Appendix B:
Community Inventory Supporting Information

B-1: Community Inventory Spreadsheets

Community Greenhouse Gas Inventory

Summary

Year: 2005

Prepared by Michael Brandman Associates

Manteca Information	**Data**	**Source**
Population	57,499	SJCOG 2004
Housing	18,864	SJCOG 2004
Employment	12,809	SJCOG 2004
San Joaquin County Information		
Population	654,541	SJCOG 2011
State of California Information		
Population	35,869,173	DOF 2012

Summary

Sectors	**MTCO2e**
Motor vehicles	214,075
Electricity - residential	44,108
Electricity - commercial	25,014
Natural gas - residential	45,527
Natural gas - commercial	9,856
Waste	42,305
ODS substitutes	19,461
Total	*400,347*

Sources:

San Joaquin Council of Governments (SJCOG). 2004. Staff Report, 2005-2030 Population and Employment Projections. Website: www.sjcog.org/docs/pdf/census/projections.pdf.

San Joaquin Council of Governments (SJCOG) and Eberhardt School of Business, Business Forecasting Center. June 2011. Website: www.sjcog.org/docs/pdf/census/ra_jun11.pdf. Accessed June 23, 2012.

California Department of Finance (DOF). 2012. Demographic Research Unit. Interim Population Projections for California and its Counties 2010-2050. Website: www.dof.ca.gov/research/demographic/reports/projections/interim/view.php. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Waste

Year: 2005

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Waste

Waste Percentages (Entry for SEEC model)	*Percent waste*
Paper products	17.3
Food waste	15.5
Plant debris	6.6
Wood or textiles	18.9
All other waste	41.7

Waste Percentages	*Percent waste*	*Emission Factor (MT methane/wet short ton waste)*	*Weighted EF*
Mixed MSW	28.6%	0.060	0.0172
Newspaper	1.3%	0.043	0.0006
Office paper	1.9%	0.203	0.0039
Corrugated containers	5.2%	0.120	0.0062
Magazines/Third-Class Mail	9.0%	0.049	0.0044
Food scraps	15.5%	0.078	0.0121
Grass	1.9%	0.038	0.0007
Leaves	1.9%	0.013	0.0002
Branches	3.3%	0.062	0.0020
Dimensional lumber	14.5%	0.062	0.0090
Textiles	2.2%	0.073	0.0016
Construction/demolition	14.6%	0.012	0.0018
Medical waste	0.0%	0.045	0.0000
Sludge/manure	0.1%	0.015	0.0000
Total	100.0%		**0.0597**

Waste Emissions

Desination Facility	*LFG Collection Effciency*	*Waste Generated by City (tons)*	*Methane emissions (MTCO2e)*
Other	0.75	838	236
Foothill Sanitary Landfill	0	25933	29258
Forward Landfill, Inc.	0.75	45420	12811
Total		72191	42305

Emissions (MTCO2e)	42,305	
Emissions (MTCO2e/person)	0.74	Emissions / Manteca population

Community Greenhouse Gas Inventory

Waste

Year: 2005

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Sources:

Methodology: ICLEI. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Public Comment Draft. July 2012. Website: www.icleiusa.org/tools/ghg-protocol/community-protocol/public-comment-on-the-community-protocol. Accessed July 20, 2012. (Appendix E: Solid Waste Emissions Activities and Sources, Equation SW.4.1 Methane Emissions)

Source of waste generated: California Department of Resources Recycling and Recovery (CalRecycle). 2012. Disposal Reporting System: Jurisdiction Disposal and Alternative Daily Cover tons by Facility. Website: www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx, Accessed June 23, 2012.

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.

Note for the percentages used for the entry into SEEC model: Plant debris includes leaves and grass, prunings and trimmings, and manures. Wood/textiles includes branches and stumps, lumber, gypsum board, and textiles.

Landfill gas (LFG) collection efficiency for Foothill Sanitary Landfill: In 2005 and 2010, it is assumed that there was not a LFG recovery system for this landfill. However, for 2020 and 2035 estimates, a 0.75 efficiency is assumed. In 1995, the landfill had a revision to its operating permit, in which it was stated that landfill gas is monitored quarterly at four points around the perimeter of the site and at all on-site structures (California Integrated Waste Management Board, Permitting and Enforcement Committee, Agenda, October 18, 1995, www.calrecycle.ca.gov/Archive/IWMBMtgDocs/mtgdocs/library/1995/19951018-pen-p.pdf). In 2011 the Permit Unit Requirements for its Title V Permit Renewal indicates that "the owner/operator shall install, maintain, and operate a collection and control system that captures gas generated from the landfill and routes it to an open, non-assisted flare." (San Joaquin Valley Air Pollution Control District. 2011. Permit to Operate. website: http://yosemite.epa.gov/r9/air/epss.nsf/735056a63c1390e08825657e0075d180/719c2b9c94c0e8018825788d0070177a/$FILE/Public%20Notice%20Package.pdf)

LFG collection for Forward Landfill: It is assumed that for all years, the collection system was operational Forward, Inc. "violated the [Clean Air] Act by operating gas extraction wells in the landfill's gas collection and control system (GCCS) in violation of the Act's New Source Performance Standards and National Emission Standards for Hazardous Air Pollutions, and in violation of the Title V permit it had received from the San Joaquin Valley Unified Air Pollution Control District (District), the United States' co-plaintiff in the action." (Federal Register, Volume 77, No. 65, April 4, 2012. www.gpo.gov/fdsys/pkg/FR-2012-04-04/pdf/2012-8033.pdf). Apparently, there were subterranean fires in the landfill (San Joaquin Valley Air Pollution Control District. Fires cost Forward Landfill $4M. March 31, 2012. www.valleyair.org/recent_news/News_Clippings/2012/IntheNews04-02-12.pdf).

LFG collection for other landfills: Assumed that the landfills have a gas collection system for all years.

Community Greenhouse Gas Inventory

Ozone Depleting Substance Substitutes

Year: 2005

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

California

Emissions (MMTCO2e)	12.14	Emissions from 2005
Population	35,869,173	
Emissions (MTCO2e per person)	0.34	

Manteca

Population	57,499
Emissions (MTCO2e)	19461
(estimated by using California per person emissions)	

California Emissions from: California Air Resources Board. 2011. California Greenhouse Gas Inventory for 2000-2009. Website: www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-09_2011-10-26.pdf. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2005
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day	1,114,205	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	406,684,825	Source: VMT per day * 365 days/year

Speed bins	AM peak	PM peak	Off peak	Total	Speed
10-15	0	0	0	**0**	10
15-20	0	0	450	**450**	15
20-25	13148	18771	40351	**72270**	20
25-30	14131	17798	37952	**69881**	25
30-35	35290	43609	80953	**159852**	30
35-40	48372	37559	47991	**133922**	35
40-45	23422	39465	32763	**95650**	40
45-50	13573	0	58091	**71664**	45
50-55	1459	2533	41064	**45056**	50
55-60	24681	95198	3884	**123763**	55
60-65	87762	51472	202462	**341696**	60
Total	**261838**	**306405**	**545961**	**1114204**	

Source: Kittelson & Associates. 2012. Development of On-Road Mobile Source Activity Data for GHG Emission Calculations. City of Manteca Climate Action Plan.

Nitrous oxide and methane emissions from the SEEC Model

		Emissions/1000 VMT/day
Methane (metric tons)	12.0617	0.011
Nitrous Oxide (metric tons)	15.4509	0.014

VMT/day per speed bin

Speed (mph)	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
VMT/day	0	450	72270	69881	159852	133922	95650	71664	45056	123763	341696

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.22%	0.13%
LDT1	5.83%	0.01%
LDT2	16.21%	0.01%
LHD1	2.74%	2.20%
LHD2	0.21%	0.43%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.20%	0.03%
OBUS	0.07%	0.06%
SBUS	0.01%	0.07%
T6	0.13%	1.68%
T7	0.02%	6.25%
UBUS	0.03%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.7%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	43.8%	LDA, MCY
DSL	Heavy duty	8.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.7%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2005
Prepared by Michael Brandman Associates
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Emission factors (g CO2/mile)

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	820	632	506	419	360	322	299	287	287	297	320
	LDT1	937	722	578	479	412	368	341	328	328	340	366
	LDT2	1127	868	695	576	496	443	410	395	394	408	440
	LHD1	2036	1392	1006	768	619	528	475	452	454	482	0
	LHD2	2036	1392	1006	768	619	528	475	452	454	482	0
	MCY	204	176	154	137	124	114	107	101	98	97	97
	MDV	1406	1083	868	718	618	552	512	493	492	509	549
	MH	2036	1392	1006	768	619	528	475	452	454	482	541
	OBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	SBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	T6	2036	1392	1006	768	619	528	475	452	454	482	541
	T7	2036	1392	1006	768	619	528	475	452	454	482	541
	UBUS	2036	1392	1006	768	619	528	475	452	454	482	541

Emission factors (g CO2/mile)

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	361	361	361	361	361	361	361	361	361	361	361
	LDT1	373	373	373	373	373	373	373	373	373	373	373
	LDT2	371	371	371	371	371	371	371	371	371	371	371
	LHD1	531	531	531	531	531	531	531	531	531	531	0
	LHD2	534	534	534	534	534	534	534	534	534	534	0
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	369	369	369	369	369	369	369	369	369	369	369
	MH	2157	1771	1453	1304	1224	1157	1104	1065	1040	1028	1029
	OBUS	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188
	SBUS	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045
	T6	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034
	T7	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587
	UBUS	2578	2578	2578	2578	2578	2578	2578	2578	2578	2578	2578

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2005
Prepared by Michael Brandman Associates
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VMT/day by Vehicle Class and speed

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	0	195	31239	30206	69096	57887	41344	30977	19475	53496	147697
	LDT1	0	26	4216	4076	9325	7812	5580	4180	2628	7220	19932
	LDT2	0	73	11717	11330	25917	21713	15508	11619	7305	20066	55399
	LHD1	0	12	1978	1913	4376	3666	2618	1962	1233	3388	9353
	LHD2	0	1	153	148	338	283	202	152	95	262	723
	MCY	0	3	406	393	899	753	538	403	253	696	1922
	MDV	0	89	14264	13793	31551	26433	18879	14145	8893	24428	67443
	MH	0	1	142	137	313	262	187	140	88	243	670
	OBUS	0	0	49	47	108	91	65	48	30	84	231
	SBUS	0	0	10	10	23	19	14	10	6	17	48
	T6	0	1	93	90	205	172	123	92	58	159	438
	T7	0	0	18	17	39	33	23	18	11	30	84
	UBUS	0	0	23	22	50	42	30	22	14	39	106

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	0	1	91	88	201	168	120	90	57	155	429
	LDT1	0	0	6	6	14	11	8	6	4	11	29
	LDT2	0	0	6	6	13	11	8	6	4	10	28
	LHD1	0	10	1591	1539	3520	2949	2106	1578	992	2725	7524
	LHD2	0	2	314	304	695	582	416	311	196	538	1485
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	0	0	7	6	14	12	9	6	4	11	31
	MH	0	0	24	23	53	45	32	24	15	41	114
	OBUS	0	0	45	44	100	84	60	45	28	78	215
	SBUS	0	0	54	52	119	100	71	53	34	92	255
	T6	0	8	1217	1177	2693	2256	1611	1207	759	2085	5756
	T7	0	28	4515	4366	9987	8367	5976	4477	2815	7732	21348
	UBUS	0	1	92	89	204	171	122	91	58	158	436

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2005
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	49	6,345	5,077	10,001	7,484	4,955	3,574	2,244	6,378	18,980	**65,088**
LDT1	0	8	978	783	1,543	1,154	764	551	346	984	2,928	**10,040**
LDT2	0	25	3,272	2,618	5,157	3,859	2,555	1,843	1,157	3,289	9,787	**33,563**
LHD1	0	7	799	590	1,088	777	500	356	225	656	0	**4,998**
LHD2	0	1	62	46	84	60	39	28	17	51	0	**386**
MCY	0	0	25	22	45	34	23	16	10	27	75	**278**
MDV	0	39	4,969	3,976	7,832	5,861	3,881	2,799	1,757	4,995	14,864	**50,973**
MH	0	0	57	42	78	56	36	25	16	47	146	**503**
OBUS	0	0	20	15	27	19	12	9	6	16	50	**174**
SBUS	0	0	4	3	6	4	3	2	1	3	10	**36**
T6	0	0	37	28	51	36	23	17	11	31	95	**329**
T7	0	0	7	5	10	7	4	3	2	6	18	**63**
UBUS	0	0	9	7	12	9	6	4	3	7	23	**80**
Total	**0**	**130**	**16,585**	**13,211**	**25,933**	**19,362**	**12,801**	**9,227**	**5,794**	**16,491**	**46,976**	**166,510**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	0	13	13	29	24	17	13	8	23	62	**203**
LDT1	0	0	1	1	2	2	1	1	1	2	4	**14**
LDT2	0	0	1	1	2	2	1	1	1	2	4	**14**
LHD1	0	2	340	328	751	629	449	337	212	581	0	**3,630**
LHD2	0	0	67	65	149	125	89	67	42	115	0	**720**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	1	1	2	2	1	1	1	2	5	**15**
MH	0	0	14	12	26	21	14	10	6	17	47	**168**
OBUS	0	0	31	28	63	52	34	26	16	42	102	**395**
SBUS	0	0	31	28	59	47	32	23	14	39	107	**380**
T6	0	5	686	619	1,328	1,052	717	518	318	864	2,389	**8,497**
T7	0	31	3,909	3,523	7,565	5,994	4,086	2,953	1,812	4,920	13,605	**48,397**
UBUS	0	1	95	92	211	177	126	95	60	164	451	**1,472**
Total	**0**	**40**	**5,189**	**4,711**	**10,188**	**8,127**	**5,570**	**4,045**	**2,490**	**6,769**	**16,777**	**63,905**

Total Emissions

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	230,415	209,032	209,032
Methane		12	253
Nitrous oxide		15	4,790
Total			**214,075**

