information		
Population	1,324,740	DOF

-California Department of Finance (DOF) Report E-2

Sources	MTCO ₂ e	MTCO ₂ e w/Pavley LFCS
Motor vehicles	392,506	299,602
Electricity - residential	29,709	29,709
Electricity - commercial	28,936	28,936
Electricity - City/County/District	3,193	3,193
Natural gas - residential	82,263	82,263
Natural gas - commercial	38,793	38,793
Natural gas - City/County/District	2,618	2,618
Waste	19,934	19,934
Electricity Water Transport	4,043	4,043
Offroad equipment	47,844	47,844
ODS substitutes	64,762	64,762
Total	714,603	621,699



Community Greenhouse Gas Inventory

Waste

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated

Tons / year (instate) 43,820

Percent Waste

Mixed MSW	48.2
Newspaper	1.3
Office paper	10.1
Corrugated cardboard	4.8
Magazines/third class mail	1.2
Food scraps	15.5
Grass	1.9
Leaves	1.9
Branches	0.6
Dimensional lumber	14.5

Waste Emissions

Emissions (MTCO ₂ e)	19,934	
Emissions (MTCO ₂ e/person)	0.2120	Divide emissions by population

Sources:

Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: <http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility>, Accessed October 23, 2014.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: CalEEMod 2011 Waste Component. Waste per ton rate for Contra Costa County from model run prepared by FirstCarbon Solutions. Includes 96% methane capture as default.

	Waste (tor CO ₂	CH ₄	CO ₂ e	CO ₂ e/Ton of Waste	
General Office Building	9.3	1.8878	0.1116	4.2307	0.454914
High Turnover (Sit Down Restaurant)	59.5	12.078	0.7138	27.0675	0.454916
Regional Shopping Center	10.5	2.1314	0.126	4.7766	0.454914
Single Family Housing	120.12	24.3833	1.441	54.6445	0.454916
Totals	199.42	40.4805	2.3924	90.7193	0.454916

Solid Waste Projections

	2008	2010	2013	2014	2020	2035
Instate Waste (tons)	40,413	36,325	35,620	36,012	38,242	43,820
Population	66,413	72,148	76,429	77,270	82,057	94,024
Per Capita Waste (tons)	0.608516	0.503476	0.466048	0.46604836	0.466048	0.466048

Waste data for 2008, 2010, and 2013 from CalRecycle Jurisdiction Disposal by Facility Report generated 10/22/14
Per capita rates for 2013 were used for later years.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 1,967,407 Source: MTC. 2014
Vehicle miles traveled / year 718,103,488 Source: VMT per day * 365 days/year
Annual VMT Growth Rate

Emission Summary Without Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	321,586.4	291,738.2
Non Passenger Vehicles	111,078.0	100,768.2
	432,664.3	392,506.5

Emission Summary With Pavley and LCFS

	CO2 Tons/Year	MTCO2e/year
Passenger Vehicles	232,088.9	210,547.5
Non Passenger Vehicles	98,166.2	89,054.8
	330,255.1	299,602.4

EMFAC Passenger Vehicle Emissions (SB 375 Categories) 2035

EMFAC2011: EMFAC Emission Rates Database. Website:
<http://www.arb.ca.gov/emfac/>