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
San Joaquin COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - San Joaquin, [year], season - annual average, vehicle category - all, fuel - all, model year - combined, speed - all, EMFAC2007 vehicle classifications) Website: www.arb.ca.gov/jpub/webapp/EMFAC2011WebApp/rateSelectionPage_1.jsp.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	LDA	GAS	5	0	0	0	0.000%
San Joaquin	2005	LDA	DSL	5	0	0	0	0.000%
San Joaquin	2005	LDA	GAS	10	2021	820	820	0.013%
San Joaquin	2005	LDA	DSL	10	6	361	361	0.000%
San Joaquin	2005	LDA	GAS	15	6802	632	632	0.045%
San Joaquin	2005	LDA	DSL	15	20	361	361	0.000%
San Joaquin	2005	LDA	GAS	20	25784	506	506	0.171%
San Joaquin	2005	LDA	DSL	20	75	361	361	0.000%
San Joaquin	2005	LDA	GAS	25	584272	419	419	3.871%
San Joaquin	2005	LDA	DSL	25	1698	361	361	0.011%
San Joaquin	2005	LDA	GAS	30	687151	360	360	4.553%
San Joaquin	2005	LDA	DSL	30	1997	361	361	0.013%
San Joaquin	2005	LDA	GAS	35	520385	322	322	3.448%
San Joaquin	2005	LDA	DSL	35	1512	361	361	0.010%
San Joaquin	2005	LDA	GAS	40	555469	299	299	3.680%
San Joaquin	2005	LDA	DSL	40	1614	361	361	0.011%
San Joaquin	2005	LDA	GAS	45	369671	287	287	2.449%
San Joaquin	2005	LDA	DSL	45	1074	361	361	0.007%
San Joaquin	2005	LDA	GAS	50	290590	287	287	1.925%
San Joaquin	2005	LDA	DSL	50	844	361	361	0.006%
San Joaquin	2005	LDA	GAS	55	344682	297	297	2.284%
San Joaquin	2005	LDA	DSL	55	1002	361	361	0.007%
San Joaquin	2005	LDA	GAS	60	635444	320	320	4.210%
San Joaquin	2005	LDA	DSL	60	1847	361	361	0.012%
San Joaquin	2005	LDA	GAS	65	1814361	357	357	12.021%
San Joaquin	2005	LDA	DSL	65	5272	361	361	0.035%
San Joaquin	2005	LDA	GAS	70	687383	383	383	4.554%
San Joaquin	2005	LDA	DSL	70	1997	361	361	0.013%
San Joaquin	2005	LDT1	GAS	5	0	0	0	0.000%
San Joaquin	2005	LDT1	DSL	5	0	0	0	0.000%
San Joaquin	2005	LDT1	GAS	10	273	937	937	0.002%
San Joaquin	2005	LDT1	DSL	10	0	373	373	0.000%
San Joaquin	2005	LDT1	GAS	15	918	722	722	0.006%
San Joaquin	2005	LDT1	DSL	15	1	373	373	0.000%
San Joaquin	2005	LDT1	GAS	20	3480	578	578	0.023%
San Joaquin	2005	LDT1	DSL	20	5	373	373	0.000%
San Joaquin	2005	LDT1	GAS	25	78850	479	479	0.522%
San Joaquin	2005	LDT1	DSL	25	115	373	373	0.001%
San Joaquin	2005	LDT1	GAS	30	92734	412	412	0.614%
San Joaquin	2005	LDT1	DSL	30	135	373	373	0.001%
San Joaquin	2005	LDT1	GAS	35	70228	368	368	0.465%
San Joaquin	2005	LDT1	DSL	35	102	373	373	0.001%
San Joaquin	2005	LDT1	GAS	40	74963	341	341	0.497%
San Joaquin	2005	LDT1	DSL	40	109	373	373	0.001%
San Joaquin	2005	LDT1	GAS	45	49889	328	328	0.331%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	LDT1	DSL	45	73	373	373	0.000%
San Joaquin	2005	LDT1	GAS	50	39216	328	328	0.260%
San Joaquin	2005	LDT1	DSL	50	57	373	373	0.000%
San Joaquin	2005	LDT1	GAS	55	46516	340	340	0.308%
San Joaquin	2005	LDT1	DSL	55	68	373	373	0.000%
San Joaquin	2005	LDT1	GAS	60	85756	366	366	0.568%
San Joaquin	2005	LDT1	DSL	60	125	373	373	0.001%
San Joaquin	2005	LDT1	GAS	65	244856	408	408	1.622%
San Joaquin	2005	LDT1	DSL	65	356	373	373	0.002%
San Joaquin	2005	LDT1	GAS	70	92765	438	438	0.615%
San Joaquin	2005	LDT1	DSL	70	135	373	373	0.001%
San Joaquin	2005	LDT2	GAS	5	0	0	0	0.000%
San Joaquin	2005	LDT2	DSL	5	0	0	0	0.000%
San Joaquin	2005	LDT2	GAS	10	758	1127	1127	0.005%
San Joaquin	2005	LDT2	DSL	10	0	371	371	0.000%
San Joaquin	2005	LDT2	GAS	15	2551	868	868	0.017%
San Joaquin	2005	LDT2	DSL	15	1	371	371	0.000%
San Joaquin	2005	LDT2	GAS	20	9671	695	695	0.064%
San Joaquin	2005	LDT2	DSL	20	5	371	371	0.000%
San Joaquin	2005	LDT2	GAS	25	219152	576	576	1.452%
San Joaquin	2005	LDT2	DSL	25	110	371	371	0.001%
San Joaquin	2005	LDT2	GAS	30	257741	496	496	1.708%
San Joaquin	2005	LDT2	DSL	30	130	371	371	0.001%
San Joaquin	2005	LDT2	GAS	35	195189	443	443	1.293%
San Joaquin	2005	LDT2	DSL	35	98	371	371	0.001%
San Joaquin	2005	LDT2	GAS	40	208349	410	410	1.380%
San Joaquin	2005	LDT2	DSL	40	105	371	371	0.001%
San Joaquin	2005	LDT2	GAS	45	138658	395	395	0.919%
San Joaquin	2005	LDT2	DSL	45	70	371	371	0.000%
San Joaquin	2005	LDT2	GAS	50	108996	394	394	0.722%
San Joaquin	2005	LDT2	DSL	50	55	371	371	0.000%
San Joaquin	2005	LDT2	GAS	55	129285	408	408	0.857%
San Joaquin	2005	LDT2	DSL	55	65	371	371	0.000%
San Joaquin	2005	LDT2	GAS	60	238346	440	440	1.579%
San Joaquin	2005	LDT2	DSL	60	120	371	371	0.001%
San Joaquin	2005	LDT2	GAS	65	680541	491	491	4.509%
San Joaquin	2005	LDT2	DSL	65	343	371	371	0.002%
San Joaquin	2005	LDT2	GAS	70	257827	526	526	1.708%
San Joaquin	2005	LDT2	DSL	70	130	371	371	0.001%
San Joaquin	2005	LHD1	GAS	5	11725	2513	2513	0.078%
San Joaquin	2005	LHD1	DSL	5	5844	531	531	0.039%
San Joaquin	2005	LHD1	GAS	10	30573	2036	2036	0.203%
San Joaquin	2005	LHD1	DSL	10	19435	531	531	0.129%
San Joaquin	2005	LHD1	GAS	15	69620	1392	1392	0.461%
San Joaquin	2005	LHD1	DSL	15	42091	531	531	0.279%
San Joaquin	2005	LHD1	GAS	20	80445	1006	1006	0.533%
San Joaquin	2005	LHD1	DSL	20	46145	531	531	0.306%
San Joaquin	2005	LHD1	GAS	25	61967	768	768	0.411%
San Joaquin	2005	LHD1	DSL	25	49387	531	531	0.327%
San Joaquin	2005	LHD1	GAS	30	54799	619	619	0.363%
San Joaquin	2005	LHD1	DSL	30	41689	531	531	0.276%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	LHD1	GAS	35	20477	528	528	0.136%
San Joaquin	2005	LHD1	DSL	35	22001	531	531	0.146%
San Joaquin	2005	LHD1	GAS	40	6044	475	475	0.040%
San Joaquin	2005	LHD1	DSL	40	12078	531	531	0.080%
San Joaquin	2005	LHD1	GAS	45	7441	452	452	0.049%
San Joaquin	2005	LHD1	DSL	45	13036	531	531	0.086%
San Joaquin	2005	LHD1	GAS	50	54943	454	454	0.364%
San Joaquin	2005	LHD1	DSL	50	50336	531	531	0.333%
San Joaquin	2005	LHD1	GAS	55	15112	482	482	0.100%
San Joaquin	2005	LHD1	DSL	55	30313	531	531	0.201%
San Joaquin	2005	LHD2	GAS	5	906	2513	2513	0.006%
San Joaquin	2005	LHD2	DSL	5	1153	534	534	0.008%
San Joaquin	2005	LHD2	GAS	10	2363	2036	2036	0.016%
San Joaquin	2005	LHD2	DSL	10	3835	534	534	0.025%
San Joaquin	2005	LHD2	GAS	15	5382	1392	1392	0.036%
San Joaquin	2005	LHD2	DSL	15	8305	534	534	0.055%
San Joaquin	2005	LHD2	GAS	20	6219	1006	1006	0.041%
San Joaquin	2005	LHD2	DSL	20	9105	534	534	0.060%
San Joaquin	2005	LHD2	GAS	25	4790	768	768	0.032%
San Joaquin	2005	LHD2	DSL	25	9745	534	534	0.065%
San Joaquin	2005	LHD2	GAS	30	4236	619	619	0.028%
San Joaquin	2005	LHD2	DSL	30	8226	534	534	0.054%
San Joaquin	2005	LHD2	GAS	35	1583	528	528	0.010%
San Joaquin	2005	LHD2	DSL	35	4341	534	534	0.029%
San Joaquin	2005	LHD2	GAS	40	467	475	475	0.003%
San Joaquin	2005	LHD2	DSL	40	2383	534	534	0.016%
San Joaquin	2005	LHD2	GAS	45	575	452	452	0.004%
San Joaquin	2005	LHD2	DSL	45	2572	534	534	0.017%
San Joaquin	2005	LHD2	GAS	50	4247	454	454	0.028%
San Joaquin	2005	LHD2	DSL	50	9932	534	534	0.066%
San Joaquin	2005	LHD2	GAS	55	1168	482	482	0.008%
San Joaquin	2005	LHD2	DSL	55	5981	534	534	0.040%
San Joaquin	2005	MCY	GAS	5	0	0	0	0.000%
San Joaquin	2005	MCY	GAS	10	26	204	204	0.000%
San Joaquin	2005	MCY	GAS	15	89	176	176	0.001%
San Joaquin	2005	MCY	GAS	20	335	154	154	0.002%
San Joaquin	2005	MCY	GAS	25	7603	137	137	0.050%
San Joaquin	2005	MCY	GAS	30	8941	124	124	0.059%
San Joaquin	2005	MCY	GAS	35	6771	114	114	0.045%
San Joaquin	2005	MCY	GAS	40	7228	107	107	0.048%
San Joaquin	2005	MCY	GAS	45	4810	101	101	0.032%
San Joaquin	2005	MCY	GAS	50	3781	98	98	0.025%
San Joaquin	2005	MCY	GAS	55	4485	97	97	0.030%
San Joaquin	2005	MCY	GAS	60	8268	97	97	0.055%
San Joaquin	2005	MCY	GAS	65	23608	99	99	0.156%
San Joaquin	2005	MCY	GAS	70	8944	104	104	0.059%
San Joaquin	2005	MDV	GAS	5	0	0	0	0.000%
San Joaquin	2005	MDV	DSL	5	0	0	0	0.000%
San Joaquin	2005	MDV	GAS	10	923	1406	1406	0.006%
San Joaquin	2005	MDV	DSL	10	0	369	369	0.000%
San Joaquin	2005	MDV	GAS	15	3106	1083	1083	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	MDV	DSL	15	1	369	369	0.000%
San Joaquin	2005	MDV	GAS	20	11774	868	868	0.078%
San Joaquin	2005	MDV	DSL	20	5	369	369	0.000%
San Joaquin	2005	MDV	GAS	25	266796	718	718	1.768%
San Joaquin	2005	MDV	DSL	25	122	369	369	0.001%
San Joaquin	2005	MDV	GAS	30	313773	618	618	2.079%
San Joaquin	2005	MDV	DSL	30	143	369	369	0.001%
San Joaquin	2005	MDV	GAS	35	237623	552	552	1.574%
San Joaquin	2005	MDV	DSL	35	108	369	369	0.001%
San Joaquin	2005	MDV	GAS	40	253643	512	512	1.681%
San Joaquin	2005	MDV	DSL	40	116	369	369	0.001%
San Joaquin	2005	MDV	GAS	45	168802	493	493	1.118%
San Joaquin	2005	MDV	DSL	45	77	369	369	0.001%
San Joaquin	2005	MDV	GAS	50	132692	492	492	0.879%
San Joaquin	2005	MDV	DSL	50	61	369	369	0.000%
San Joaquin	2005	MDV	GAS	55	157392	509	509	1.043%
San Joaquin	2005	MDV	DSL	55	72	369	369	0.000%
San Joaquin	2005	MDV	GAS	60	290162	549	549	1.922%
San Joaquin	2005	MDV	DSL	60	132	369	369	0.001%
San Joaquin	2005	MDV	GAS	65	828491	613	613	5.489%
San Joaquin	2005	MDV	DSL	65	378	369	369	0.003%
San Joaquin	2005	MDV	GAS	70	313879	657	657	2.080%
San Joaquin	2005	MDV	DSL	70	143	369	369	0.001%
San Joaquin	2005	MH	GAS	5	256	2513	2513	0.002%
San Joaquin	2005	MH	DSL	5	40	2375	2375	0.000%
San Joaquin	2005	MH	GAS	10	1286	2036	2036	0.009%
San Joaquin	2005	MH	DSL	10	202	2157	2157	0.001%
San Joaquin	2005	MH	GAS	15	1624	1392	1392	0.011%
San Joaquin	2005	MH	DSL	15	272	1771	1771	0.002%
San Joaquin	2005	MH	GAS	20	1685	1006	1006	0.011%
San Joaquin	2005	MH	DSL	20	288	1453	1453	0.002%
San Joaquin	2005	MH	GAS	25	1877	768	768	0.012%
San Joaquin	2005	MH	DSL	25	300	1304	1304	0.002%
San Joaquin	2005	MH	GAS	30	2122	619	619	0.014%
San Joaquin	2005	MH	DSL	30	361	1224	1224	0.002%
San Joaquin	2005	MH	GAS	35	2638	528	528	0.017%
San Joaquin	2005	MH	DSL	35	426	1157	1157	0.003%
San Joaquin	2005	MH	GAS	40	3284	475	475	0.022%
San Joaquin	2005	MH	DSL	40	529	1104	1104	0.004%
San Joaquin	2005	MH	GAS	45	2995	452	452	0.020%
San Joaquin	2005	MH	DSL	45	433	1065	1065	0.003%
San Joaquin	2005	MH	GAS	50	2914	454	454	0.019%
San Joaquin	2005	MH	DSL	50	484	1040	1040	0.003%
San Joaquin	2005	MH	GAS	55	3812	482	482	0.025%
San Joaquin	2005	MH	DSL	55	710	1028	1028	0.005%
San Joaquin	2005	MH	GAS	60	4398	541	541	0.029%
San Joaquin	2005	MH	DSL	60	853	1029	1029	0.006%
San Joaquin	2005	MH	GAS	65	687	641	641	0.005%
San Joaquin	2005	MH	DSL	65	134	1045	1045	0.001%
San Joaquin	2005	OBUS	GAS	5	88	2513	2513	0.001%
San Joaquin	2005	OBUS	DSL	5	55	3085	3085	0.000%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	OBUS	GAS	10	444	2036	2036	0.003%
San Joaquin	2005	OBUS	DSL	10	254	2487	2487	0.002%
San Joaquin	2005	OBUS	GAS	15	560	1392	1392	0.004%
San Joaquin	2005	OBUS	DSL	15	334	2025	2025	0.002%
San Joaquin	2005	OBUS	GAS	20	581	1006	1006	0.004%
San Joaquin	2005	OBUS	DSL	20	447	1711	1711	0.003%
San Joaquin	2005	OBUS	GAS	25	648	768	768	0.004%
San Joaquin	2005	OBUS	DSL	25	463	1595	1595	0.003%
San Joaquin	2005	OBUS	GAS	30	732	619	619	0.005%
San Joaquin	2005	OBUS	DSL	30	646	1551	1551	0.004%
San Joaquin	2005	OBUS	GAS	35	910	528	528	0.006%
San Joaquin	2005	OBUS	DSL	35	955	1530	1530	0.006%
San Joaquin	2005	OBUS	GAS	40	1133	475	475	0.008%
San Joaquin	2005	OBUS	DSL	40	1019	1421	1421	0.007%
San Joaquin	2005	OBUS	GAS	45	1033	452	452	0.007%
San Joaquin	2005	OBUS	DSL	45	1140	1443	1443	0.008%
San Joaquin	2005	OBUS	GAS	50	1005	454	454	0.007%
San Joaquin	2005	OBUS	DSL	50	1218	1399	1399	0.008%
San Joaquin	2005	OBUS	GAS	55	1315	482	482	0.009%
San Joaquin	2005	OBUS	DSL	55	1596	1360	1360	0.011%
San Joaquin	2005	OBUS	GAS	60	1517	541	541	0.010%
San Joaquin	2005	OBUS	DSL	60	1079	1188	1188	0.007%
San Joaquin	2005	OBUS	GAS	65	237	641	641	0.002%
San Joaquin	2005	OBUS	DSL	65	281	1365	1365	0.002%
San Joaquin	2005	SBUS	GAS	5	21	2513	2513	0.000%
San Joaquin	2005	SBUS	DSL	5	111	2650	2650	0.001%
San Joaquin	2005	SBUS	GAS	10	74	2036	2036	0.000%
San Joaquin	2005	SBUS	DSL	10	390	2189	2189	0.003%
San Joaquin	2005	SBUS	GAS	15	148	1392	1392	0.001%
San Joaquin	2005	SBUS	DSL	15	781	1798	1798	0.005%
San Joaquin	2005	SBUS	GAS	20	201	1006	1006	0.001%
San Joaquin	2005	SBUS	DSL	20	1060	1418	1418	0.007%
San Joaquin	2005	SBUS	GAS	25	317	768	768	0.002%
San Joaquin	2005	SBUS	DSL	25	1673	1323	1323	0.011%
San Joaquin	2005	SBUS	GAS	30	381	619	619	0.003%
San Joaquin	2005	SBUS	DSL	30	2007	1242	1242	0.013%
San Joaquin	2005	SBUS	GAS	35	391	528	528	0.003%
San Joaquin	2005	SBUS	DSL	35	2060	1175	1175	0.014%
San Joaquin	2005	SBUS	GAS	40	264	475	475	0.002%
San Joaquin	2005	SBUS	DSL	40	1390	1121	1121	0.009%
San Joaquin	2005	SBUS	GAS	45	127	452	452	0.001%
San Joaquin	2005	SBUS	DSL	45	667	1081	1081	0.004%
San Joaquin	2005	SBUS	GAS	50	63	454	454	0.000%
San Joaquin	2005	SBUS	DSL	50	334	1055	1055	0.002%
San Joaquin	2005	SBUS	GAS	55	94	482	482	0.001%
San Joaquin	2005	SBUS	DSL	55	497	1043	1043	0.003%
San Joaquin	2005	SBUS	GAS	60	52	541	541	0.000%
San Joaquin	2005	SBUS	DSL	60	277	1045	1045	0.002%
San Joaquin	2005	T6	GAS	5	167	2513	2513	0.001%
San Joaquin	2005	T6	DSL	5	2045	2621	2621	0.014%
San Joaquin	2005	T6	GAS	10	840	2036	2036	0.006%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	T6	DSL	10	10179	2165	2165	0.067%
San Joaquin	2005	T6	GAS	15	1062	1392	1392	0.007%
San Joaquin	2005	T6	DSL	15	13738	1778	1778	0.091%
San Joaquin	2005	T6	GAS	20	1101	1006	1006	0.007%
San Joaquin	2005	T6	DSL	20	14570	1403	1403	0.097%
San Joaquin	2005	T6	GAS	25	1227	768	768	0.008%
San Joaquin	2005	T6	DSL	25	15174	1309	1309	0.101%
San Joaquin	2005	T6	GAS	30	1387	619	619	0.009%
San Joaquin	2005	T6	DSL	30	18246	1228	1228	0.121%
San Joaquin	2005	T6	GAS	35	1724	528	528	0.011%
San Joaquin	2005	T6	DSL	35	21514	1162	1162	0.143%
San Joaquin	2005	T6	GAS	40	2146	475	475	0.014%
San Joaquin	2005	T6	DSL	40	26706	1109	1109	0.177%
San Joaquin	2005	T6	GAS	45	1957	452	452	0.013%
San Joaquin	2005	T6	DSL	45	21869	1070	1070	0.145%
San Joaquin	2005	T6	GAS	50	1905	454	454	0.013%
San Joaquin	2005	T6	DSL	50	24475	1044	1044	0.162%
San Joaquin	2005	T6	GAS	55	2491	482	482	0.017%
San Joaquin	2005	T6	DSL	55	35866	1032	1032	0.238%
San Joaquin	2005	T6	GAS	60	2875	541	541	0.019%
San Joaquin	2005	T6	DSL	60	43099	1034	1034	0.286%
San Joaquin	2005	T6	GAS	65	449	641	641	0.003%
San Joaquin	2005	T6	DSL	65	6783	1049	1049	0.045%
San Joaquin	2005	T7	GAS	5	13	2513	2513	0.000%
San Joaquin	2005	T7	DSL	5	3403	4026	4026	0.023%
San Joaquin	2005	T7	GAS	10	66	2036	2036	0.000%
San Joaquin	2005	T7	DSL	10	13000	3326	3326	0.086%
San Joaquin	2005	T7	GAS	15	72	1392	1392	0.000%
San Joaquin	2005	T7	DSL	15	15899	2731	2731	0.105%
San Joaquin	2005	T7	GAS	20	122	1006	1006	0.001%
San Joaquin	2005	T7	DSL	20	39269	2156	2156	0.260%
San Joaquin	2005	T7	GAS	25	160	768	768	0.001%
San Joaquin	2005	T7	DSL	25	35910	2010	2010	0.238%
San Joaquin	2005	T7	GAS	30	292	619	619	0.002%
San Joaquin	2005	T7	DSL	30	60626	1887	1887	0.402%
San Joaquin	2005	T7	GAS	35	519	528	528	0.003%
San Joaquin	2005	T7	DSL	35	109068	1784	1784	0.723%
San Joaquin	2005	T7	GAS	40	452	475	475	0.003%
San Joaquin	2005	T7	DSL	40	102928	1703	1703	0.682%
San Joaquin	2005	T7	GAS	45	479	452	452	0.003%
San Joaquin	2005	T7	DSL	45	144106	1643	1643	0.955%
San Joaquin	2005	T7	GAS	50	501	454	454	0.003%
San Joaquin	2005	T7	DSL	50	149867	1603	1603	0.993%
San Joaquin	2005	T7	GAS	55	735	482	482	0.005%
San Joaquin	2005	T7	DSL	55	182754	1585	1585	1.211%
San Joaquin	2005	T7	GAS	60	181	541	541	0.001%
San Joaquin	2005	T7	DSL	60	55673	1587	1587	0.369%
San Joaquin	2005	T7	GAS	65	97	641	641	0.001%
San Joaquin	2005	T7	DSL	65	30493	1611	1611	0.202%
San Joaquin	2005	UBUS	GAS	5	47	2513	2513	0.000%
San Joaquin	2005	UBUS	DSL	5	191	2578	2578	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_ RUNEX (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2005	UBUS	GAS	10	167	2036	2036	0.001%
San Joaquin	2005	UBUS	DSL	10	685	2578	2578	0.005%
San Joaquin	2005	UBUS	GAS	15	335	1392	1392	0.002%
San Joaquin	2005	UBUS	DSL	15	1371	2578	2578	0.009%
San Joaquin	2005	UBUS	GAS	20	441	1006	1006	0.003%
San Joaquin	2005	UBUS	DSL	20	1809	2578	2578	0.012%
San Joaquin	2005	UBUS	GAS	25	665	768	768	0.004%
San Joaquin	2005	UBUS	DSL	25	2725	2578	2578	0.018%
San Joaquin	2005	UBUS	GAS	30	832	619	619	0.006%
San Joaquin	2005	UBUS	DSL	30	3410	2578	2578	0.023%
San Joaquin	2005	UBUS	GAS	35	816	528	528	0.005%
San Joaquin	2005	UBUS	DSL	35	3342	2578	2578	0.022%
San Joaquin	2005	UBUS	GAS	40	588	475	475	0.004%
San Joaquin	2005	UBUS	DSL	40	2409	2578	2578	0.016%
San Joaquin	2005	UBUS	GAS	45	256	452	452	0.002%
San Joaquin	2005	UBUS	DSL	45	1050	2578	2578	0.007%
San Joaquin	2005	UBUS	GAS	50	130	454	454	0.001%
San Joaquin	2005	UBUS	DSL	50	534	2578	2578	0.004%
San Joaquin	2005	UBUS	GAS	55	161	482	482	0.001%
San Joaquin	2005	UBUS	DSL	55	662	2578	2578	0.004%
San Joaquin	2005	UBUS	GAS	60	264	541	541	0.002%
San Joaquin	2005	UBUS	DSL	60	1083	2578	2578	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2005

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.559	(average of 2005-2009 factors)
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	172,699,979	3,004	48270	2.7	0.9	44,108
Commercial	97,939,112	7,646	27374	1.5	0.5	25,014
Industrial	0		0	0.0	0.0	0
Total	**270,639,091**		**75,644**	**4.2**	**1.5**	**69,122**

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) CO2	CH4	N2O	Emissions MTCO2e
Residential	8,556,595	149	50,056	4.7	0.1	45,527
Commercial	1,852,345	145	10,836	1.0	0.0	9,856
Industrial	0		0	0.0	0.0	0
Total	**10,408,940**		**60,892**	**5.7**	**0.1**	**55,383**

Sources:

- 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 and emission factors for carbon dioxide from: PG&E 2012. Pacific Gas and Electric Company. Community Wide GHG Inventory Report for City of Manteca 2005 and 2010.

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

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2005

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
San Joaquin Valley	654,541	520	0.1069	0.0061	475
Manteca	57,499	46	0	0	42
Percent Manteca/SJV	8.8%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
San Joaquin Valley	654,541	492	0.268	0.046	464
Manteca	57,499	43	0	0	41
Percent Manteca/SJV	8.8%				

Total Manteca **83**

Notes:
Emissions for San Joaquin Valley County are from OFFROAD2007 for the year assessed; emissions from Manteca are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, generators, industrial equipment, lawn and garden equipment, light commercial equipment, other portable equipment, and transport refrigeration units. Emissions from pleasure craft (boats), railyard operations, dredging, logging equipment, oil drilling, airport ground support equipment, and military tactical support equipment were not included, as those are not substantial sources within the City.

The agricultural equipment are the "agricultural equipment" source in OFFROAD2007.

Community Greenhouse Gas Inventory

Summary

Year: 2010

Prepared by Michael Brandman Associates

Manteca Information	**Data**	**Source**
Population	66,210	SJCOG 2004
Housing	20,839	SJCOG 2004
Employment	13,737	SJCOG 2004
San Joaquin County Information		
Population	685,306	SJCOG 2011
State of California Information		
Population	37,312,510	DOF 2012

Summary

Sectors	**MTCO2e**
Motor vehicles	210,901
Electricity - residential	47,343
Electricity - commercial	31,146
Natural gas - residential	50,466
Natural gas - commercial	11,818
Waste	30,454
ODS substitutes	26,741
Total	*408,870*

Sources:

San Joaquin Council of Governments (SJCOG). 2004. Staff Report, 2005-2030 Population and Employment Projections. Website: www.sjcog.org/docs/pdf/census/projections.pdf.

San Joaquin Council of Governments (SJCOG) and Eberhardt School of Business, Business Forecasting Center. June 2011. Website: www.sjcog.org/docs/pdf/census/ra_jun11.pdf. Accessed June 23, 2012.

California Department of Finance (DOF). 2012. Demographic Research Unit. Interim Population Projections for California and its Counties 2010-2050. Website: www.dof.ca.gov/research/demographic/reports/projections/interim/view.php. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Waste

Waste Percentages (Entry for SEEC model)	*Percent waste*
Paper products	17.3
Food waste	15.5
Plant debris	6.6
Wood or textiles	18.9
All other waste	41.7

Waste Percentages	*Percent waste*	*Emission Factor (MT methane/wet short ton waste)*	*Weighted EF*
Mixed MSW	28.6%	0.060	0.0172
Newspaper	1.3%	0.043	0.0006
Office paper	1.9%	0.203	0.0039
Corrugated containers	5.2%	0.120	0.0062
Magazines/Third-Class Mail	9.0%	0.049	0.0044
Food scraps	15.5%	0.078	0.0121
Grass	1.9%	0.038	0.0007
Leaves	1.9%	0.013	0.0002
Branches	3.3%	0.062	0.0020
Dimensional lumber	14.5%	0.062	0.0090
Textiles	2.2%	0.073	0.0016
Construction/demolition	14.6%	0.012	0.0018
Medical waste	0.0%	0.045	0.0000
Sludge/manure	0.1%	0.015	0.0000
Total	100.0%		**0.0597**

Methane Emissions

Desination Facility	*LFG Collection Effciency*	*Waste Generated by City (tons)*	*Methane emissions (MTCO2e)*
Other	0.75	136	38
Foothill Sanitary Landfill	0	16256	18340
Forward Landfill, Inc.	0.75	42813	12076
Total		59205	30454

Emissions (MTCO2e)	30,454	
Emissions (MTCO2e/person)	0.46	Emissions / Manteca population
Waste per person (tons)	0.894	

Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Sources:

Methodology: ICLEI. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Public Comment Draft. July 2012. Website: www.icleiusa.org/tools/ghg-protocol/community-protocol/public-comment-on-the-community-protocol. Accessed July 20, 2012. (Appendix E: Solid Waste Emissions Activities and Sources, Equation SW.4.1 Methane Emissions)

Source of waste generated: California Department of Resources Recycling and Recovery (CalRecycle). 2012. Disposal Reporting System: Jurisdiction Disposal and Alternative Daily Cover tons by Facility. Website: www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx, Accessed June 23, 2012.

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.

Note for the percentages used for the entry into SEEC model: Plant debris includes leaves and grass, prunings and trimmings, and manures. Wood/textiles includes branches and stumps, lumber, gypsum board, and textiles.

Landfill gas (LFG) collection efficiency for Foothill Sanitary Landfill: In 2005 and 2010, it is assumed that there was not a LFG recovery system for this landfill. However, for 2020 and 2035 estimates, a 0.75 efficiency is assumed. In 1995, the landfill had a revision to its operating permit, in which it was stated that landfill gas is monitored quarterly at four points around the perimeter of the site and at all on-site structures (California Integrated Waste Management Board, Permitting and Enforcement Committee, Agenda, October 18, 1995, www.calrecycle.ca.gov/Archive/IWMBMtgDocs/mtgdocs/library/1995/19951018-pen-p.pdf). In 2011 the Permit Unit Requirements for its Title V Permit Renewal indicates that "the owner/operator shall install, maintain, and operate a collection and control system that captures gas generated from the landfill and routes it to an open, non-assisted flare." (San Joaquin Valley Air Pollution Control District. 2011. Permit to Operate. website: http://yosemite.epa.gov/r9/air/epss.nsf/735056a63c1390e08825657e0075d180/719c2b9c94c0e8018825788d0070177a/$FILE/Public%20Notice%20Package.pdf)

LFG collection for Forward Landfill: It is assumed that for all years, the collection system was operational Forward, Inc. "violated the [Clean Air] Act by operating gas extraction wells in the landfill's gas collection and control system (GCCS) in violation of the Act's New Source Performance Standards and National Emission Standards for Hazardous Air Pollutions, and in violation of the Title V permit it had received from the San Joaquin Valley Unified Air Pollution Control District (District), the United States' co-plaintiff in the action." (Federal Register, Volume 77, No. 65, April 4, 2012. www.gpo.gov/fdsys/pkg/FR-2012-04-04/pdf/2012-8033.pdf). Apparently, there were subterranean fires in the landfill (San Joaquin Valley Air Pollution Control District. Fires cost Forward Landfill $4M. March 31, 2012. www.valleyair.org/recent_news/News_Clippings/2012/IntheNews04-02-12.pdf).

LFG collection for other landfills: Assumed that the landfills have a gas collection system for all years.

Community Greenhouse Gas Inventory

Ozone Depleting Substance Substitutes

Year: 2010

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

California

Emissions (MMTCO2e)	15.07
Population	37,312,510
Emissions (MTCO2e per person)	0.40

Manteca

Population	66,210
Emissions (MTCO2e)	26741

(estimated by using California per person emissions)

California Emissions from: California Air Resources Board. 2011. California Greenhouse Gas Inventory for 2000-2009. Website: www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-09_2011-10-26.pdf. Accessed June 23, 2012.

- Note that the emissions for 2010 were interpolated from 2008 and 2009 emissions.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2010
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day	1,144,710	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	417,819,150	Source: VMT per day * 365 days/year

Speed bins	AM peak	PM peak	Off peak	Total	Speed
10-15				**0**	10
15-20			462	**462**	15
20-25	13508	19285	41455	**74248**	20
25-30	14518	18286	38991	**71795**	25
30-35	36256	44803	83170	**164229**	30
35-40	49697	38587	49305	**137589**	35
40-45	24063	40546	33660	**98269**	40
45-50	13945		59681	**73626**	45
50-55	1499	2603	42188	**46290**	50
55-60	25356	97804	3990	**127150**	55
60-65	90165	52881	208005	**351051**	60
Total	**269007**	**314795**	**560907**	**1144709**	

Source: Kittelson & Associates. 2012. Development of On-Road Mobile Source Activity Data for GHG Emission Calculations. City of Manteca Climate Action Plan.

Nitrous oxide and methane emissions from the SEEC Model

		Emissions/1000 VMT/day
Methane (metric tons)	11.5471	0.010
Nitrous Oxide (metric tons)	13.9753	0.012

VMT/day per speed bin

Speed (mph)	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
VMT/day	0	462	74248	71795	164229	137589	98269	73626	46290	127150	351051

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	45.70%	0.12%
LDT1	6.27%	0.01%
LDT2	16.12%	0.01%
LHD1	2.87%	2.03%
LHD2	0.19%	0.46%
MCY	0.65%	0.00%
MDV	18.21%	0.01%
MH	0.20%	0.04%
OBUS	0.07%	0.05%
SBUS	0.01%	0.05%
T6	0.16%	1.27%
T7	0.04%	5.29%
UBUS	0.03%	0.14%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	43.7%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	46.4%	LDA, MCY
DSL	Heavy duty	6.8%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.5%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2010
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emission factors (g CO2/mile)

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	0	633	506	419	361	322	298	287	287	298	320
	LDT1	0	725	580	480	413	369	342	329	329	341	367
	LDT2	0	866	692	573	494	441	409	393	393	408	438
	LHD1	2036	1392	1006	768	619	528	475	452	454	482	0
	LHD2	2036	1392	1006	768	619	528	475	452	454	482	0
	MCY	0	188	165	147	134	125	119	116	116	120	127
	MDV	0	1089	871	721	621	555	514	495	494	513	551
	MH	2036	1392	1006	768	619	528	475	452	454	482	541
	OBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	SBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	T6	2036	1392	1006	768	619	528	475	452	454	482	541
	T7	2036	1392	1006	768	619	528	475	452	454	482	541
	UBUS	2036	1392	1006	768	619	528	475	452	454	482	541

Emission factors (g CO2/mile)

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	0	365	350	340	334	332	333	337	344	357	375
	LDT1	0	375	366	361	357	356	356	359	363	370	381
	LDT2	0	369	360	354	350	349	349	352	357	364	375
	LHD1	527	527	527	527	527	527	527	527	527	527	0
	LHD2	527	527	527	527	527	527	527	527	527	527	0
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	0	377	346	326	314	309	311	319	334	359	397
	MH	2154	1769	1452	1302	1222	1156	1103	1064	1039	1027	1028
	OBUS	2459	2002	1695	1580	1538	1519	1410	1434	1390	1350	1175
	SBUS	2180	1790	1412	1317	1237	1169	1116	1077	1051	1039	1040
	T6	2156	1771	1397	1303	1223	1157	1104	1065	1039	1028	1029
	T7	3324	2729	2152	2009	1886	1783	1702	1642	1602	1584	1587
	UBUS	2552	2552	2552	2552	2552	2552	2552	2552	2552	2552	2552

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

VMT/day by Vehicle Class and speed

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	0	211	33934	32813	75059	62884	44913	33650	21156	58113	160444
	LDT1	0	29	4653	4499	10292	8622	6158	4614	2901	7968	22000
	LDT2	0	74	11971	11576	26479	22184	15844	11871	7464	20501	56602
	LHD1	0	13	2131	2061	4714	3949	2821	2113	1329	3650	10076
	LHD2	0	1	141	137	313	262	187	140	88	242	668
	MCY	0	3	482	466	1066	893	638	478	301	826	2279
	MDV	0	84	13522	13075	29909	25058	17897	13409	8430	23156	63933
	MH	0	1	146	142	324	271	194	145	91	251	692
	OBUS	0	0	51	49	113	95	68	51	32	87	242
	SBUS	0	0	11	11	24	20	15	11	7	19	52
	T6	0	1	116	113	258	216	154	115	73	199	551
	T7	0	0	29	28	63	53	38	28	18	49	136
	UBUS	0	0	21	20	46	38	27	21	13	35	98

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	0	1	88	85	195	163	117	87	55	151	417
	LDT1	0	0	4	4	10	8	6	4	3	8	21
	LDT2	0	0	5	5	11	9	6	5	3	8	23
	LHD1	0	9	1505	1455	3328	2788	1991	1492	938	2577	7114
	LHD2	0	2	342	331	756	634	453	339	213	586	1617
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	0	0	11	10	24	20	14	11	7	18	51
	MH	0	0	32	31	71	59	42	32	20	55	151
	OBUS	0	0	38	36	83	69	50	37	23	64	177
	SBUS	0	0	41	39	90	75	54	40	25	69	192
	T6	0	6	946	915	2093	1754	1253	938	590	1621	4475
	T7	0	24	3924	3795	8680	7272	5194	3891	2447	6720	18554
	UBUS	0	1	103	100	228	191	136	102	64	176	487

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2010
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	54	6,889	5,517	10,866	8,130	5,382	3,881	2,437	6,949	20,596	**70,701**
LDT1	0	8	1,083	867	1,708	1,278	846	610	383	1,092	3,239	**11,116**
LDT2	0	26	3,328	2,665	5,249	3,927	2,600	1,875	1,177	3,357	9,950	**34,154**
LHD1	0	7	861	635	1,172	837	538	384	242	707	0	**5,384**
LHD2	0	0	57	42	78	56	36	25	16	47	0	**357**
MCY	0	0	32	28	57	45	31	22	14	40	116	**384**
MDV	0	37	4,727	3,787	7,457	5,580	3,694	2,663	1,673	4,769	14,136	**48,522**
MH	0	1	59	44	81	58	37	26	17	49	150	**520**
OBUS	0	0	21	15	28	20	13	9	6	17	52	**182**
SBUS	0	0	4	3	6	4	3	2	1	4	11	**39**
T6	0	0	47	35	64	46	29	21	13	39	120	**414**
T7	0	0	12	9	16	11	7	5	3	10	29	**102**
UBUS	0	0	8	6	11	8	5	4	2	7	21	**74**
Total	**0**	**134**	**17,128**	**13,654**	**26,795**	**20,000**	**13,221**	**9,528**	**5,985**	**17,084**	**48,421**	**171,949**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	0	12	12	26	22	16	12	8	22	63	**191**
LDT1	0	0	1	1	1	1	1	1	0	1	3	**10**
LDT2	0	0	1	1	2	1	1	1	0	1	3	**11**
LHD1	0	2	318	308	704	590	421	316	198	545	0	**3,401**
LHD2	0	0	72	70	160	134	96	72	45	124	0	**773**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	1	1	3	2	2	1	1	3	8	**23**
MH	0	0	19	16	35	28	19	14	8	23	63	**223**
OBUS	0	0	26	23	51	42	28	21	13	35	84	**323**
SBUS	0	0	23	21	44	35	24	17	11	29	80	**285**
T6	0	4	531	479	1,028	815	555	401	246	669	1,849	**6,577**
T7	0	27	3,391	3,061	6,572	5,207	3,549	2,565	1,574	4,274	11,819	**42,039**
UBUS	0	1	105	102	233	195	140	105	66	181	499	**1,626**
Total	**0**	**35**	**4,500**	**4,093**	**8,860**	**7,073**	**4,851**	**3,525**	**2,171**	**5,905**	**14,470**	**55,483**

Total Emissions

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	227,432	206,327	206,327
Methane		12	242
Nitrous oxide		14	4,332
Total			**210,901**