EMFAC2011 Emission Rates

Region Type: County
 Region: Contra Costa
 Calendar Year: 2035
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdlYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	VMT		CO2_RUNEX (gms/mile)	CO2_STREX (gms/vehicle/ day)	CO2_RUNEX(Pavley I+LCFS) (gms/mile)	CO2_STREX(Pavley I+LCFS) (gms/vehicle/day)
									Fraction	Trips (trips/day)				
Contra Costa	2035 Annual	LDA	GAS	Aggregated	Aggregated	474,332	17,505,665	0.578	2,994,010	339,357,903	468.6426746	202.4457354	280.2807425	
Contra Costa	2035 Annual	LDA	DSL	Aggregated	Aggregated	2,111	71,381	0.002	13,043	356.6565142	0	217.6449088	0	
Contra Costa	2035 Annual	LDT1	GAS	Aggregated	Aggregated	58,191	2,182,142	0.072	353,746	394.4073641	524.0105902	245.1272065	326.7625403	
Contra Costa	2035 Annual	LDT1	DSL	Aggregated	Aggregated	79	3,031	0.000	497	356.74927	0	214.0765487	0	
Contra Costa	2035 Annual	LDT2	GAS	Aggregated	Aggregated	148,283	5,817,313	0.192	926,740	461.5800166	631.2924566	315.1544926	431.5606508	
Contra Costa	2035 Annual	LDT2	DSL	Aggregated	Aggregated	71	2,662	0.000	440	356.5035649	0	245.051271	0	
Contra Costa	2035 Annual	MDV	GAS	Aggregated	Aggregated	126,790	4,701,892	0.155	757,597	591.3605782	771.4987371	415.9476686	546.5597687	
Contra Costa	2035 Annual	MDV	DSL	Aggregated	Aggregated	127	4,790	0.000	781	356.6966734	0	248.3683183	0	
						809,984	30,288,875	1.000						
						avg miles/vehicle	37.3944097							

Emission Estimate Without Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh Class	CO2_RUN EX (gms/mile)	Run Emissions (gms/day)	SR Vehicle Population	CO2_STREX (gms/vehicle /day)	Start Emis/ Day g/day
LDA	0.002	1,695,318	4,053	356.65651	45,336	0	0
LDT1	0.071	1,695,318	120,576	394.40736	45,336	524.0105902	23,756,615
LDT1	0.000	1,695,318	153	356.74927	45,336	0	0
LDT2	0.192	1,695,318	326,058	461.58002	45,336	631.2924566	28,620,360
LDT2	0.000	1,695,318	155	356.50356	45,336	0	0
MDV	0.161	1,695,318	272,988	591.36058	45,336	771.4987371	34,976,771
MDV	0.000	1,695,318	276	356.69667	45,336	0	0
Total Passenger Vehicle Emissions						690,682,643	108,600,193

San Ramon Vehicles 2035

VMT	Avg Miles/ Day CCC	Vehicles
1,695,318	37	45,336

Vehicle population estimated based on VMT fraction of Contra Costa VMT reported for San Ramon by MTC and EMFAC VMT and population for Contra Costa

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
690,682,643	108,600,193	799,282,836	907184.7	881.1	321,586.4

Emission Estimate With Pavley and LCFS

VMT Fraction	SR VMT	Miles/Day/Veh Class	CO2_RUN EX(Pavley I+LCFS) (gms/mile)	Run Emissions (gms/day)	Vehicle Population	CO2_STREX (gms/vehicle /day)	CO2_STREX X(Pavley I+LCFS) (gms/vehicl e/day)	
								LDA
LDA	0.002	1,695,318	4,053	251.81425	1,020,511	45,336	0	0
LDT1	0.071	1,695,318	120,576	288.22255	34,752,602	45,336	326.7625403	14,814,151
LDT1	0.000	1,695,318	153	249.62662	38,202	45,336	0	0
LDT2	0.192	1,695,318	326,058	350.80721	114,383,328	45,336	431.5606508	19,565,292
LDT2	0.000	1,695,318	155	266.15795	41,237	45,336	0	0
MDV	0.161	1,695,318	272,988	466.45893	127,337,884	45,336	546.5597687	24,778,907
MDV	0.000	1,695,318	276	280.13265	77,249	45,336	0	0
Total Passenger Vehicle Emissions						504,977,344	71,865,195	

San Ramon Vehicles

VMT	Avg Miles/ CCC	Vehicles
1,695,318	37	45,336

Convert Grams to Tons

Running Emiss	Start Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
504,977,344	71,865,195	576,842,540	907184.7	635.9	232,089