EMFAC 2011
2010 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
San Joaquin COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - San Joaquin, [year], season - annual average, vehicle category - all, fuel - all, model year - combined, speed - all, EMFAC2007 vehicle classifications) Website: www.arb.ca.gov/jpub/webapp/EMFAC2011WebApp/rateSelectionPage_1.jsp.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	LDA	GAS	5	735	1107	1102	0.005%
San Joaquin	2010	LDA	DSL	5	2	402	398	0.000%
San Joaquin	2010	LDA	GAS	10	0	0	0	0.000%
San Joaquin	2010	LDA	DSL	10	0	0	0	0.000%
San Joaquin	2010	LDA	GAS	15	4433	633	629	0.027%
San Joaquin	2010	LDA	DSL	15	12	365	362	0.000%
San Joaquin	2010	LDA	GAS	20	23459	506	503	0.145%
San Joaquin	2010	LDA	DSL	20	61	350	347	0.000%
San Joaquin	2010	LDA	GAS	25	581803	419	417	3.602%
San Joaquin	2010	LDA	DSL	25	1511	340	338	0.009%
San Joaquin	2010	LDA	GAS	30	627910	361	359	3.887%
San Joaquin	2010	LDA	DSL	30	1631	334	332	0.010%
San Joaquin	2010	LDA	GAS	35	584662	322	320	3.619%
San Joaquin	2010	LDA	DSL	35	1519	332	330	0.009%
San Joaquin	2010	LDA	GAS	40	643717	298	297	3.985%
San Joaquin	2010	LDA	DSL	40	1672	333	331	0.010%
San Joaquin	2010	LDA	GAS	45	540154	287	286	3.344%
San Joaquin	2010	LDA	DSL	45	1403	337	335	0.009%
San Joaquin	2010	LDA	GAS	50	404024	287	285	2.501%
San Joaquin	2010	LDA	DSL	50	1050	344	342	0.006%
San Joaquin	2010	LDA	GAS	55	254179	298	296	1.573%
San Joaquin	2010	LDA	DSL	55	660	357	354	0.004%
San Joaquin	2010	LDA	GAS	60	1168766	320	318	7.235%
San Joaquin	2010	LDA	DSL	60	3036	375	372	0.019%
San Joaquin	2010	LDA	GAS	65	1747519	358	356	10.818%
San Joaquin	2010	LDA	DSL	65	4539	402	398	0.028%
San Joaquin	2010	LDA	GAS	70	801733	383	381	4.963%
San Joaquin	2010	LDA	DSL	70	2083	442	437	0.013%
San Joaquin	2010	LDT1	GAS	5	101	1269	1263	0.001%
San Joaquin	2010	LDT1	DSL	5	0	396	393	0.000%
San Joaquin	2010	LDT1	GAS	10	0	0	0	0.000%
San Joaquin	2010	LDT1	DSL	10	0	0	0	0.000%
San Joaquin	2010	LDT1	GAS	15	608	725	722	0.004%
San Joaquin	2010	LDT1	DSL	15	1	375	373	0.000%
San Joaquin	2010	LDT1	GAS	20	3217	580	577	0.020%
San Joaquin	2010	LDT1	DSL	20	3	366	364	0.000%
San Joaquin	2010	LDT1	GAS	25	79776	480	478	0.494%
San Joaquin	2010	LDT1	DSL	25	77	361	359	0.000%
San Joaquin	2010	LDT1	GAS	30	86098	413	411	0.533%
San Joaquin	2010	LDT1	DSL	30	83	357	356	0.001%
San Joaquin	2010	LDT1	GAS	35	80168	369	367	0.496%
San Joaquin	2010	LDT1	DSL	35	77	356	354	0.000%
San Joaquin	2010	LDT1	GAS	40	88265	342	341	0.546%
San Joaquin	2010	LDT1	DSL	40	85	356	355	0.001%
San Joaquin	2010	LDT1	GAS	45	74065	329	328	0.458%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	LDT1	DSL	45	71	359	357	0.000%
San Joaquin	2010	LDT1	GAS	50	55399	329	327	0.343%
San Joaquin	2010	LDT1	DSL	50	53	363	361	0.000%
San Joaquin	2010	LDT1	GAS	55	34853	341	340	0.216%
San Joaquin	2010	LDT1	DSL	55	34	370	368	0.000%
San Joaquin	2010	LDT1	GAS	60	160259	367	365	0.992%
San Joaquin	2010	LDT1	DSL	60	154	381	378	0.001%
San Joaquin	2010	LDT1	GAS	65	239617	410	408	1.483%
San Joaquin	2010	LDT1	DSL	65	230	396	393	0.001%
San Joaquin	2010	LDT1	GAS	70	109932	439	437	0.681%
San Joaquin	2010	LDT1	DSL	70	106	419	415	0.001%
San Joaquin	2010	LDT2	GAS	5	259	1516	1507	0.002%
San Joaquin	2010	LDT2	DSL	5	0	392	387	0.000%
San Joaquin	2010	LDT2	GAS	10	0	0	0	0.000%
San Joaquin	2010	LDT2	DSL	10	0	0	0	0.000%
San Joaquin	2010	LDT2	GAS	15	1564	866	861	0.010%
San Joaquin	2010	LDT2	DSL	15	1	369	365	0.000%
San Joaquin	2010	LDT2	GAS	20	8276	692	688	0.051%
San Joaquin	2010	LDT2	DSL	20	3	360	357	0.000%
San Joaquin	2010	LDT2	GAS	25	205249	573	570	1.271%
San Joaquin	2010	LDT2	DSL	25	83	354	351	0.001%
San Joaquin	2010	LDT2	GAS	30	221515	494	491	1.371%
San Joaquin	2010	LDT2	DSL	30	89	350	348	0.001%
San Joaquin	2010	LDT2	GAS	35	206258	441	438	1.277%
San Joaquin	2010	LDT2	DSL	35	83	349	346	0.001%
San Joaquin	2010	LDT2	GAS	40	227091	409	406	1.406%
San Joaquin	2010	LDT2	DSL	40	92	349	347	0.001%
San Joaquin	2010	LDT2	GAS	45	190556	393	391	1.180%
San Joaquin	2010	LDT2	DSL	45	77	352	349	0.000%
San Joaquin	2010	LDT2	GAS	50	142532	393	391	0.882%
San Joaquin	2010	LDT2	DSL	50	57	357	353	0.000%
San Joaquin	2010	LDT2	GAS	55	89670	408	405	0.555%
San Joaquin	2010	LDT2	DSL	55	36	364	361	0.000%
San Joaquin	2010	LDT2	GAS	60	412319	438	435	2.552%
San Joaquin	2010	LDT2	DSL	60	166	375	371	0.001%
San Joaquin	2010	LDT2	GAS	65	616492	490	487	3.816%
San Joaquin	2010	LDT2	DSL	65	248	392	387	0.002%
San Joaquin	2010	LDT2	GAS	70	282836	524	521	1.751%
San Joaquin	2010	LDT2	DSL	70	114	417	411	0.001%
San Joaquin	2010	LHD1	GAS	5	13159	2513	2513	0.081%
San Joaquin	2010	LHD1	DSL	5	5756	527	527	0.036%
San Joaquin	2010	LHD1	GAS	10	34313	2036	2036	0.212%
San Joaquin	2010	LHD1	DSL	10	19143	527	527	0.118%
San Joaquin	2010	LHD1	GAS	15	78135	1392	1392	0.484%
San Joaquin	2010	LHD1	DSL	15	41457	527	527	0.257%
San Joaquin	2010	LHD1	GAS	20	90284	1006	1006	0.559%
San Joaquin	2010	LHD1	DSL	20	45451	527	527	0.281%
San Joaquin	2010	LHD1	GAS	25	69546	768	768	0.431%
San Joaquin	2010	LHD1	DSL	25	48644	527	527	0.301%
San Joaquin	2010	LHD1	GAS	30	61502	619	619	0.381%
San Joaquin	2010	LHD1	DSL	30	41062	527	527	0.254%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	LHD1	GAS	35	22981	528	528	0.142%
San Joaquin	2010	LHD1	DSL	35	21670	527	527	0.134%
San Joaquin	2010	LHD1	GAS	40	6783	475	475	0.042%
San Joaquin	2010	LHD1	DSL	40	11896	527	527	0.074%
San Joaquin	2010	LHD1	GAS	45	8351	452	452	0.052%
San Joaquin	2010	LHD1	DSL	45	12840	527	527	0.079%
San Joaquin	2010	LHD1	GAS	50	61663	454	454	0.382%
San Joaquin	2010	LHD1	DSL	50	49579	527	527	0.307%
San Joaquin	2010	LHD1	GAS	55	16960	482	482	0.105%
San Joaquin	2010	LHD1	DSL	55	29857	527	527	0.185%
San Joaquin	2010	LHD2	GAS	5	873	2513	2513	0.005%
San Joaquin	2010	LHD2	DSL	5	1308	527	527	0.008%
San Joaquin	2010	LHD2	GAS	10	2276	2036	2036	0.014%
San Joaquin	2010	LHD2	DSL	10	4351	527	527	0.027%
San Joaquin	2010	LHD2	GAS	15	5183	1392	1392	0.032%
San Joaquin	2010	LHD2	DSL	15	9424	527	527	0.058%
San Joaquin	2010	LHD2	GAS	20	5988	1006	1006	0.037%
San Joaquin	2010	LHD2	DSL	20	10331	527	527	0.064%
San Joaquin	2010	LHD2	GAS	25	4613	768	768	0.029%
San Joaquin	2010	LHD2	DSL	25	11057	527	527	0.068%
San Joaquin	2010	LHD2	GAS	30	4079	619	619	0.025%
San Joaquin	2010	LHD2	DSL	30	9334	527	527	0.058%
San Joaquin	2010	LHD2	GAS	35	1524	528	528	0.009%
San Joaquin	2010	LHD2	DSL	35	4926	527	527	0.030%
San Joaquin	2010	LHD2	GAS	40	450	475	475	0.003%
San Joaquin	2010	LHD2	DSL	40	2704	527	527	0.017%
San Joaquin	2010	LHD2	GAS	45	554	452	452	0.003%
San Joaquin	2010	LHD2	DSL	45	2919	527	527	0.018%
San Joaquin	2010	LHD2	GAS	50	4090	454	454	0.025%
San Joaquin	2010	LHD2	DSL	50	11270	527	527	0.070%
San Joaquin	2010	LHD2	GAS	55	1125	482	482	0.007%
San Joaquin	2010	LHD2	DSL	55	6787	527	527	0.042%
San Joaquin	2010	MCY	GAS	5	10	240	240	0.000%
San Joaquin	2010	MCY	GAS	10	0	0	0	0.000%
San Joaquin	2010	MCY	GAS	15	63	188	188	0.000%
San Joaquin	2010	MCY	GAS	20	333	165	165	0.002%
San Joaquin	2010	MCY	GAS	25	8266	147	147	0.051%
San Joaquin	2010	MCY	GAS	30	8921	134	134	0.055%
San Joaquin	2010	MCY	GAS	35	8306	125	125	0.051%
San Joaquin	2010	MCY	GAS	40	9145	119	119	0.057%
San Joaquin	2010	MCY	GAS	45	7674	116	116	0.048%
San Joaquin	2010	MCY	GAS	50	5740	116	116	0.036%
San Joaquin	2010	MCY	GAS	55	3611	120	120	0.022%
San Joaquin	2010	MCY	GAS	60	16605	127	127	0.103%
San Joaquin	2010	MCY	GAS	65	24827	139	139	0.154%
San Joaquin	2010	MCY	GAS	70	11390	158	158	0.071%
San Joaquin	2010	MDV	GAS	5	293	1907	1903	0.002%
San Joaquin	2010	MDV	DSL	5	0	453	449	0.000%
San Joaquin	2010	MDV	GAS	10	0	0	0	0.000%
San Joaquin	2010	MDV	DSL	10	0	0	0	0.000%
San Joaquin	2010	MDV	GAS	15	1766	1089	1087	0.011%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	MDV	DSL	15	1	377	374	0.000%
San Joaquin	2010	MDV	GAS	20	9348	871	869	0.058%
San Joaquin	2010	MDV	DSL	20	7	346	343	0.000%
San Joaquin	2010	MDV	GAS	25	231835	721	720	1.435%
San Joaquin	2010	MDV	DSL	25	183	326	323	0.001%
San Joaquin	2010	MDV	GAS	30	250207	621	620	1.549%
San Joaquin	2010	MDV	DSL	30	198	314	312	0.001%
San Joaquin	2010	MDV	GAS	35	232974	555	553	1.442%
San Joaquin	2010	MDV	DSL	35	184	309	307	0.001%
San Joaquin	2010	MDV	GAS	40	256506	514	513	1.588%
San Joaquin	2010	MDV	DSL	40	203	311	308	0.001%
San Joaquin	2010	MDV	GAS	45	215239	495	494	1.332%
San Joaquin	2010	MDV	DSL	45	170	319	317	0.001%
San Joaquin	2010	MDV	GAS	50	160994	494	493	0.997%
San Joaquin	2010	MDV	DSL	50	127	334	332	0.001%
San Joaquin	2010	MDV	GAS	55	101284	513	512	0.627%
San Joaquin	2010	MDV	DSL	55	80	359	357	0.000%
San Joaquin	2010	MDV	GAS	60	465726	551	550	2.883%
San Joaquin	2010	MDV	DSL	60	368	397	394	0.002%
San Joaquin	2010	MDV	GAS	65	696345	616	615	4.311%
San Joaquin	2010	MDV	DSL	65	551	453	449	0.003%
San Joaquin	2010	MDV	GAS	70	319472	659	658	1.978%
San Joaquin	2010	MDV	DSL	70	253	535	530	0.002%
San Joaquin	2010	MH	GAS	5	276	2513	2513	0.002%
San Joaquin	2010	MH	DSL	5	56	2373	2373	0.000%
San Joaquin	2010	MH	GAS	10	1385	2036	2036	0.009%
San Joaquin	2010	MH	DSL	10	279	2154	2154	0.002%
San Joaquin	2010	MH	GAS	15	1750	1392	1392	0.011%
San Joaquin	2010	MH	DSL	15	377	1769	1769	0.002%
San Joaquin	2010	MH	GAS	20	1815	1006	1006	0.011%
San Joaquin	2010	MH	DSL	20	399	1452	1452	0.002%
San Joaquin	2010	MH	GAS	25	2022	768	768	0.013%
San Joaquin	2010	MH	DSL	25	416	1302	1302	0.003%
San Joaquin	2010	MH	GAS	30	2286	619	619	0.014%
San Joaquin	2010	MH	DSL	30	500	1222	1222	0.003%
San Joaquin	2010	MH	GAS	35	2841	528	528	0.018%
San Joaquin	2010	MH	DSL	35	590	1156	1156	0.004%
San Joaquin	2010	MH	GAS	40	3537	475	475	0.022%
San Joaquin	2010	MH	DSL	40	732	1103	1103	0.005%
San Joaquin	2010	MH	GAS	45	3226	452	452	0.020%
San Joaquin	2010	MH	DSL	45	599	1064	1064	0.004%
San Joaquin	2010	MH	GAS	50	3139	454	454	0.019%
San Joaquin	2010	MH	DSL	50	671	1039	1039	0.004%
San Joaquin	2010	MH	GAS	55	4106	482	482	0.025%
San Joaquin	2010	MH	DSL	55	983	1027	1027	0.006%
San Joaquin	2010	MH	GAS	60	4738	541	541	0.029%
San Joaquin	2010	MH	DSL	60	1181	1028	1028	0.007%
San Joaquin	2010	MH	GAS	65	740	641	641	0.005%
San Joaquin	2010	MH	DSL	65	186	1044	1044	0.001%
San Joaquin	2010	OBUS	GAS	5	96	2513	2513	0.001%
San Joaquin	2010	OBUS	DSL	5	48	3053	3053	0.000%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	OBUS	GAS	10	483	2036	2036	0.003%
San Joaquin	2010	OBUS	DSL	10	219	2459	2459	0.001%
San Joaquin	2010	OBUS	GAS	15	610	1392	1392	0.004%
San Joaquin	2010	OBUS	DSL	15	289	2002	2002	0.002%
San Joaquin	2010	OBUS	GAS	20	633	1006	1006	0.004%
San Joaquin	2010	OBUS	DSL	20	385	1695	1695	0.002%
San Joaquin	2010	OBUS	GAS	25	705	768	768	0.004%
San Joaquin	2010	OBUS	DSL	25	399	1580	1580	0.002%
San Joaquin	2010	OBUS	GAS	30	798	619	619	0.005%
San Joaquin	2010	OBUS	DSL	30	556	1538	1538	0.003%
San Joaquin	2010	OBUS	GAS	35	991	528	528	0.006%
San Joaquin	2010	OBUS	DSL	35	820	1519	1519	0.005%
San Joaquin	2010	OBUS	GAS	40	1234	475	475	0.008%
San Joaquin	2010	OBUS	DSL	40	876	1410	1410	0.005%
San Joaquin	2010	OBUS	GAS	45	1125	452	452	0.007%
San Joaquin	2010	OBUS	DSL	45	979	1434	1434	0.006%
San Joaquin	2010	OBUS	GAS	50	1095	454	454	0.007%
San Joaquin	2010	OBUS	DSL	50	1046	1390	1390	0.006%
San Joaquin	2010	OBUS	GAS	55	1433	482	482	0.009%
San Joaquin	2010	OBUS	DSL	55	1371	1350	1350	0.008%
San Joaquin	2010	OBUS	GAS	60	1653	541	541	0.010%
San Joaquin	2010	OBUS	DSL	60	931	1175	1175	0.006%
San Joaquin	2010	OBUS	GAS	65	258	641	641	0.002%
San Joaquin	2010	OBUS	DSL	65	242	1355	1355	0.001%
San Joaquin	2010	SBUS	GAS	5	24	2513	2513	0.000%
San Joaquin	2010	SBUS	DSL	5	87	2639	2639	0.001%
San Joaquin	2010	SBUS	GAS	10	83	2036	2036	0.001%
San Joaquin	2010	SBUS	DSL	10	306	2180	2180	0.002%
San Joaquin	2010	SBUS	GAS	15	166	1392	1392	0.001%
San Joaquin	2010	SBUS	DSL	15	612	1790	1790	0.004%
San Joaquin	2010	SBUS	GAS	20	226	1006	1006	0.001%
San Joaquin	2010	SBUS	DSL	20	830	1412	1412	0.005%
San Joaquin	2010	SBUS	GAS	25	356	768	768	0.002%
San Joaquin	2010	SBUS	DSL	25	1311	1317	1317	0.008%
San Joaquin	2010	SBUS	GAS	30	427	619	619	0.003%
San Joaquin	2010	SBUS	DSL	30	1573	1237	1237	0.010%
San Joaquin	2010	SBUS	GAS	35	438	528	528	0.003%
San Joaquin	2010	SBUS	DSL	35	1614	1169	1169	0.010%
San Joaquin	2010	SBUS	GAS	40	296	475	475	0.002%
San Joaquin	2010	SBUS	DSL	40	1090	1116	1116	0.007%
San Joaquin	2010	SBUS	GAS	45	142	452	452	0.001%
San Joaquin	2010	SBUS	DSL	45	523	1077	1077	0.003%
San Joaquin	2010	SBUS	GAS	50	71	454	454	0.000%
San Joaquin	2010	SBUS	DSL	50	262	1051	1051	0.002%
San Joaquin	2010	SBUS	GAS	55	106	482	482	0.001%
San Joaquin	2010	SBUS	DSL	55	390	1039	1039	0.002%
San Joaquin	2010	SBUS	GAS	60	59	541	541	0.000%
San Joaquin	2010	SBUS	DSL	60	217	1040	1040	0.001%
San Joaquin	2010	T6	GAS	5	219	2513	2513	0.001%
San Joaquin	2010	T6	DSL	5	1656	2610	2610	0.010%
San Joaquin	2010	T6	GAS	10	1102	2036	2036	0.007%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	T6	DSL	10	8244	2156	2156	0.051%
San Joaquin	2010	T6	GAS	15	1392	1392	1392	0.009%
San Joaquin	2010	T6	DSL	15	11126	1771	1771	0.069%
San Joaquin	2010	T6	GAS	20	1443	1006	1006	0.009%
San Joaquin	2010	T6	DSL	20	11799	1397	1397	0.073%
San Joaquin	2010	T6	GAS	25	1608	768	768	0.010%
San Joaquin	2010	T6	DSL	25	12289	1303	1303	0.076%
San Joaquin	2010	T6	GAS	30	1818	619	619	0.011%
San Joaquin	2010	T6	DSL	30	14776	1223	1223	0.091%
San Joaquin	2010	T6	GAS	35	2260	528	528	0.014%
San Joaquin	2010	T6	DSL	35	17423	1157	1157	0.108%
San Joaquin	2010	T6	GAS	40	2813	475	475	0.017%
San Joaquin	2010	T6	DSL	40	21628	1104	1104	0.134%
San Joaquin	2010	T6	GAS	45	2566	452	452	0.016%
San Joaquin	2010	T6	DSL	45	17710	1065	1065	0.110%
San Joaquin	2010	T6	GAS	50	2497	454	454	0.015%
San Joaquin	2010	T6	DSL	50	19821	1039	1039	0.123%
San Joaquin	2010	T6	GAS	55	3266	482	482	0.020%
San Joaquin	2010	T6	DSL	55	29046	1028	1028	0.180%
San Joaquin	2010	T6	GAS	60	3768	541	541	0.023%
San Joaquin	2010	T6	DSL	60	34903	1029	1029	0.216%
San Joaquin	2010	T6	GAS	65	589	641	641	0.004%
San Joaquin	2010	T6	DSL	65	5493	1044	1044	0.034%
San Joaquin	2010	T7	GAS	5	23	2513	2513	0.000%
San Joaquin	2010	T7	DSL	5	3081	4024	4024	0.019%
San Joaquin	2010	T7	GAS	10	111	2036	2036	0.001%
San Joaquin	2010	T7	DSL	10	11768	3324	3324	0.073%
San Joaquin	2010	T7	GAS	15	121	1392	1392	0.001%
San Joaquin	2010	T7	DSL	15	14392	2729	2729	0.089%
San Joaquin	2010	T7	GAS	20	207	1006	1006	0.001%
San Joaquin	2010	T7	DSL	20	35707	2152	2152	0.221%
San Joaquin	2010	T7	GAS	25	270	768	768	0.002%
San Joaquin	2010	T7	DSL	25	32507	2009	2009	0.201%
San Joaquin	2010	T7	GAS	30	494	619	619	0.003%
San Joaquin	2010	T7	DSL	30	54880	1886	1886	0.340%
San Joaquin	2010	T7	GAS	35	878	528	528	0.005%
San Joaquin	2010	T7	DSL	35	98731	1783	1783	0.611%
San Joaquin	2010	T7	GAS	40	766	475	475	0.005%
San Joaquin	2010	T7	DSL	40	93173	1702	1702	0.577%
San Joaquin	2010	T7	GAS	45	810	452	452	0.005%
San Joaquin	2010	T7	DSL	45	130448	1642	1642	0.808%
San Joaquin	2010	T7	GAS	50	848	454	454	0.005%
San Joaquin	2010	T7	DSL	50	135663	1602	1602	0.840%
San Joaquin	2010	T7	GAS	55	1244	482	482	0.008%
San Joaquin	2010	T7	DSL	55	165433	1584	1584	1.024%
San Joaquin	2010	T7	GAS	60	307	541	541	0.002%
San Joaquin	2010	T7	DSL	60	50397	1587	1587	0.312%
San Joaquin	2010	T7	GAS	65	165	641	641	0.001%
San Joaquin	2010	T7	DSL	65	27603	1610	1610	0.171%
San Joaquin	2010	UBUS	GAS	5	45	2513	2513	0.000%
San Joaquin	2010	UBUS	DSL	5	222	2552	2552	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2010	UBUS	GAS	10	160	2036	2036	0.001%
San Joaquin	2010	UBUS	DSL	10	797	2552	2552	0.005%
San Joaquin	2010	UBUS	GAS	15	321	1392	1392	0.002%
San Joaquin	2010	UBUS	DSL	15	1593	2552	2552	0.010%
San Joaquin	2010	UBUS	GAS	20	423	1006	1006	0.003%
San Joaquin	2010	UBUS	DSL	20	2102	2552	2552	0.013%
San Joaquin	2010	UBUS	GAS	25	637	768	768	0.004%
San Joaquin	2010	UBUS	DSL	25	3166	2552	2552	0.020%
San Joaquin	2010	UBUS	GAS	30	797	619	619	0.005%
San Joaquin	2010	UBUS	DSL	30	3963	2552	2552	0.025%
San Joaquin	2010	UBUS	GAS	35	781	528	528	0.005%
San Joaquin	2010	UBUS	DSL	35	3884	2552	2552	0.024%
San Joaquin	2010	UBUS	GAS	40	563	475	475	0.003%
San Joaquin	2010	UBUS	DSL	40	2800	2552	2552	0.017%
San Joaquin	2010	UBUS	GAS	45	246	452	452	0.002%
San Joaquin	2010	UBUS	DSL	45	1221	2552	2552	0.008%
San Joaquin	2010	UBUS	GAS	50	125	454	454	0.001%
San Joaquin	2010	UBUS	DSL	50	620	2552	2552	0.004%
San Joaquin	2010	UBUS	GAS	55	155	482	482	0.001%
San Joaquin	2010	UBUS	DSL	55	769	2552	2552	0.005%
San Joaquin	2010	UBUS	GAS	60	253	541	541	0.002%
San Joaquin	2010	UBUS	DSL	60	1258	2552	2552	0.008%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.559	(average of 2005-2009 factors)
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	185,366,454	2,800	51810	2.9	1.0	47,343
Commercial	121,947,140	8,877	34084	1.9	0.7	31,146
Industrial	0		0	0.0	0.0	0
Total	**307,313,594**		**85,894**	**4.8**	**1.7**	**78,489**

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) CO2	CH4	N2O	Emissions MTCO2e
Residential	9,484,817	143	55,486	5.2	0.1	50,466
Commercial	2,221,211	162	12,994	1.2	0.0	11,818
Industrial	0		0	0.0	0.0	0
Total	**11,706,028**		**68,480**	**6.4**	**0.1**	**62,284**

Sources:

- 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 and emission factors for carbon dioxide from: PG&E 2012. Pacific Gas and Electric Company. Community Wide GHG Inventory Report for City of Manteca 2005 and 2010.

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

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
San Joaquin Valley	685,306	291	0.0270	0.0004	264
Manteca	66,210	28	0	0	26
Percent Manteca/SJV	9.7%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
San Joaquin Valley	685,306	261	0.028	0.00025	238
Manteca	66,210	25	0	0	23
Percent Manteca/SJV	9.7%				

Total Manteca	**49**

Notes:
Emissions for San Joaquin Valley County are from OFFROAD2007 for the year assessed; emissions from Manteca are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, generators, industrial equipment, lawn and garden equipment, light commercial equipment, other portable equipment, and transport refrigeration units. Emissions from pleasure craft (boats), railyard operations, dredging, logging equipment, oil drilling, airport ground support equipment, and military tactical support equipment were not included, as those are not substantial sources within the City.

The agricultural equipment are the "agricultural equipment" source in OFFROAD2007.

Community Greenhouse Gas Inventory

Summary

Year: 2020

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

	Data	Source
Manteca Information		
Population	85,605	SJCOG 2004
Housing	24,986	SJCOG 2004
Employment	15,722	SJCOG 2004
San Joaquin County Information		
Population	790,623	SJCOG 2011
State of California Information		
Population	40,817,839	DOF 2012

Summary

Sectors	MTCO2e
Motor vehicles	275,507
Electricity - residential	61,212
Electricity - commercial	35,646
Natural gas - residential	65,249
Natural gas - commercial	13,526
Waste	21,586
ODS substitutes	75,711
Total	548,437

Sources:

San Joaquin Council of Governments (SJCOG). 2004. Staff Report, 2005-2030 Population and Employment Projections. Website: www.sjcog.org/docs/pdf/census/projections.pdf.