Contra Costa	2035 Annual	SBUS	GAS	Aggregated	Aggregated	108	0.2%	4,842	0.2%	413	742.1199316	0	520.3885556	667.9079385	0	468.3497001
Contra Costa	2035 Annual	SBUS	DSL	Aggregated	Aggregated	1,392	2.8%	47,134	1.7%	0	1291.210415	3863.95333	0	1162.089374	3477.557995	0
Contra Costa	2035 Annual	T6 Ag	DSL	Aggregated	Aggregated	50	0.1%	1,769	0.1%	0	1180.798088	697.966312	0	1062.718279	628.1696804	0
Contra Costa	2035 Annual	T6 Public	DSL	Aggregated	Aggregated	475	1.0%	8,991	0.3%	0	1186.584731	737.309388	0	1067.926258	663.5784488	0
Contra Costa	2035 Annual	T6 CAIRP heavy	DSL	Aggregated	Aggregated	3	0.0%	173	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 CAIRP small	DSL	Aggregated	Aggregated	8	0.0%	598	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 OOS heavy	DSL	Aggregated	Aggregated	2	0.0%	99	0.0%	0	1175.955843	746.373042	0	1058.360259	671.7357382	0
Contra Costa	2035 Annual	T6 OOS small	DSL	Aggregated	Aggregated	5	0.0%	343	0.0%	0	1171.373345	745.784124	0	1054.236011	671.2057114	0
Contra Costa	2035 Annual	T6 instate const	DSL	Aggregated	Aggregated	189	0.4%	10,842	0.4%	0	1183.282342	746.389164	0	1064.954108	671.7502475	0
Contra Costa	2035 Annual	T6 instate const	DSL	Aggregated	Aggregated	470	1.0%	31,962	1.1%	0	1173.722273	745.784124	0	1056.350045	671.2057114	0
Contra Costa	2035 Annual	T6 instate heavy	DSL	Aggregated	Aggregated	1,127	2.3%	64,532	2.3%	0	1181.702876	746.5901	0	1063.532588	671.9310897	0
Contra Costa	2035 Annual	T6 instate small	DSL	Aggregated	Aggregated	2,793	5.7%	189,863	6.8%	0	1173.147637	745.784124	0	1055.832873	671.2057114	0
Contra Costa	2035 Annual	T6 utility	DSL	Aggregated	Aggregated	71	0.1%	1,432	0.1%	0	1178.715818	746.821193	0	1060.844236	672.1390733	0
Contra Costa	2035 Annual	T6TS	GAS	Aggregated	Aggregated	1,073	2.2%	50,146	1.8%	19,651	677.4460022	251.58011	1104.516667	609.701402	226.422099	994.0650001
Contra Costa	2035 Annual	T7 Ag	DSL	Aggregated	Aggregated	89	0.2%	6,408	0.2%	0	1736.821165	3701.15219	0	1563.139048	3331.036973	0
Contra Costa	2035 Annual	T7 CAIRP	DSL	Aggregated	Aggregated	559	1.1%	135,491	4.8%	0	1721.332151	29375.1139	0	1549.198935	26437.60249	0
Contra Costa	2035 Annual	T7 CAIRP const	DSL	Aggregated	Aggregated	49	0.1%	11,773	0.4%	0	1721.586019	29235.2631	0	1549.427417	26311.73675	0

San Ramon Vehicles

	Avg Miles	
VMT	CCC	Vehicles
272,089	10,345	26,3007843

San Ramon Motor Vehicle Emissions 2035

Running Emiss	Start and Idle Emiss	Total Daily (g/day)	g/ton	Tons/Day	Tons/Year
236,335,517	7,650,325	243,985,842	907184.7	268.9	98,166

Community Greenhouse Gas Inventory

Energy

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	PG&E 2013 emission factor
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	222,731,483	2,369	32296	3.5	1.2	29,709
Commercial	216,931,902	3,762	31455	3.4	1.2	28,936
City/County/Dist	23,938,168		3471	0.4	0.1	3,193
Total	463,601,553		67,222	7.2	2.5	61,838

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
			CO2	CH4	N2O	MTCO2e
Residential	15,460,869	164	90,446	8.5	0.2	82,263
Commercial	7,290,998	126	42,652	4.0	0.1	38,793
City/Co/Dist	492,120		2,879	0.3	0.0	2,618
Total	23,243,987		135,977	12.8	0.3	123,674

Notes and Sources:

*The Industrial kWh/year and therms/year are not reported by PG&E.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010.