San Joaquin Council of Governments (SJCOG) and Eberhardt School of Business, Business Forecasting Center. June 2011. Website: www.sjcog.org/docs/pdf/census/ra_jun11.pdf. Accessed June 23, 2012.

California Department of Finance (DOF). 2012. Demographic Research Unit. Interim Population Projections for California and its Counties 2010-2050. Website: www.dof.ca.gov/research/demographic/reports/projections/interim/view.php. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Waste

Year: 2020

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Waste Percentages	*Percent waste*	*Emission Factor (MT methane/wet short ton waste)*	*Weighted EF*
Mixed MSW	28.6%	0.060	0.0172
Newspaper	1.3%	0.043	0.0006
Office paper	1.9%	0.203	0.0039
Corrugated containers	5.2%	0.120	0.0062
Magazines/Third-Class Mail	9.0%	0.049	0.0044
Food scraps	15.5%	0.078	0.0121
Grass	1.9%	0.038	0.0007
Leaves	1.9%	0.013	0.0002
Branches	3.3%	0.062	0.0020
Dimensional lumber	14.5%	0.062	0.0090
Textiles	2.2%	0.073	0.0016
Construction/demolition	14.6%	0.012	0.0018
Medical waste	0.0%	0.045	0.0000
Sludge/manure	0.1%	0.015	0.0000
Total	100.0%		**0.0597**

Methane Emissions

Desination Facility	*LFG Collection Effciency*	*Waste Generated by City (tons)*	*Methane emissions (MTCO2e)*
All landfills	0.75	76531	21586

Emissions (MTCO2e)	21,586	
Emissions (MTCO2e/person)	0.25	Emissions / Manteca population
Waste per person (tons)	0.894	(in 2010)
Manteca population	85,605	

Sources:

Methodology: ICLEI. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Public Comment Draft. July 2012. Website: www.icleiusa.org/tools/ghg-protocol/community-protocol/public-comment-on-the-community-protocol. Accessed July 20, 2012. (Appendix E: Solid Waste Emissions Activities and Sources, Equation SW.4.1 Methane Emissions)

Source of waste generated: Use of 2010 waste per person applied to manteca population.

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.

Community Greenhouse Gas Inventory

Ozone Depleting Substance Substitutes

Year: 2020

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

California

Emissions (MMTCO2e)	36.1
Population	40,817,839
Emissions (MTCO2e per person)	0.88

Manteca

Population	85,605
Emissions (MTCO2e)	75,711

(estimated by using California per person emissions)

California emissions from: California Air Resources Board. Greenhouse Gas Inventory - 2020 Emissions Forecast. Website: http://www.arb.ca.gov/cc/inventory/data/forecast.htm. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2020
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day	1,443,281	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	526,797,565	Source: VMT per day * 365 days/year

Speed bins	AM peak	PM peak	Off peak	Total	Speed
10-15	508	614	167	**1289**	10
15-20	668	669	1476	**2813**	15
20-25	17408	23263	48703	**89374**	20
25-30	31400	31408	49921	**112729**	25
30-35	57380	67241	113388	**238009**	30
35-40	56621	46233	55990	**158844**	35
40-45	47202	63418	27305	**137925**	40
45-50	22082	16334	99011	**137427**	45
50-55	2112	2820	60662	**65594**	50
55-60	22643	81029	83073	**186745**	55
60-65	78796	61123	162612	**302531**	60
Total	**336820**	**394152**	**702308**	**1433280**	

Source: Kittelson & Associates. 2012. Development of On-Road Mobile Source Activity Data for GHG Emission Calculations. City of Manteca Climate Action Plan.

Nitrous oxide and methane emissions from 2010 emissions per 1000 VMT/day estimates

Methane (metric tons)	14.46	0.010	emissions per 1000 vmt/day
Nitrous Oxide (metric tons)	17.50	0.012	emissions per 1000 vmt/day

VMT/day per speed bin

Speed (mph)	10	15	20	25	30	35	40	45	50	55	60
VMT/day	1289	2813	89374	112729	238009	158844	137925	137427	65594	186745	302531

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	45.95%	0.14%
LDT1	6.45%	0.01%
LDT2	16.01%	0.01%
LHD1	2.65%	1.83%
LHD2	0.18%	0.41%
MCY	0.64%	0.00%
MDV	16.72%	0.01%
MH	0.19%	0.04%
OBUS	0.06%	0.05%
SBUS	0.01%	0.05%
T6	0.24%	1.63%
T7	0.04%	6.54%
UBUS	0.02%	0.12%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.0%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	46.6%	LDA, MCY
DSL	Heavy duty	8.4%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.3%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2020
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emission factors (g CO2/mile)

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	826	629	509	421	362	324	300	289	288	300	322
	LDT1	954	728	588	487	419	374	347	334	333	346	372
	LDT2	1123	857	693	573	493	440	408	393	392	408	437
	LHD1	2036	1392	1006	768	619	528	475	452	454	482	0
	LHD2	2036	1392	1006	768	619	528	475	452	454	482	0
	MCY	240	203	177	159	147	140	137	139	145	158	177
	MDV	1431	1092	882	730	628	561	520	501	499	520	557
	MH	2036	1392	1006	768	619	528	475	452	454	482	541
	OBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	SBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	T6	2036	1392	1006	768	619	528	475	452	454	482	541
	T7	2036	1392	1006	768	619	528	475	452	454	482	541
	UBUS	2036	1392	1006	768	619	528	475	452	454	482	541

Emission factors (g CO2/mile)

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	442	378	335	307	290	283	286	297	319	354	407
	LDT1	444	381	337	310	293	286	289	300	322	357	409
	LDT2	442	378	335	307	291	284	286	298	319	354	407
	LHD1	521	521	521	521	521	521	521	521	521	521	0
	LHD2	521	521	521	521	521	521	521	521	521	521	0
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	447	380	336	307	290	283	285	297	319	356	410
	MH	2168	1780	1461	1310	1230	1163	1110	1071	1045	1033	1035
	OBUS	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164
	SBUS	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038
	T6	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016
	T7	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568
	UBUS	2447	2447	2447	2447	2447	2447	2447	2447	2447	2447	2447

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2020
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

VMT/day by Vehicle Class and speed

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	592	1292	41065	51796	109359	72985	63373	63144	30139	85804	139005
	LDT1	83	181	5762	7267	15343	10240	8891	8859	4229	12039	19503
	LDT2	206	450	14307	18046	38101	25428	22080	22000	10501	29895	48430
	LHD1	34	75	2368	2987	6306	4208	3654	3641	1738	4948	8015
	LHD2	2	5	165	208	440	293	255	254	121	345	559
	MCY	8	18	572	721	1522	1016	882	879	420	1194	1935
	MDV	215	470	14940	18844	39786	26553	23056	22973	10965	31217	50572
	MH	2	5	173	218	461	307	267	266	127	361	586
	OBUS	1	2	51	64	135	90	78	78	37	106	172
	SBUS	0	0	12	15	31	21	18	18	9	24	40
	T6	3	7	212	267	564	377	327	326	156	443	717
	T7	1	1	37	47	99	66	58	57	27	78	126
	UBUS	0	1	22	28	59	39	34	34	16	46	75

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	2	4	123	156	329	219	190	190	91	258	418
	LDT1	0	0	8	10	20	13	12	12	6	16	26
	LDT2	0	0	7	9	19	13	11	11	5	15	25
	LHD1	24	52	1637	2064	4359	2909	2526	2517	1201	3420	5540
	LHD2	5	11	364	460	970	648	562	560	267	761	1233
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	0	0	12	15	32	21	19	18	9	25	41
	MH	0	1	34	43	91	61	53	53	25	72	116
	OBUS	1	2	49	61	130	87	75	75	36	102	165
	SBUS	1	1	44	55	116	77	67	67	32	91	147
	T6	21	46	1457	1838	3880	2589	2248	2240	1069	3044	4932
	T7	84	184	5844	7372	15564	10387	9019	8987	4289	12212	19783
	UBUS	2	3	109	138	292	195	169	168	80	229	371

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2020
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	196	327	8,394	8,759	15,916	9,488	7,636	7,321	3,485	10,327	17,943	**89,793**
LDT1	32	53	1,361	1,420	2,580	1,538	1,238	1,187	565	1,674	2,909	**14,558**
LDT2	93	155	3,978	4,152	7,544	4,497	3,619	3,470	1,652	4,894	8,505	**42,559**
LHD1	28	42	956	921	1,568	892	697	661	317	958	0	**7,041**
LHD2	2	3	67	64	109	62	49	46	22	67	0	**491**
MCY	1	1	41	46	90	57	49	49	24	76	138	**571**
MDV	124	206	5,293	5,524	10,037	5,983	4,815	4,617	2,198	6,512	11,316	**56,628**
MH	2	3	70	67	115	65	51	48	23	70	127	**642**
OBUS	1	1	21	20	34	19	15	14	7	21	37	**188**
SBUS	0	0	5	5	8	4	3	3	2	5	9	**43**
T6	2	4	86	82	140	80	62	59	28	86	156	**786**
T7	0	1	15	15	25	14	11	10	5	15	27	**138**
UBUS	0	0	9	9	15	8	6	6	3	9	16	**82**
Total	**482**	**796**	**20,295**	**21,084**	**38,181**	**22,708**	**18,252**	**17,493**	**8,332**	**24,714**	**41,184**	**213,520**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	1	17	19	38	25	22	23	12	37	68	**261**
LDT1	0	0	1	1	2	2	1	1	1	2	4	**16**
LDT2	0	0	1	1	2	1	1	1	1	2	4	**15**
LHD1	5	11	343	432	912	609	529	527	251	716	0	**4,335**
LHD2	1	2	76	96	203	136	118	117	56	159	0	**965**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	2	2	4	2	2	2	1	4	7	**25**
MH	0	1	20	23	45	28	24	23	11	30	48	**252**
OBUS	1	1	33	39	79	52	42	43	20	55	77	**441**
SBUS	1	1	25	29	57	36	30	29	13	38	61	**320**
T6	18	32	807	950	1,882	1,188	984	946	441	1,240	2,013	**10,501**
T7	111	199	4,997	5,878	11,649	7,353	6,093	5,856	2,728	7,677	12,457	**64,998**
UBUS	2	3	108	136	286	191	166	165	79	225	364	**1,725**
Total	**139**	**252**	**6,428**	**7,605**	**15,161**	**9,623**	**8,012**	**7,733**	**3,613**	**10,185**	**15,104**	**83,855**

Total Emissions

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	297,376	269,779	269,779
Methane		14	304
Nitrous oxide		17	5,424
Total			**275,507**

EMFAC 2011
2020 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
San Joaquin COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - San Joaquin, [year], season - annual average, vehicle category - all, fuel - all, model year - combined, speed - all, EMFAC2007 vehicle classifications) Website: www.arb.ca.gov/jpub/webapp/EMFAC2011WebApp/rateSelectionPage_1.jsp.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	LDA	GAS	5	0	0	0	0.000%
San Joaquin	2020	LDA	DSL	5	0	0	0	0.000%
San Joaquin	2020	LDA	GAS	10	1602	826	558	0.008%
San Joaquin	2020	LDA	DSL	10	5	442	301	0.000%
San Joaquin	2020	LDA	GAS	15	11687	629	425	0.059%
San Joaquin	2020	LDA	DSL	15	35	378	259	0.000%
San Joaquin	2020	LDA	GAS	20	40822	509	344	0.205%
San Joaquin	2020	LDA	DSL	20	123	335	231	0.001%
San Joaquin	2020	LDA	GAS	25	657828	421	285	3.306%
San Joaquin	2020	LDA	DSL	25	1977	307	212	0.010%
San Joaquin	2020	LDA	GAS	30	814481	362	245	4.093%
San Joaquin	2020	LDA	DSL	30	2447	290	202	0.012%
San Joaquin	2020	LDA	GAS	35	680928	324	219	3.422%
San Joaquin	2020	LDA	DSL	35	2046	283	197	0.010%
San Joaquin	2020	LDA	GAS	40	944745	300	203	4.748%
San Joaquin	2020	LDA	DSL	40	2839	286	199	0.014%
San Joaquin	2020	LDA	GAS	45	576115	289	195	2.895%
San Joaquin	2020	LDA	DSL	45	1731	297	206	0.009%
San Joaquin	2020	LDA	GAS	50	525262	288	195	2.640%
San Joaquin	2020	LDA	DSL	50	1578	319	220	0.008%
San Joaquin	2020	LDA	GAS	55	335955	300	203	1.688%
San Joaquin	2020	LDA	DSL	55	1010	354	243	0.005%
San Joaquin	2020	LDA	GAS	60	1595250	322	217	8.017%
San Joaquin	2020	LDA	DSL	60	4794	407	278	0.024%
San Joaquin	2020	LDA	GAS	65	2014249	360	243	10.122%
San Joaquin	2020	LDA	DSL	65	6053	484	329	0.030%
San Joaquin	2020	LDA	GAS	70	944396	385	260	4.746%
San Joaquin	2020	LDA	DSL	70	2838	599	404	0.014%
San Joaquin	2020	LDT1	GAS	5	0	0	0	0.000%
San Joaquin	2020	LDT1	DSL	5	0	0	0	0.000%
San Joaquin	2020	LDT1	GAS	10	225	954	674	0.001%
San Joaquin	2020	LDT1	DSL	10	0	444	296	0.000%
San Joaquin	2020	LDT1	GAS	15	1640	728	514	0.008%
San Joaquin	2020	LDT1	DSL	15	2	381	255	0.000%
San Joaquin	2020	LDT1	GAS	20	5727	588	415	0.029%
San Joaquin	2020	LDT1	DSL	20	8	337	228	0.000%
San Joaquin	2020	LDT1	GAS	25	92296	487	344	0.464%
San Joaquin	2020	LDT1	DSL	25	121	310	210	0.001%
San Joaquin	2020	LDT1	GAS	30	114275	419	296	0.574%
San Joaquin	2020	LDT1	DSL	30	150	293	200	0.001%
San Joaquin	2020	LDT1	GAS	35	95537	374	264	0.480%
San Joaquin	2020	LDT1	DSL	35	126	286	195	0.001%
San Joaquin	2020	LDT1	GAS	40	132552	347	245	0.666%
San Joaquin	2020	LDT1	DSL	40	174	289	197	0.001%
San Joaquin	2020	LDT1	GAS	45	80831	334	236	0.406%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	LDT1	DSL	45	106	300	204	0.001%
San Joaquin	2020	LDT1	GAS	50	73697	333	235	0.370%
San Joaquin	2020	LDT1	DSL	50	97	322	218	0.000%
San Joaquin	2020	LDT1	GAS	55	47136	346	245	0.237%
San Joaquin	2020	LDT1	DSL	55	62	357	240	0.000%
San Joaquin	2020	LDT1	GAS	60	223820	372	262	1.125%
San Joaquin	2020	LDT1	DSL	60	294	409	273	0.001%
San Joaquin	2020	LDT1	GAS	65	282608	415	293	1.420%
San Joaquin	2020	LDT1	DSL	65	372	487	323	0.002%
San Joaquin	2020	LDT1	GAS	70	132503	445	314	0.666%
San Joaquin	2020	LDT1	DSL	70	174	601	395	0.001%
San Joaquin	2020	LDT2	GAS	5	0	0	0	0.000%
San Joaquin	2020	LDT2	DSL	5	0	0	0	0.000%
San Joaquin	2020	LDT2	GAS	10	558	1123	835	0.003%
San Joaquin	2020	LDT2	DSL	10	0	442	322	0.000%
San Joaquin	2020	LDT2	GAS	15	4072	857	637	0.020%
San Joaquin	2020	LDT2	DSL	15	2	378	277	0.000%
San Joaquin	2020	LDT2	GAS	20	14223	693	515	0.071%
San Joaquin	2020	LDT2	DSL	20	7	335	246	0.000%
San Joaquin	2020	LDT2	GAS	25	229192	573	426	1.152%
San Joaquin	2020	LDT2	DSL	25	117	307	227	0.001%
San Joaquin	2020	LDT2	GAS	30	283771	493	366	1.426%
San Joaquin	2020	LDT2	DSL	30	144	291	215	0.001%
San Joaquin	2020	LDT2	GAS	35	237240	440	327	1.192%
San Joaquin	2020	LDT2	DSL	35	121	284	210	0.001%
San Joaquin	2020	LDT2	GAS	40	329156	408	303	1.654%
San Joaquin	2020	LDT2	DSL	40	168	286	212	0.001%
San Joaquin	2020	LDT2	GAS	45	200722	393	292	1.009%
San Joaquin	2020	LDT2	DSL	45	102	298	220	0.001%
San Joaquin	2020	LDT2	GAS	50	183005	392	291	0.920%
San Joaquin	2020	LDT2	DSL	50	93	319	235	0.000%
San Joaquin	2020	LDT2	GAS	55	117049	408	303	0.588%
San Joaquin	2020	LDT2	DSL	55	60	354	260	0.000%
San Joaquin	2020	LDT2	GAS	60	555797	437	325	2.793%
San Joaquin	2020	LDT2	DSL	60	283	407	297	0.001%
San Joaquin	2020	LDT2	GAS	65	701779	489	363	3.527%
San Joaquin	2020	LDT2	DSL	65	357	485	352	0.002%
San Joaquin	2020	LDT2	GAS	70	329034	524	389	1.653%
San Joaquin	2020	LDT2	DSL	70	167	599	433	0.001%
San Joaquin	2020	LHD1	GAS	5	14962	2513	2262	0.075%
San Joaquin	2020	LHD1	DSL	5	6408	521	469	0.032%
San Joaquin	2020	LHD1	GAS	10	39015	2036	1833	0.196%
San Joaquin	2020	LHD1	DSL	10	21311	521	469	0.107%
San Joaquin	2020	LHD1	GAS	15	88843	1392	1253	0.446%
San Joaquin	2020	LHD1	DSL	15	46152	521	469	0.232%
San Joaquin	2020	LHD1	GAS	20	102657	1006	905	0.516%
San Joaquin	2020	LHD1	DSL	20	50598	521	469	0.254%
San Joaquin	2020	LHD1	GAS	25	79077	768	691	0.397%
San Joaquin	2020	LHD1	DSL	25	54153	521	469	0.272%
San Joaquin	2020	LHD1	GAS	30	69930	619	557	0.351%
San Joaquin	2020	LHD1	DSL	30	45712	521	469	0.230%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	LHD1	GAS	35	26130	528	475	0.131%
San Joaquin	2020	LHD1	DSL	35	24124	521	469	0.121%
San Joaquin	2020	LHD1	GAS	40	7713	475	428	0.039%
San Joaquin	2020	LHD1	DSL	40	13243	521	469	0.067%
San Joaquin	2020	LHD1	GAS	45	9496	452	407	0.048%
San Joaquin	2020	LHD1	DSL	45	14294	521	469	0.072%
San Joaquin	2020	LHD1	GAS	50	70114	454	409	0.352%
San Joaquin	2020	LHD1	DSL	50	55193	521	469	0.277%
San Joaquin	2020	LHD1	GAS	55	19285	482	434	0.097%
San Joaquin	2020	LHD1	DSL	55	33238	521	469	0.167%
San Joaquin	2020	LHD2	GAS	5	1043	2513	2262	0.005%
San Joaquin	2020	LHD2	DSL	5	1426	521	469	0.007%
San Joaquin	2020	LHD2	GAS	10	2721	2036	1833	0.014%
San Joaquin	2020	LHD2	DSL	10	4744	521	469	0.024%
San Joaquin	2020	LHD2	GAS	15	6196	1392	1253	0.031%
San Joaquin	2020	LHD2	DSL	15	10273	521	469	0.052%
San Joaquin	2020	LHD2	GAS	20	7159	1006	905	0.036%
San Joaquin	2020	LHD2	DSL	20	11263	521	469	0.057%
San Joaquin	2020	LHD2	GAS	25	5515	768	691	0.028%
San Joaquin	2020	LHD2	DSL	25	12054	521	469	0.061%
San Joaquin	2020	LHD2	GAS	30	4877	619	557	0.025%
San Joaquin	2020	LHD2	DSL	30	10175	521	469	0.051%
San Joaquin	2020	LHD2	GAS	35	1822	528	475	0.009%
San Joaquin	2020	LHD2	DSL	35	5370	521	469	0.027%
San Joaquin	2020	LHD2	GAS	40	538	475	428	0.003%
San Joaquin	2020	LHD2	DSL	40	2948	521	469	0.015%
San Joaquin	2020	LHD2	GAS	45	662	452	407	0.003%
San Joaquin	2020	LHD2	DSL	45	3182	521	469	0.016%
San Joaquin	2020	LHD2	GAS	50	4890	454	409	0.025%
San Joaquin	2020	LHD2	DSL	50	12286	521	469	0.062%
San Joaquin	2020	LHD2	GAS	55	1345	482	434	0.007%
San Joaquin	2020	LHD2	DSL	55	7399	521	469	0.037%
San Joaquin	2020	MCY	GAS	5	0	0	0	0.000%
San Joaquin	2020	MCY	GAS	10	22	240	216	0.000%
San Joaquin	2020	MCY	GAS	15	163	203	183	0.001%
San Joaquin	2020	MCY	GAS	20	568	177	160	0.003%
San Joaquin	2020	MCY	GAS	25	9157	159	143	0.046%
San Joaquin	2020	MCY	GAS	30	11338	147	132	0.057%
San Joaquin	2020	MCY	GAS	35	9479	140	126	0.048%
San Joaquin	2020	MCY	GAS	40	13151	137	124	0.066%
San Joaquin	2020	MCY	GAS	45	8020	139	125	0.040%
San Joaquin	2020	MCY	GAS	50	7312	145	131	0.037%
San Joaquin	2020	MCY	GAS	55	4677	158	142	0.024%
San Joaquin	2020	MCY	GAS	60	22206	177	159	0.112%
San Joaquin	2020	MCY	GAS	65	28039	206	186	0.141%
San Joaquin	2020	MCY	GAS	70	13146	251	225	0.066%
San Joaquin	2020	MDV	GAS	5	0	0	0	0.000%
San Joaquin	2020	MDV	DSL	5	0	0	0	0.000%
San Joaquin	2020	MDV	GAS	10	583	1431	1115	0.003%
San Joaquin	2020	MDV	DSL	10	0	447	344	0.000%
San Joaquin	2020	MDV	GAS	15	4252	1092	851	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	MDV	DSL	15	3	380	294	0.000%
San Joaquin	2020	MDV	GAS	20	14852	882	688	0.075%
San Joaquin	2020	MDV	DSL	20	12	336	260	0.000%
San Joaquin	2020	MDV	GAS	25	239328	730	569	1.203%
San Joaquin	2020	MDV	DSL	25	192	307	238	0.001%
San Joaquin	2020	MDV	GAS	30	296321	628	490	1.489%
San Joaquin	2020	MDV	DSL	30	238	290	225	0.001%
San Joaquin	2020	MDV	GAS	35	247732	561	437	1.245%
San Joaquin	2020	MDV	DSL	35	199	283	220	0.001%
San Joaquin	2020	MDV	GAS	40	343713	520	405	1.727%
San Joaquin	2020	MDV	DSL	40	276	285	221	0.001%
San Joaquin	2020	MDV	GAS	45	209600	501	390	1.053%
San Joaquin	2020	MDV	DSL	45	168	297	230	0.001%
San Joaquin	2020	MDV	GAS	50	191099	499	389	0.960%
San Joaquin	2020	MDV	DSL	50	153	319	247	0.001%
San Joaquin	2020	MDV	GAS	55	122226	520	405	0.614%
San Joaquin	2020	MDV	DSL	55	98	356	275	0.000%
San Joaquin	2020	MDV	GAS	60	580377	557	434	2.917%
San Joaquin	2020	MDV	DSL	60	466	410	316	0.002%
San Joaquin	2020	MDV	GAS	65	732816	623	486	3.683%
San Joaquin	2020	MDV	DSL	65	588	490	377	0.003%
San Joaquin	2020	MDV	GAS	70	343586	668	520	1.727%
San Joaquin	2020	MDV	DSL	70	276	609	467	0.001%
San Joaquin	2020	MH	GAS	5	333	2513	2262	0.002%
San Joaquin	2020	MH	DSL	5	61	2388	2149	0.000%
San Joaquin	2020	MH	GAS	10	1674	2036	1833	0.008%
San Joaquin	2020	MH	DSL	10	306	2168	1951	0.002%
San Joaquin	2020	MH	GAS	15	2115	1392	1253	0.011%
San Joaquin	2020	MH	DSL	15	412	1780	1602	0.002%
San Joaquin	2020	MH	GAS	20	2194	1006	905	0.011%
San Joaquin	2020	MH	DSL	20	437	1461	1315	0.002%
San Joaquin	2020	MH	GAS	25	2445	768	691	0.012%
San Joaquin	2020	MH	DSL	25	456	1310	1179	0.002%
San Joaquin	2020	MH	GAS	30	2764	619	557	0.014%
San Joaquin	2020	MH	DSL	30	548	1230	1107	0.003%
San Joaquin	2020	MH	GAS	35	3435	528	475	0.017%
San Joaquin	2020	MH	DSL	35	646	1163	1047	0.003%
San Joaquin	2020	MH	GAS	40	4276	475	428	0.021%
San Joaquin	2020	MH	DSL	40	802	1110	999	0.004%
San Joaquin	2020	MH	GAS	45	3900	452	407	0.020%
San Joaquin	2020	MH	DSL	45	657	1071	964	0.003%
San Joaquin	2020	MH	GAS	50	3795	454	409	0.019%
San Joaquin	2020	MH	DSL	50	735	1045	941	0.004%
San Joaquin	2020	MH	GAS	55	4964	482	434	0.025%
San Joaquin	2020	MH	DSL	55	1077	1033	930	0.005%
San Joaquin	2020	MH	GAS	60	5728	541	487	0.029%
San Joaquin	2020	MH	DSL	60	1294	1035	931	0.007%
San Joaquin	2020	MH	GAS	65	895	641	577	0.004%
San Joaquin	2020	MH	DSL	65	204	1050	945	0.001%
San Joaquin	2020	OBUS	GAS	5	98	2513	2262	0.000%
San Joaquin	2020	OBUS	DSL	5	63	3024	2721	0.000%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	OBUS	GAS	10	492	2036	1833	0.002%
San Joaquin	2020	OBUS	DSL	10	290	2435	2192	0.001%
San Joaquin	2020	OBUS	GAS	15	621	1392	1253	0.003%
San Joaquin	2020	OBUS	DSL	15	382	1982	1784	0.002%
San Joaquin	2020	OBUS	GAS	20	645	1006	905	0.003%
San Joaquin	2020	OBUS	DSL	20	510	1680	1512	0.003%
San Joaquin	2020	OBUS	GAS	25	718	768	691	0.004%
San Joaquin	2020	OBUS	DSL	25	530	1566	1409	0.003%
San Joaquin	2020	OBUS	GAS	30	812	619	557	0.004%
San Joaquin	2020	OBUS	DSL	30	739	1524	1372	0.004%
San Joaquin	2020	OBUS	GAS	35	1009	528	475	0.005%
San Joaquin	2020	OBUS	DSL	35	1091	1507	1356	0.005%
San Joaquin	2020	OBUS	GAS	40	1256	475	428	0.006%
San Joaquin	2020	OBUS	DSL	40	1164	1398	1258	0.006%
San Joaquin	2020	OBUS	GAS	45	1146	452	407	0.006%
San Joaquin	2020	OBUS	DSL	45	1303	1423	1280	0.007%
San Joaquin	2020	OBUS	GAS	50	1115	454	409	0.006%
San Joaquin	2020	OBUS	DSL	50	1391	1379	1241	0.007%
San Joaquin	2020	OBUS	GAS	55	1458	482	434	0.007%
San Joaquin	2020	OBUS	DSL	55	1823	1339	1205	0.009%
San Joaquin	2020	OBUS	GAS	60	1683	541	487	0.008%
San Joaquin	2020	OBUS	DSL	60	1233	1164	1047	0.006%
San Joaquin	2020	OBUS	GAS	65	263	641	577	0.001%
San Joaquin	2020	OBUS	DSL	65	321	1344	1209	0.002%
San Joaquin	2020	SBUS	GAS	5	26	2513	2262	0.000%
San Joaquin	2020	SBUS	DSL	5	96	2632	2369	0.000%
San Joaquin	2020	SBUS	GAS	10	90	2036	1833	0.000%
San Joaquin	2020	SBUS	DSL	10	336	2174	1957	0.002%
San Joaquin	2020	SBUS	GAS	15	181	1392	1253	0.001%
San Joaquin	2020	SBUS	DSL	15	673	1785	1607	0.003%
San Joaquin	2020	SBUS	GAS	20	245	1006	905	0.001%
San Joaquin	2020	SBUS	DSL	20	913	1408	1268	0.005%
San Joaquin	2020	SBUS	GAS	25	388	768	691	0.002%
San Joaquin	2020	SBUS	DSL	25	1441	1314	1183	0.007%
San Joaquin	2020	SBUS	GAS	30	465	619	557	0.002%
San Joaquin	2020	SBUS	DSL	30	1729	1234	1110	0.009%
San Joaquin	2020	SBUS	GAS	35	477	528	475	0.002%
San Joaquin	2020	SBUS	DSL	35	1775	1167	1050	0.009%
San Joaquin	2020	SBUS	GAS	40	322	475	428	0.002%
San Joaquin	2020	SBUS	DSL	40	1198	1113	1002	0.006%
San Joaquin	2020	SBUS	GAS	45	155	452	407	0.001%
San Joaquin	2020	SBUS	DSL	45	575	1074	967	0.003%
San Joaquin	2020	SBUS	GAS	50	77	454	409	0.000%
San Joaquin	2020	SBUS	DSL	50	288	1048	943	0.001%
San Joaquin	2020	SBUS	GAS	55	115	482	434	0.001%
San Joaquin	2020	SBUS	DSL	55	428	1036	933	0.002%
San Joaquin	2020	SBUS	GAS	60	64	541	487	0.000%
San Joaquin	2020	SBUS	DSL	60	238	1038	934	0.001%
San Joaquin	2020	T6	GAS	5	408	2513	2262	0.002%
San Joaquin	2020	T6	DSL	5	2609	2578	2320	0.013%
San Joaquin	2020	T6	GAS	10	2052	2036	1833	0.010%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	T6	DSL	10	12987	2130	1917	0.065%
San Joaquin	2020	T6	GAS	15	2591	1392	1253	0.013%
San Joaquin	2020	T6	DSL	15	17528	1749	1574	0.088%
San Joaquin	2020	T6	GAS	20	2688	1006	905	0.014%
San Joaquin	2020	T6	DSL	20	18589	1379	1241	0.093%
San Joaquin	2020	T6	GAS	25	2995	768	691	0.015%
San Joaquin	2020	T6	DSL	25	19360	1287	1158	0.097%
San Joaquin	2020	T6	GAS	30	3386	619	557	0.017%
San Joaquin	2020	T6	DSL	30	23279	1208	1087	0.117%
San Joaquin	2020	T6	GAS	35	4209	528	475	0.021%
San Joaquin	2020	T6	DSL	35	27449	1143	1028	0.138%
San Joaquin	2020	T6	GAS	40	5239	475	428	0.026%
San Joaquin	2020	T6	DSL	40	34073	1090	981	0.171%
San Joaquin	2020	T6	GAS	45	4778	452	407	0.024%
San Joaquin	2020	T6	DSL	45	27901	1052	947	0.140%
San Joaquin	2020	T6	GAS	50	4650	454	409	0.023%
San Joaquin	2020	T6	DSL	50	31226	1027	924	0.157%
San Joaquin	2020	T6	GAS	55	6082	482	434	0.031%
San Joaquin	2020	T6	DSL	55	45759	1015	913	0.230%
San Joaquin	2020	T6	GAS	60	7018	541	487	0.035%
San Joaquin	2020	T6	DSL	60	54987	1016	915	0.276%
San Joaquin	2020	T6	GAS	65	1097	641	577	0.006%
San Joaquin	2020	T6	DSL	65	8653	1031	928	0.043%
San Joaquin	2020	T7	GAS	5	30	2513	2262	0.000%
San Joaquin	2020	T7	DSL	5	4696	3978	3580	0.024%
San Joaquin	2020	T7	GAS	10	148	2036	1833	0.001%
San Joaquin	2020	T7	DSL	10	17937	3286	2957	0.090%
San Joaquin	2020	T7	GAS	15	161	1392	1253	0.001%
San Joaquin	2020	T7	DSL	15	21937	2698	2428	0.110%
San Joaquin	2020	T7	GAS	20	276	1006	905	0.001%
San Joaquin	2020	T7	DSL	20	54300	2130	1917	0.273%
San Joaquin	2020	T7	GAS	25	360	768	691	0.002%
San Joaquin	2020	T7	DSL	25	49549	1986	1787	0.249%
San Joaquin	2020	T7	GAS	30	657	619	557	0.003%
San Joaquin	2020	T7	DSL	30	83653	1864	1678	0.420%
San Joaquin	2020	T7	GAS	35	1168	528	475	0.006%
San Joaquin	2020	T7	DSL	35	150494	1763	1587	0.756%
San Joaquin	2020	T7	GAS	40	1019	475	428	0.005%
San Joaquin	2020	T7	DSL	40	142022	1683	1514	0.714%
San Joaquin	2020	T7	GAS	45	1078	452	407	0.005%
San Joaquin	2020	T7	DSL	45	198840	1623	1461	0.999%
San Joaquin	2020	T7	GAS	50	1128	454	409	0.006%
San Joaquin	2020	T7	DSL	50	206789	1584	1426	1.039%
San Joaquin	2020	T7	GAS	55	1655	482	434	0.008%
San Joaquin	2020	T7	DSL	55	252167	1566	1409	1.267%
San Joaquin	2020	T7	GAS	60	409	541	487	0.002%
San Joaquin	2020	T7	DSL	60	76819	1568	1412	0.386%
San Joaquin	2020	T7	GAS	65	219	641	577	0.001%
San Joaquin	2020	T7	DSL	65	42075	1592	1432	0.211%
San Joaquin	2020	UBUS	GAS	5	49	2513	2262	0.000%
San Joaquin	2020	UBUS	DSL	5	242	2447	2202	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
San Joaquin	2020	UBUS	GAS	10	174	2036	1833	0.001%
San Joaquin	2020	UBUS	DSL	10	867	2447	2202	0.004%
San Joaquin	2020	UBUS	GAS	15	349	1392	1253	0.002%
San Joaquin	2020	UBUS	DSL	15	1734	2447	2202	0.009%
San Joaquin	2020	UBUS	GAS	20	460	1006	905	0.002%
San Joaquin	2020	UBUS	DSL	20	2289	2447	2202	0.012%
San Joaquin	2020	UBUS	GAS	25	694	768	691	0.003%
San Joaquin	2020	UBUS	DSL	25	3447	2447	2202	0.017%
San Joaquin	2020	UBUS	GAS	30	868	619	557	0.004%
San Joaquin	2020	UBUS	DSL	30	4314	2447	2202	0.022%
San Joaquin	2020	UBUS	GAS	35	851	528	475	0.004%
San Joaquin	2020	UBUS	DSL	35	4227	2447	2202	0.021%
San Joaquin	2020	UBUS	GAS	40	613	475	428	0.003%
San Joaquin	2020	UBUS	DSL	40	3048	2447	2202	0.015%
San Joaquin	2020	UBUS	GAS	45	267	452	407	0.001%
San Joaquin	2020	UBUS	DSL	45	1329	2447	2202	0.007%
San Joaquin	2020	UBUS	GAS	50	136	454	409	0.001%
San Joaquin	2020	UBUS	DSL	50	675	2447	2202	0.003%
San Joaquin	2020	UBUS	GAS	55	168	482	434	0.001%
San Joaquin	2020	UBUS	DSL	55	837	2447	2202	0.004%
San Joaquin	2020	UBUS	GAS	60	276	541	487	0.001%
San Joaquin	2020	UBUS	DSL	60	1370	2447	2202	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.559	(average of 2005-2009 factors)
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	239,666,142	2,800	66987	3.7	1.3	61,212
Commercial	139,568,533	8,877	39009	2.2	0.8	35,646
Industrial			0	0.0	0.0	0
Total	**379,234,675**		**105,996**	**5.9**	**2.1**	**96,858**

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) CO2	CH4	N2O	Emissions MTCO2e
Residential	12,263,219	143	71,740	6.7	0.1	65,249
Commercial	2,542,177	162	14,872	1.4	0.0	13,526
Industrial			0	0.0	0.0	0
Total	**14,805,396**		**86,612**	**8.1**	**0.2**	**78,775**

Sources:

- 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)

- Emission factors for carbon dioxide from: PG&E 2012. Pacific Gas and Electric Company. Community Wide GHG Inventory Report for City of Manteca 2005 and 2010.

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

- Data is forecast by using 2010 per capita usage rates.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2020

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Agricultural Equipment

Location	Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
San Joaquin Valley	790,623	285	0.0120	0.0002	259
Manteca	85,605	31	0	0	28
Percent Manteca/SJV	10.8%				

Other Equipment

Location	Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
San Joaquin Valley	790,623	296	0.018	0.00018	269
Manteca	85,605	32	0	0	29
Percent Manteca/SJV	10.8%				

Total Manteca **57**

Notes:
Emissions for San Joaquin Valley County are from OFFROAD2007 for the year assessed; emissions from Manteca are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, generators, industrial equipment, lawn and garden equipment, light commercial equipment, other portable equipment, and transport refrigeration units. Emissions from pleasure craft (boats), railyard operations, dredging, logging equipment, oil drilling, airport ground support equipment, and military tactical support equipment were not included, as those are not substantial sources within the City.

Community Greenhouse Gas Inventory

Summary

Year: 2020 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

	Data	Source
Manteca Information		
Population	85,605	SJCOG 2004
Housing	24,986	SJCOG 2004
Employment	15,722	SJCOG 2004
San Joaquin County Information		
Population	790,623	SJCOG 2011
State of California Information		
Population	40,817,839	DOF 2012

Summary

Sectors	**MTCO2e**
Motor vehicles	210,064
Electricity - residential	48,722
Electricity - commercial	28,373
Natural gas - residential	65,249
Natural gas - commercial	13,526
Waste	21,586
ODS substitutes	62,688
Total	**450,209**

Sources:

San Joaquin Council of Governments (SJCOG). 2004. Staff Report, 2005-2030 Population and Employment Projections. Website: www.sjcog.org/docs/pdf/census/projections.pdf.

San Joaquin Council of Governments (SJCOG) and Eberhardt School of Business, Business Forecasting Center. June 2011. Website: www.sjcog.org/docs/pdf/census/ra_jun11.pdf. Accessed June 23, 2012.

California Department of Finance (DOF). 2012. Demographic Research Unit. Interim Population Projections for California and its Counties 2010-2050. Website: www.dof.ca.gov/research/demographic/reports/projections/interim/view.php. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Waste

Year: 2020 (with regulation)

Prepared by Michael Brandman Associates

Waste Percentages	*Percent waste*	*Emission Factor (MT methane/wet short ton waste)*	*Weighted EF*
Mixed MSW	28.6%	0.060	0.0172
Newspaper	1.3%	0.043	0.0006
Office paper	1.9%	0.203	0.0039
Corrugated containers	5.2%	0.120	0.0062
Magazines/Third-Class Mail	9.0%	0.049	0.0044
Food scraps	15.5%	0.078	0.0121
Grass	1.9%	0.038	0.0007
Leaves	1.9%	0.013	0.0002
Branches	3.3%	0.062	0.0020
Dimensional lumber	14.5%	0.062	0.0090
Textiles	2.2%	0.073	0.0016
Construction/demolition	14.6%	0.012	0.0018
Medical waste	0.0%	0.045	0.0000
Sludge/manure	0.1%	0.015	0.0000
Total	100.0%		**0.0597**

Methane Emissions

Desination Facility	*LFG Collection Effciency*	*Waste Generated by City (tons)*	*Methane emissions (MTCO2e)*
All landfills	0.75	76531	21586

Emissions (MTCO2e)	21,586	
Emissions (MTCO2e/person)	0.25	Emissions / Manteca population
Waste per person (tons)	0.894	(in 2010)
Manteca population	85,605	

Sources:

Methodology: ICLEI. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Public Comment Draft. July 2012. Website: www.icleiusa.org/tools/ghg-protocol/community-protocol/public-comment-on-the-community-protocol. Accessed July 20, 2012. (Appendix E: Solid Waste Emissions Activities and Sources, Equation SW.4.1 Methane Emissions)

Source of waste generated: Use of 2010 waste per person applied to manteca population.

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.

Community Greenhouse Gas Inventory

Ozone Depleting Substance Substitutes

Year: 2020 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

California

Emissions (MMTCO2e)	36.1
Population	40,817,839
Emissions (MTCO2e per person)	0.88

Manteca

Population	85,605
Emissions (MTCO2e)	75,711
Regulation percent reduction	17.2%
Emissions with regulation (MTCO2e)	62,688
(estimated by using California per person emissions)	
Reductions (MTCO2e)	13,022

California emissions from: California Air Resources Board. Greenhouse Gas Inventory - 2020 Emissions Forecast. Website: http://www.arb.ca.gov/cc/inventory/data/forecast.htm. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2020 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day	1,443,281	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	526,797,565	Source: VMT per day * 365 days/year

Speed bins	AM peak	PM peak	Off peak	Total	Speed
10-15	508	614	167	**1289**	10
15-20	668	669	1476	**2813**	15
20-25	17408	23263	48703	**89374**	20
25-30	31400	31408	49921	**112729**	25
30-35	57380	67241	113388	**238009**	30
35-40	56621	46233	55990	**158844**	35
40-45	47202	63418	27305	**137925**	40
45-50	22082	16334	99011	**137427**	45
50-55	2112	2820	60662	**65594**	50
55-60	22643	81029	83073	**186745**	55
60-65	78796	61123	162612	**302531**	60
Total	**336820**	**394152**	**702308**	**1433280**	

Source: Kittelson & Associates. 2012. Development of On-Road Mobile Source Activity Data for GHG Emission Calculations. City of Manteca Climate Action Plan.