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factors: PG&E 2014.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

San Ramon Offroad Equipment Emissions Estimate

Population	2007	2008	2010	2014	2020	2035
Population in City Limits		66,413	72,148	77,270	83,553	94,024
Contra Costa Population		1,027,264	1,052,211	1,087,008	1,147,399	1,324,740
San Ramon Fraction		0.06465037	0.068568	0.07108503	0.07281926	0.070975437
Bay Area Offroad Emissions Inventory MT	2,920,462	3,000,000	3,033,333	3,100,000	3,600,000	4,850,000
Contra Costa Offroad Emissions (MT/yr)	405,913	416,968	421,601	430,867	500,362	674,098
Contra Costa Fraction of Bay Area	0.139					
San Ramon Emissions (MT/year)		26,957	28,908	30,628	36,436	47,844

Bay Area and Contra Costa Emissions from BAAQMD, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated February 2010.
 Contra Costa fraction of Bay Area 2007 emissions was applied to emissions for 2008 through 2035.
 San Ramon emissions assumed to be proportional to its share of Contra Costa population

Community Greenhouse Gas Inventory

Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa Co	1,324,740	1,019	0.1600	0.0100	930
San Ramon	94,024	72	0	0	66
Percent San Ramon/Contra Costa County	7.1%				

Other Equipment

Location	Population	Emissions (tons/year)			Emissions MTCO2e
		CO2	CH4	N2O	
Contra Costa County	1,324,740	920	0.360	0.08000	864
San Ramon	94,024	65	0	0	61
Percent San Ramon/Contra Costa County	7.1%				

Total San Ramon 127

Notes:

Emissions for Contra Costa County are from OFFROAD2007 for the year assessed; emissions from San Ramon are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory Ozone Depleting Substance Substitutes

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

California

Emissions (MMTCO ₂ e)	25.66
Population	37,253,956
Emissions (MTCO ₂ e per person)	0.69

San Ramon

Population	94,024
Emissions (MTCO ₂ e per person)	64,762
(estimated by using California per person emissions)	

Sources/Notes:

California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website:
http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed October 28, 2014.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website:
<http://quickfacts.census.gov/qfd/states/06000.html>. Accessed August 19, 2013.

Water Conveyance, Treatment, Distribution

Community: City of San Ramon

Prepared by FirstCarbon Solutions

Prepared on 10/28/14

Electricity Requirements in Northern California

	kWh per million gallons
Water Supply, Conveyance	2,117
Water Treatment	111
Water Distribution	1,272
Wastewater Treatment	<u>1,911</u>
<i>Total</i>	<i>5,411</i>

Year 2035 Assumptions

	2008	2035
San Ramon Population	66,413	94,024
Water Usage (gallons/day)	10,840,000	15,346,697
Water Usage (million gallons/year)	3957	5602
Energy Usage (kWh)	21,409,163	30,309,956
Energy Usage (MWh)	21,409	30,310

Year 2035 Emissions

Greenhouse Gas	Electricity	2035 Emissions (pounds/year)	2035 Emissions (tons/year)	2035 Emissions MTCO2e
	Emission Factor (pounds per MWh)			
Carbon dioxide	290	8,789,887	4,395	3,987.1
Methane	0.031	939.61	0.470	9.0
Nitrous oxide	0.011	333.41	0.167	46.9
				4,042.9

Source for electricity emission factor:
PG&E emission factor for 2013 used as latest factor available

Source for electricity requirements:
Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

Source for population estimates: City of San Ramon General Plan Update.

Source for water usage: City of San Ramon General Plan (2010).