Nitrous oxide and methane emissions from 2010 emissions per 1000 VMT/day estimates

Methane (metric tons)	14.46	0.010	emissions per 1000 vmt/day
Nitrous Oxide (metric tons)	17.50	0.012	emissions per 1000 vmt/day

VMT/day per speed bin

Speed (mph)	10	15	20	25	30	35	40	45	50	55	60
VMT/day	1289	2813	89374	112729	238009	158844	137925	137427	65594	186745	302531

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL	Total
LDA	45.95%	0.14%	46.09%
LDT1	6.45%	0.01%	6.46%
LDT2	16.01%	0.01%	16.02%
LHD1	2.65%	1.83%	4.48%
LHD2	0.18%	0.41%	0.59%
MCY	0.64%	0.00%	0.64%
MDV	16.72%	0.01%	16.73%
MH	0.19%	0.04%	0.23%
OBUS	0.06%	0.05%	0.11%
SBUS	0.01%	0.05%	0.06%
T6	0.24%	1.63%	1.87%
T7	0.04%	6.54%	6.58%
UBUS	0.02%	0.12%	0.15%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.0%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	46.6%	LDA, MCY
DSL	Heavy duty	8.4%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.3%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2020 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emission factors (g CO2/mile)
Note: Pavley I + LCFS factors are used

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	558	425	344	285	245	219	203	195	195	203	217
	LDT1	674	514	415	344	296	264	245	236	235	245	262
	LDT2	835	637	515	426	366	327	303	292	291	303	325
	LHD1	1833	1253	905	691	557	475	428	407	409	434	0
	LHD2	1833	1253	905	691	557	475	428	407	409	434	0
	MCY	216	183	160	143	132	126	124	125	131	142	159
	MDV	1115	851	688	569	490	437	405	390	389	405	434
	MH	1833	1253	905	691	557	475	428	407	409	434	487
	OBUS	1833	1253	905	691	557	475	428	407	409	434	487
	SBUS	1833	1253	905	691	557	475	428	407	409	434	487
	T6	1833	1253	905	691	557	475	428	407	409	434	487
	T7	1833	1253	905	691	557	475	428	407	409	434	487
	UBUS	1833	1253	905	691	557	475	428	407	409	434	487

Emission factors (g CO2/mile)
Note: Pavley I + LCFS factors are used

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	301	259	231	212	202	197	199	206	220	243	278
	LDT1	296	255	228	210	200	195	197	204	218	240	273
	LDT2	322	277	246	227	215	210	212	220	235	260	297
	LHD1	469	469	469	469	469	469	469	469	469	469	0
	LHD2	469	469	469	469	469	469	469	469	469	469	0
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	344	294	260	238	225	220	221	230	247	275	316
	MH	1951	1602	1315	1179	1107	1047	999	964	941	930	931
	OBUS	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047
	SBUS	1957	1607	1268	1183	1110	1050	1002	967	943	933	934
	T6	1917	1574	1241	1158	1087	1028	981	947	924	913	915
	T7	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412
	UBUS	2202	2202	2202	2202	2202	2202	2202	2202	2202	2202	2202

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2020 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

VMT/day by Vehicle Class and speed

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	592	1292	41065	51796	109359	72985	63373	63144	30139	85804	139005
	LDT1	83	181	5762	7267	15343	10240	8891	8859	4229	12039	19503
	LDT2	206	450	14307	18046	38101	25428	22080	22000	10501	29895	48430
	LHD1	34	75	2368	2987	6306	4208	3654	3641	1738	4948	8015
	LHD2	2	5	165	208	440	293	255	254	121	345	559
	MCY	8	18	572	721	1522	1016	882	879	420	1194	1935
	MDV	215	470	14940	18844	39786	26553	23056	22973	10965	31217	50572
	MH	2	5	173	218	461	307	267	266	127	361	586
	OBUS	1	2	51	64	135	90	78	78	37	106	172
	SBUS	0	0	12	15	31	21	18	18	9	24	40
	T6	3	7	212	267	564	377	327	326	156	443	717
	T7	1	1	37	47	99	66	58	57	27	78	126
	UBUS	0	1	22	28	59	39	34	34	16	46	75

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	2	4	123	156	329	219	190	190	91	258	418
	LDT1	0	0	8	10	20	13	12	12	6	16	26
	LDT2	0	0	7	9	19	13	11	11	5	15	25
	LHD1	24	52	1637	2064	4359	2909	2526	2517	1201	3420	5540
	LHD2	5	11	364	460	970	648	562	560	267	761	1233
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	0	0	12	15	32	21	19	18	9	25	41
	MH	0	1	34	43	91	61	53	53	25	72	116
	OBUS	1	2	49	61	130	87	75	75	36	102	165
	SBUS	1	1	44	55	116	77	67	67	32	91	147
	T6	21	46	1457	1838	3880	2589	2248	2240	1069	3044	4932
	T7	84	184	5844	7372	15564	10387	9019	8987	4289	12212	19783
	UBUS	2	3	109	138	292	195	169	168	80	229	371

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2020 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	133	221	5,673	5,920	10,756	6,412	5,160	4,948	2,355	6,979	12,126	**60,683**
LDT1	22	37	961	1,003	1,822	1,086	874	838	399	1,182	2,054	**10,279**
LDT2	69	115	2,956	3,085	5,605	3,341	2,689	2,579	1,228	3,637	6,320	**31,623**
LHD1	25	37	861	829	1,411	803	628	595	285	862	0	**6,337**
LHD2	2	3	60	58	98	56	44	41	20	60	0	**442**
MCY	1	1	37	41	81	51	44	44	22	68	124	**514**
MDV	96	161	4,125	4,305	7,823	4,663	3,753	3,599	1,713	5,075	8,820	**44,133**
MH	2	3	63	61	103	59	46	43	21	63	115	**577**
OBUS	1	1	18	18	30	17	13	13	6	19	34	**170**
SBUS	0	0	4	4	7	4	3	3	1	4	8	**39**
T6	2	3	77	74	126	72	56	53	26	77	140	**707**
T7	0	1	14	13	22	13	10	9	4	14	25	**125**
UBUS	0	0	8	8	13	7	6	6	3	8	15	**74**
Total	**354**	**583**	**14,856**	**15,418**	**27,899**	**16,585**	**13,326**	**12,771**	**6,084**	**18,048**	**29,779**	**155,703**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	0	11	13	27	17	15	16	8	25	47	**180**
LDT1	0	0	1	1	2	1	1	1	0	2	3	**11**
LDT2	0	0	1	1	2	1	1	1	1	2	3	**11**
LHD1	4	10	308	389	821	548	476	474	226	644	0	**3,901**
LHD2	1	2	69	87	183	122	106	106	50	143	0	**868**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	1	1	3	2	2	2	1	3	5	**20**
MH	0	1	18	20	41	26	21	20	10	27	43	**227**
OBUS	1	1	30	35	71	47	38	38	18	49	69	**397**
SBUS	0	1	22	26	52	33	27	26	12	34	55	**288**
T6	16	29	726	855	1,694	1,069	886	851	397	1,116	1,811	**9,451**
T7	100	179	4,497	5,290	10,484	6,617	5,484	5,270	2,455	6,910	11,212	**58,499**
UBUS	1	3	97	122	258	172	149	149	71	202	328	**1,552**
Total	**125**	**226**	**5,781**	**6,840**	**13,636**	**8,655**	**7,206**	**6,955**	**3,249**	**9,157**	**13,576**	**75,406**

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2020 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Additional Reductions

	Emissions w/ Pavley, LCFS (metric tons CO2)	Emissions (metric tons methane)	Emissions (metric tons nitrous oxide)	Total w/ Pavley, LCFS (MTCO2e)	Tire Pressure	Emissions w/ Tire Pressure (MTCO2e)	Low Friction Oil	Emissions w/Low Friction Oil (MTCO2e)	Aerodynamic Efficiency	Emissions w/ Aero (MTCO2e)
LDA	55,215	6.66	8.06	57,855	0.5%	57,566	2.2%	56,299		56,299
LDT1	9,335	0.93	1.13	9,704	0.5%	9,656	2.2%	9,444		9,444
LDT2	28,699	2.32	2.80	29,616	0.5%	29,468	2.2%	28,820		28,820
LHD1	9,288	0.65	0.78	9,545	0.5%	9,497	2.2%	9,288		9,288
LHD2	1,189	0.09	0.10	1,222	0.5%	1,216	2.2%	1,190		1,190
MCY	466	0.09	0.11	503		503		503		503
MDV	40,056	2.42	2.93	41,014	0.5%	40,809	2.2%	39,911		39,911
MH	730	0.03	0.04	743		743		743		743
OBUS	514	0.02	0.02	521		521		521		521
SBUS	297	0.01	0.01	301		301		301		301
T6	9,215	0.27	0.33	9,322		9,322		9,322	2.1%	9,127
T7	53,183	0.95	1.15	53,560		53,560		53,560	2.1%	52,435
UBUS	1,475	0.02	0.03	1,483		1,483		1,483		1,483
Total	**209,662**	**14.46**	**17.50**	**215,390**		**214,645**		**211,385**		**210,064**
			Business as usual:	275,507	**Reduction:**	**745**		**3,261**		**1,321**
			Reduction:	60,117						

Community Greenhouse Gas Inventory

Energy

Year: 2020 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445
Methane	0.000025
Nitrous oxide	0.000009

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Regulation MTCO2e	Business as usual MTCO2e	Reductions MTCO2e
Residential	239,666,142	2,800	53321	2.9	1.0	48,722	61,212	12,489
Commercial	139,568,533	8,877	31051	1.7	0.6	28,373	35,646	7,273
Industrial			0	0.0	0.0	0	0	0
Total	**379,234,675**		**84,373**	**4.6**	**1.6**	**77,096**	**96,858**	**19,763**

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) CO2	CH4	N2O	Emissions MTCO2e
Residential	12,263,219	143	71,740	6.7	0.1	65,249
Commercial	2,542,177	162	14,872	1.4	0.0	13,526
Industrial			0	0.0	0.0	0
Total	**14,805,396**		**86,612**	**8.1**	**0.2**	**78,775**

Sources:

- 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). According to the Large IOU RPS Procurement Data 2003-2010 (website: http://www.cpuc.ca.gov/PUC/energy/Renewables), PG&E had 12.1% renewable energy in 2005; therefore, an additional 20.9% renewables is required by 2020.

- Emission factor for carbon dioxide: The average of the 2005 through 2009 emission factors is 0.559, which is from the Pacific Gas and Electric Company, Community Wide GHG Inventory Report for City of Manteca 2005 and 2010. According to the Large IOU RPS Procurement Data 2003-2010 (website: http://www.cpuc.ca.gov/PUC/energy/Renewables), PG&E had an average of 12.6% renewable energy 2005 - 2009. At least 33% renewables is required by the year 2020 according to regulation; therefore, 20.4% is subtracted from the average 2005-2009 emission factor to result in the emission factor with regulation.

- Residential per capita is based on the population; commercial per capita is based on the number of employees. Data is forecast by using 2010 per capita usage rates.

Community Greenhouse Gas Inventory

Summary

Year: 2035

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

	Data	Source
Manteca Information		
Population	117,010	SJCOG 2004
Housing	31,594	SJCOG 2004
Employment	21,756	SJCOG 2004
San Joaquin County Information		
Population	998,532	SJCOG 2011
State of California Information		
Population	46,330,221	DOF 2012

Summary

Sectors	MTCO2e
Motor vehicles	368,297
Electricity - residential	83,668
Electricity - commercial	49,327
Natural gas - residential	89,186
Natural gas - commercial	18,717
Waste	29,505
ODS substitutes	103,486
Total	742,186

Sources:

San Joaquin Council of Governments (SJCOG). 2004. Staff Report, 2005-2030 Population and Employment Projections. Website: www.sjcog.org/docs/pdf/census/projections.pdf.

San Joaquin Council of Governments (SJCOG) and Eberhardt School of Business, Business Forecasting Center. June 2011. Website: www.sjcog.org/docs/pdf/census/ra_jun11.pdf. Accessed June 23, 2012.

California Department of Finance (DOF). 2012. Demographic Research Unit. Interim Population Projections for California and its Counties 2010-2050. Website: www.dof.ca.gov/research/demographic/reports/projections/interim/view.php. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Waste

Year: 2035

Prepared by Michael Brandman Associates

Waste Percentages	*Percent waste*	*Emission Factor (MT methane/wet short ton waste)*	*Weighted EF*
Mixed MSW	28.6%	0.060	0.0172
Newspaper	1.3%	0.043	0.0006
Office paper	1.9%	0.203	0.0039
Corrugated containers	5.2%	0.120	0.0062
Magazines/Third-Class Mail	9.0%	0.049	0.0044
Food scraps	15.5%	0.078	0.0121
Grass	1.9%	0.038	0.0007
Leaves	1.9%	0.013	0.0002
Branches	3.3%	0.062	0.0020
Dimensional lumber	14.5%	0.062	0.0090
Textiles	2.2%	0.073	0.0016
Construction/demolition	14.6%	0.012	0.0018
Medical waste	0.0%	0.045	0.0000
Sludge/manure	0.1%	0.015	0.0000
Total	100.0%		**0.0597**

Methane Emissions

Desination Facility	*LFG Collection Effciency*	*Waste Generated by City (tons)*	*Methane emissions (MTCO2e)*
All landfills	0.75	104607	29505

Emissions (MTCO2e)	29,505	
Emissions (MTCO2e/person)	0.25	Emissions / Manteca population
Waste per person (tons)	0.894	(in 2010)
Manteca population	117,010	

Sources:

Methodology: ICLEI. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Public Comment Draft. July 2012. Website: www.icleiusa.org/tools/ghg-protocol/community-protocol/public-comment-on-the-community-protocol. Accessed July 20, 2012. (Appendix E: Solid Waste Emissions Activities and Sources, Equation SW.4.1 Methane Emissions)

Source of waste generated: Use of 2010 waste per person applied to manteca population.

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.

Community Greenhouse Gas Inventory

Ozone Depleting Substance Substitutes

Year: 2035

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

California

Emissions (MMTCO2e)	36.1	Emissions in 2020
Population	40,817,839	Population in 2020
Emissions (MTCO2e per person)	0.88	Per capita in 2020

Manteca

Population	117,010
Emissions (MTCO2e)	103,486

(estimated by using California per person emissions)

California emissions from: California Air Resources Board. Greenhouse Gas Inventory - 2020 Emissions Forecast. Website: http://www.arb.ca.gov/cc/inventory/data/forecast.htm. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2035
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day	1,865,877	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	681,045,105	Source: VMT per day * 365 days/year

Speed bins	AM peak	PM peak	Off peak	Total	Speed
10-15	1655	1999	542	**4196**	10
15-20	2173	2178	3673	**8024**	15
20-25	23630	28558	57148	**109336**	20
25-30	66695	57511	67138	**191344**	25
30-35	98099	109296	165679	**373074**	30
35-40	62767	56121	61673	**180561**	35
40-45	94789	107263	6567	**208619**	40
45-50	37773	53160	176317	**267250**	45
50-55	3209	2815	94279	**100303**	50
55-60	11697	24581	260608	**296886**	55
60-65	35995	69635	20657	**126287**	60
Total	**438482**	**513117**	**914281**	**1865880**	

Source: Kittelson & Associates. 2012. Development of On-Road Mobile Source Activity Data for GHG Emission Calculations. City of Manteca Climate Action Plan.

Nitrous oxide and methane emissions from 2010 emissions per 1000 VMT/day estimates

Methane (metric tons)	18.82	0.010	emissions per 1000 vmt/day
Nitrous Oxide (metric tons)	22.78	0.012	emissions per 1000 vmt/day

VMT/day per speed bin

Speed (mph)	10	15	20	25	30	35	40	45	50	55	60
VMT/day	4196	8024	109336	191344	373074	180561	208619	267250	100303	296886	126287

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	46.07%	0.13%
LDT1	6.48%	0.01%
LDT2	15.83%	0.01%
LHD1	2.60%	1.80%
LHD2	0.18%	0.41%
MCY	0.69%	0.00%
MDV	16.04%	0.01%
MH	0.19%	0.04%
OBUS	0.06%	0.06%
SBUS	0.01%	0.04%
T6	0.23%	1.81%
T7	0.04%	7.10%
UBUS	0.02%	0.12%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	41.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	46.8%	LDA, MCY
DSL	Heavy duty	9.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.2%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2035
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emission factors (g CO2/mile)

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	826	633	509	421	363	323	300	289	288	299	322
	LDT1	959	735	591	489	421	376	349	336	335	347	374
	LDT2	1122	860	692	573	493	440	408	393	392	406	438
	LHD1	2036	1392	1006	768	619	528	475	452	454	482	0
	LHD2	2036	1392	1006	768	619	528	475	452	454	482	0
	MCY	242	205	179	161	149	142	139	142	149	162	183
	MDV	1438	1102	886	734	631	563	523	503	502	520	561
	MH	2036	1392	1006	768	619	528	475	452	454	482	541
	OBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	SBUS	2036	1392	1006	768	619	528	475	452	454	482	541
	T6	2036	1392	1006	768	619	528	475	452	454	482	541
	T7	2036	1392	1006	768	619	528	475	452	454	482	541
	UBUS	2036	1392	1006	768	619	528	475	452	454	482	541

Emission factors (g CO2/mile)

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	455	382	332	300	281	274	276	289	314	354	414
	LDT1	456	382	332	300	281	273	276	289	314	354	415
	LDT2	454	381	332	300	282	274	277	290	314	354	414
	LHD1	519	519	519	519	519	519	519	519	519	519	0
	LHD2	519	519	519	519	519	519	519	519	519	519	0
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	455	382	332	300	281	273	276	289	314	354	415
	MH	2187	1796	1473	1322	1241	1173	1120	1080	1054	1042	1044
	OBUS	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155
	SBUS	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032
	T6	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009
	T7	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560
	UBUS	2293	2293	2293	2293	2293	2293	2293	2293	2293	2293	2293

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

VMT/day by Vehicle Class and speed

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	1933	3696	50368	88146	171864	83179	96104	123114	46206	136766	58176
	LDT1	272	520	7089	12407	24191	11708	13527	17329	6504	19250	8189
	LDT2	664	1270	17311	30295	59068	28588	33030	42313	15881	47005	19995
	LHD1	109	209	2844	4977	9704	4697	5426	6951	2609	7722	3285
	LHD2	8	15	202	353	689	334	385	494	185	548	233
	MCY	29	56	757	1324	2582	1250	1444	1850	694	2055	874
	MDV	673	1287	17542	30699	59856	28969	33471	42878	16093	47632	20262
	MH	8	15	205	359	700	339	391	501	188	557	237
	OBUS	2	5	64	111	217	105	121	155	58	173	73
	SBUS	1	1	14	25	49	24	28	35	13	39	17
	T6	9	18	246	431	840	407	470	602	226	669	284
	T7	2	3	40	71	138	67	77	99	37	110	47
	UBUS	1	2	27	48	93	45	52	66	25	74	31

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	6	11	146	255	497	240	278	356	134	395	168
	LDT1	0	1	9	16	32	15	18	23	9	25	11
	LDT2	0	1	8	15	29	14	16	20	8	23	10
	LHD1	76	145	1972	3451	6729	3257	3763	4820	1809	5355	2278
	LHD2	17	33	450	788	1537	744	860	1101	413	1223	520
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	1	1	14	25	48	23	27	34	13	38	16
	MH	2	3	41	72	141	68	79	101	38	112	48
	OBUS	2	5	63	110	215	104	120	154	58	171	73
	SBUS	2	3	43	76	148	72	83	106	40	118	50
	T6	76	145	1977	3459	6745	3264	3772	4832	1813	5368	2283
	T7	298	570	7767	13593	26503	12827	14820	18985	7125	21090	8971
	UBUS	5	10	135	236	461	223	258	330	124	367	156

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2035
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	641	939	10,290	14,910	25,019	10,802	11,589	14,293	5,352	16,409	7,523	**117,766**
LDT1	105	154	1,682	2,438	4,091	1,766	1,895	2,337	875	2,683	1,230	**19,255**
LDT2	299	439	4,807	6,965	11,687	5,046	5,414	6,677	2,500	7,666	3,514	**55,013**
LHD1	89	117	1,149	1,535	2,413	995	1,035	1,262	476	1,496	0	**10,567**
LHD2	6	8	82	109	171	71	74	90	34	106	0	**750**
MCY	3	5	54	85	154	71	81	105	42	134	64	**798**
MDV	389	569	6,239	9,041	15,171	6,551	7,027	8,667	3,246	9,951	4,562	**71,415**
MH	6	8	83	111	174	72	75	91	34	108	51	**814**
OBUS	2	3	26	34	54	22	23	28	11	33	16	**252**
SBUS	0	1	6	8	12	5	5	6	2	8	4	**57**
T6	8	10	99	133	209	86	90	109	41	130	62	**977**
T7	1	2	16	22	34	14	15	18	7	21	10	**160**
UBUS	1	1	11	15	23	10	10	12	5	14	7	**108**
Total	**1,551**	**2,255**	**24,544**	**35,405**	**59,213**	**25,511**	**27,332**	**33,695**	**12,624**	**38,759**	**17,044**	**277,932**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	1	2	19	31	56	26	31	41	17	56	28	**309**
LDT1	0	0	1	2	4	2	2	3	1	4	2	**20**
LDT2	0	0	1	2	3	2	2	2	1	3	2	**18**
LHD1	16	30	411	719	1,402	679	784	1,005	377	1,116	0	**6,539**
LHD2	4	7	94	164	320	155	179	229	86	255	0	**1,494**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	2	3	5	3	3	4	2	5	3	**30**
MH	1	2	24	38	70	32	35	44	16	47	20	**331**
OBUS	2	4	42	69	131	63	67	87	32	91	34	**622**
SBUS	1	2	24	40	73	33	37	45	17	49	21	**343**
T6	64	101	1,087	1,775	3,249	1,487	1,640	2,026	742	2,172	925	**15,269**
T7	391	614	6,602	10,780	19,729	9,031	9,958	12,305	4,507	13,188	5,619	**92,725**
UBUS	5	9	124	218	424	205	237	304	114	338	144	**2,121**
Total	**486**	**772**	**8,433**	**13,841**	**25,467**	**11,717**	**12,975**	**16,096**	**5,912**	**17,324**	**6,796**	**119,819**

Total Emissions

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	397,751	360,840	360,840
Methane		19	395
Nitrous oxide		23	7,062
Total			**368,297**

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
San Joaquin COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - San Joaquin, [year], season - annual average, vehicle category - all, fuel - all, model year - combined, speed - all, EMFAC2007 vehicle classifications) Website: www.arb.ca.gov/jpub/webapp/EMFAC2011WebApp/rateSelectionPage_1.jsp.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	LDA	GAS	5	732	1113	662	0.003%
San Joaquin	2035	LDA	DSL	5	2	504	304	0.000%
San Joaquin	2035	LDA	GAS	10	5484	826	491	0.023%
San Joaquin	2035	LDA	DSL	10	16	455	275	0.000%
San Joaquin	2035	LDA	GAS	15	32493	633	376	0.133%
San Joaquin	2035	LDA	DSL	15	94	382	231	0.000%
San Joaquin	2035	LDA	GAS	20	63331	509	303	0.260%
San Joaquin	2035	LDA	DSL	20	183	332	201	0.001%
San Joaquin	2035	LDA	GAS	25	833900	421	251	3.421%
San Joaquin	2035	LDA	DSL	25	2410	300	182	0.010%
San Joaquin	2035	LDA	GAS	30	1094047	363	216	4.489%
San Joaquin	2035	LDA	DSL	30	3162	281	170	0.013%
San Joaquin	2035	LDA	GAS	35	1036458	323	192	4.252%
San Joaquin	2035	LDA	DSL	35	2996	274	166	0.012%
San Joaquin	2035	LDA	GAS	40	1095161	300	179	4.493%
San Joaquin	2035	LDA	DSL	40	3166	276	167	0.013%
San Joaquin	2035	LDA	GAS	45	712802	289	172	2.925%
San Joaquin	2035	LDA	DSL	45	2060	289	175	0.008%
San Joaquin	2035	LDA	GAS	50	740144	288	172	3.037%
San Joaquin	2035	LDA	DSL	50	2139	314	190	0.009%
San Joaquin	2035	LDA	GAS	55	759515	299	178	3.116%
San Joaquin	2035	LDA	DSL	55	2195	354	214	0.009%
San Joaquin	2035	LDA	GAS	60	2194097	322	192	9.002%
San Joaquin	2035	LDA	DSL	60	6342	414	250	0.026%
San Joaquin	2035	LDA	GAS	65	1695507	359	214	6.956%
San Joaquin	2035	LDA	DSL	65	4901	503	304	0.020%
San Joaquin	2035	LDA	GAS	70	964393	385	229	3.957%
San Joaquin	2035	LDA	DSL	70	2788	634	383	0.011%
San Joaquin	2035	LDT1	GAS	5	103	1293	789	0.000%
San Joaquin	2035	LDT1	DSL	5	0	505	302	0.000%
San Joaquin	2035	LDT1	GAS	10	772	959	585	0.003%
San Joaquin	2035	LDT1	DSL	10	1	456	273	0.000%
San Joaquin	2035	LDT1	GAS	15	4574	735	448	0.019%
San Joaquin	2035	LDT1	DSL	15	6	382	228	0.000%
San Joaquin	2035	LDT1	GAS	20	8914	591	361	0.037%
San Joaquin	2035	LDT1	DSL	20	12	332	199	0.000%
San Joaquin	2035	LDT1	GAS	25	117375	489	299	0.482%
San Joaquin	2035	LDT1	DSL	25	155	300	179	0.001%
San Joaquin	2035	LDT1	GAS	30	153992	421	257	0.632%
San Joaquin	2035	LDT1	DSL	30	203	281	168	0.001%
San Joaquin	2035	LDT1	GAS	35	145886	376	229	0.599%
San Joaquin	2035	LDT1	DSL	35	193	273	163	0.001%
San Joaquin	2035	LDT1	GAS	40	154149	349	213	0.632%
San Joaquin	2035	LDT1	DSL	40	204	276	165	0.001%
San Joaquin	2035	LDT1	GAS	45	100330	336	205	0.412%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	LDT1	DSL	45	133	289	173	0.001%
San Joaquin	2035	LDT1	GAS	50	104179	335	204	0.427%
San Joaquin	2035	LDT1	DSL	50	138	314	188	0.001%
San Joaquin	2035	LDT1	GAS	55	106905	347	212	0.439%
San Joaquin	2035	LDT1	DSL	55	141	354	212	0.001%
San Joaquin	2035	LDT1	GAS	60	308829	374	228	1.267%
San Joaquin	2035	LDT1	DSL	60	408	415	248	0.002%
San Joaquin	2035	LDT1	GAS	65	238650	418	255	0.979%
San Joaquin	2035	LDT1	DSL	65	315	505	302	0.001%
San Joaquin	2035	LDT1	GAS	70	135743	448	273	0.557%
San Joaquin	2035	LDT1	DSL	70	179	637	381	0.001%
San Joaquin	2035	LDT2	GAS	5	252	1513	1029	0.001%
San Joaquin	2035	LDT2	DSL	5	0	503	343	0.000%
San Joaquin	2035	LDT2	GAS	10	1885	1122	763	0.008%
San Joaquin	2035	LDT2	DSL	10	1	454	310	0.000%
San Joaquin	2035	LDT2	GAS	15	11168	860	585	0.046%
San Joaquin	2035	LDT2	DSL	15	5	381	261	0.000%
San Joaquin	2035	LDT2	GAS	20	21766	692	470	0.089%
San Joaquin	2035	LDT2	DSL	20	11	332	227	0.000%
San Joaquin	2035	LDT2	GAS	25	286603	573	389	1.176%
San Joaquin	2035	LDT2	DSL	25	139	300	206	0.001%
San Joaquin	2035	LDT2	GAS	30	376012	493	335	1.543%
San Joaquin	2035	LDT2	DSL	30	182	282	193	0.001%
San Joaquin	2035	LDT2	GAS	35	356220	440	299	1.462%
San Joaquin	2035	LDT2	DSL	35	172	274	188	0.001%
San Joaquin	2035	LDT2	GAS	40	376395	408	277	1.544%
San Joaquin	2035	LDT2	DSL	40	182	277	189	0.001%
San Joaquin	2035	LDT2	GAS	45	244983	393	267	1.005%
San Joaquin	2035	LDT2	DSL	45	118	290	198	0.000%
San Joaquin	2035	LDT2	GAS	50	254380	392	267	1.044%
San Joaquin	2035	LDT2	DSL	50	123	314	215	0.001%
San Joaquin	2035	LDT2	GAS	55	261037	406	276	1.071%
San Joaquin	2035	LDT2	DSL	55	126	354	242	0.001%
San Joaquin	2035	LDT2	GAS	60	754088	438	298	3.094%
San Joaquin	2035	LDT2	DSL	60	365	414	283	0.001%
San Joaquin	2035	LDT2	GAS	65	582728	489	332	2.391%
San Joaquin	2035	LDT2	DSL	65	282	502	343	0.001%
San Joaquin	2035	LDT2	GAS	70	331452	524	356	1.360%
San Joaquin	2035	LDT2	DSL	70	160	632	431	0.001%
San Joaquin	2035	LHD1	GAS	5	17992	2513	2262	0.074%
San Joaquin	2035	LHD1	DSL	5	7730	519	467	0.032%
San Joaquin	2035	LHD1	GAS	10	46914	2036	1833	0.192%
San Joaquin	2035	LHD1	DSL	10	25706	519	467	0.105%
San Joaquin	2035	LHD1	GAS	15	106831	1392	1253	0.438%
San Joaquin	2035	LHD1	DSL	15	55672	519	467	0.228%
San Joaquin	2035	LHD1	GAS	20	123442	1006	905	0.506%
San Joaquin	2035	LHD1	DSL	20	61035	519	467	0.250%
San Joaquin	2035	LHD1	GAS	25	95088	768	691	0.390%
San Joaquin	2035	LHD1	DSL	25	65324	519	467	0.268%
San Joaquin	2035	LHD1	GAS	30	84089	619	557	0.345%
San Joaquin	2035	LHD1	DSL	30	55141	519	467	0.226%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	LHD1	GAS	35	31421	528	475	0.129%
San Joaquin	2035	LHD1	DSL	35	29100	519	467	0.119%
San Joaquin	2035	LHD1	GAS	40	9275	475	428	0.038%
San Joaquin	2035	LHD1	DSL	40	15975	519	467	0.066%
San Joaquin	2035	LHD1	GAS	45	11418	452	407	0.047%
San Joaquin	2035	LHD1	DSL	45	17242	519	467	0.071%
San Joaquin	2035	LHD1	GAS	50	84310	454	409	0.346%
San Joaquin	2035	LHD1	DSL	50	66578	519	467	0.273%
San Joaquin	2035	LHD1	GAS	55	23189	482	434	0.095%
San Joaquin	2035	LHD1	DSL	55	40094	519	467	0.164%
San Joaquin	2035	LHD2	GAS	5	1278	2513	2262	0.005%
San Joaquin	2035	LHD2	DSL	5	1766	519	467	0.007%
San Joaquin	2035	LHD2	GAS	10	3332	2036	1833	0.014%
San Joaquin	2035	LHD2	DSL	10	5872	519	467	0.024%
San Joaquin	2035	LHD2	GAS	15	7587	1392	1253	0.031%
San Joaquin	2035	LHD2	DSL	15	12717	519	467	0.052%
San Joaquin	2035	LHD2	GAS	20	8767	1006	905	0.036%
San Joaquin	2035	LHD2	DSL	20	13942	519	467	0.057%
San Joaquin	2035	LHD2	GAS	25	6753	768	691	0.028%
San Joaquin	2035	LHD2	DSL	25	14922	519	467	0.061%
San Joaquin	2035	LHD2	GAS	30	5972	619	557	0.025%
San Joaquin	2035	LHD2	DSL	30	12596	519	467	0.052%
San Joaquin	2035	LHD2	GAS	35	2232	528	475	0.009%
San Joaquin	2035	LHD2	DSL	35	6647	519	467	0.027%
San Joaquin	2035	LHD2	GAS	40	659	475	428	0.003%
San Joaquin	2035	LHD2	DSL	40	3649	519	467	0.015%
San Joaquin	2035	LHD2	GAS	45	811	452	407	0.003%
San Joaquin	2035	LHD2	DSL	45	3939	519	467	0.016%
San Joaquin	2035	LHD2	GAS	50	5988	454	409	0.025%
San Joaquin	2035	LHD2	DSL	50	15208	519	467	0.062%
San Joaquin	2035	LHD2	GAS	55	1647	482	434	0.007%
San Joaquin	2035	LHD2	DSL	55	9159	519	467	0.038%
San Joaquin	2035	MCY	GAS	5	11	266	240	0.000%
San Joaquin	2035	MCY	GAS	10	82	242	218	0.000%
San Joaquin	2035	MCY	GAS	15	488	205	185	0.002%
San Joaquin	2035	MCY	GAS	20	952	179	161	0.004%
San Joaquin	2035	MCY	GAS	25	12529	161	144	0.051%
San Joaquin	2035	MCY	GAS	30	16438	149	134	0.067%
San Joaquin	2035	MCY	GAS	35	15572	142	128	0.064%
San Joaquin	2035	MCY	GAS	40	16454	139	125	0.068%
San Joaquin	2035	MCY	GAS	45	10710	142	128	0.044%
San Joaquin	2035	MCY	GAS	50	11120	149	134	0.046%
San Joaquin	2035	MCY	GAS	55	11411	162	146	0.047%
San Joaquin	2035	MCY	GAS	60	32966	183	165	0.135%
San Joaquin	2035	MCY	GAS	65	25474	215	193	0.105%
San Joaquin	2035	MCY	GAS	70	14490	262	236	0.059%
San Joaquin	2035	MDV	GAS	5	255	1939	1353	0.001%
San Joaquin	2035	MDV	DSL	5	0	504	349	0.000%
San Joaquin	2035	MDV	GAS	10	1910	1438	1004	0.008%
San Joaquin	2035	MDV	DSL	10	2	455	315	0.000%
San Joaquin	2035	MDV	GAS	15	11317	1102	769	0.046%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	MDV	DSL	15	9	382	265	0.000%
San Joaquin	2035	MDV	GAS	20	22057	886	618	0.090%
San Joaquin	2035	MDV	DSL	20	18	332	230	0.000%
San Joaquin	2035	MDV	GAS	25	290428	734	512	1.192%
San Joaquin	2035	MDV	DSL	25	233	300	208	0.001%
San Joaquin	2035	MDV	GAS	30	381031	631	441	1.563%
San Joaquin	2035	MDV	DSL	30	306	281	195	0.001%
San Joaquin	2035	MDV	GAS	35	360974	563	393	1.481%
San Joaquin	2035	MDV	DSL	35	290	273	190	0.001%
San Joaquin	2035	MDV	GAS	40	381419	523	365	1.565%
San Joaquin	2035	MDV	DSL	40	306	276	191	0.001%
San Joaquin	2035	MDV	GAS	45	248252	503	351	1.019%
San Joaquin	2035	MDV	DSL	45	199	289	200	0.001%
San Joaquin	2035	MDV	GAS	50	257775	502	351	1.058%
San Joaquin	2035	MDV	DSL	50	207	314	218	0.001%
San Joaquin	2035	MDV	GAS	55	264521	520	363	1.085%
San Joaquin	2035	MDV	DSL	55	212	354	246	0.001%
San Joaquin	2035	MDV	GAS	60	764153	561	391	3.135%
San Joaquin	2035	MDV	DSL	60	614	415	287	0.003%
San Joaquin	2035	MDV	GAS	65	590505	626	437	2.423%
San Joaquin	2035	MDV	DSL	65	474	504	349	0.002%
San Joaquin	2035	MDV	GAS	70	335875	671	468	1.378%
San Joaquin	2035	MDV	DSL	70	270	636	440	0.001%
San Joaquin	2035	MH	GAS	5	395	2513	2262	0.002%
San Joaquin	2035	MH	DSL	5	74	2408	2168	0.000%
San Joaquin	2035	MH	GAS	10	1988	2036	1833	0.008%
San Joaquin	2035	MH	DSL	10	368	2187	1968	0.002%
San Joaquin	2035	MH	GAS	15	2511	1392	1253	0.010%
San Joaquin	2035	MH	DSL	15	497	1796	1616	0.002%
San Joaquin	2035	MH	GAS	20	2605	1006	905	0.011%
San Joaquin	2035	MH	DSL	20	527	1473	1326	0.002%
San Joaquin	2035	MH	GAS	25	2902	768	691	0.012%
San Joaquin	2035	MH	DSL	25	549	1322	1189	0.002%
San Joaquin	2035	MH	GAS	30	3282	619	557	0.013%
San Joaquin	2035	MH	DSL	30	660	1241	1116	0.003%
San Joaquin	2035	MH	GAS	35	4078	528	475	0.017%
San Joaquin	2035	MH	DSL	35	779	1173	1056	0.003%
San Joaquin	2035	MH	GAS	40	5077	475	428	0.021%
San Joaquin	2035	MH	DSL	40	966	1120	1008	0.004%
San Joaquin	2035	MH	GAS	45	4630	452	407	0.019%
San Joaquin	2035	MH	DSL	45	791	1080	972	0.003%
San Joaquin	2035	MH	GAS	50	4506	454	409	0.018%
San Joaquin	2035	MH	DSL	50	886	1054	949	0.004%
San Joaquin	2035	MH	GAS	55	5894	482	434	0.024%
San Joaquin	2035	MH	DSL	55	1298	1042	938	0.005%
San Joaquin	2035	MH	GAS	60	6801	541	487	0.028%
San Joaquin	2035	MH	DSL	60	1560	1044	939	0.006%
San Joaquin	2035	MH	GAS	65	1063	641	577	0.004%
San Joaquin	2035	MH	DSL	65	245	1059	953	0.001%
San Joaquin	2035	OBUS	GAS	5	123	2513	2262	0.001%
San Joaquin	2035	OBUS	DSL	5	82	3001	2701	0.000%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	OBUS	GAS	10	616	2036	1833	0.003%
San Joaquin	2035	OBUS	DSL	10	377	2416	2175	0.002%
San Joaquin	2035	OBUS	GAS	15	779	1392	1253	0.003%
San Joaquin	2035	OBUS	DSL	15	496	1966	1770	0.002%
San Joaquin	2035	OBUS	GAS	20	808	1006	905	0.003%
San Joaquin	2035	OBUS	DSL	20	662	1668	1501	0.003%
San Joaquin	2035	OBUS	GAS	25	900	768	691	0.004%
San Joaquin	2035	OBUS	DSL	25	687	1554	1399	0.003%
San Joaquin	2035	OBUS	GAS	30	1017	619	557	0.004%
San Joaquin	2035	OBUS	DSL	30	958	1513	1362	0.004%
San Joaquin	2035	OBUS	GAS	35	1264	528	475	0.005%
San Joaquin	2035	OBUS	DSL	35	1415	1496	1347	0.006%
San Joaquin	2035	OBUS	GAS	40	1574	475	428	0.006%
San Joaquin	2035	OBUS	DSL	40	1510	1388	1249	0.006%
San Joaquin	2035	OBUS	GAS	45	1435	452	407	0.006%
San Joaquin	2035	OBUS	DSL	45	1690	1413	1271	0.007%
San Joaquin	2035	OBUS	GAS	50	1397	454	409	0.006%
San Joaquin	2035	OBUS	DSL	50	1805	1369	1232	0.007%
San Joaquin	2035	OBUS	GAS	55	1827	482	434	0.007%
San Joaquin	2035	OBUS	DSL	55	2365	1330	1197	0.010%
San Joaquin	2035	OBUS	GAS	60	2108	541	487	0.009%
San Joaquin	2035	OBUS	DSL	60	1600	1155	1039	0.007%
San Joaquin	2035	OBUS	GAS	65	329	641	577	0.001%
San Joaquin	2035	OBUS	DSL	65	416	1334	1201	0.002%
San Joaquin	2035	SBUS	GAS	5	32	2513	2262	0.000%
San Joaquin	2035	SBUS	DSL	5	96	2617	2356	0.000%
San Joaquin	2035	SBUS	GAS	10	112	2036	1833	0.000%
San Joaquin	2035	SBUS	DSL	10	336	2162	1946	0.001%
San Joaquin	2035	SBUS	GAS	15	223	1392	1253	0.001%
San Joaquin	2035	SBUS	DSL	15	671	1775	1598	0.003%
San Joaquin	2035	SBUS	GAS	20	303	1006	905	0.001%
San Joaquin	2035	SBUS	DSL	20	911	1401	1261	0.004%
San Joaquin	2035	SBUS	GAS	25	479	768	691	0.002%
San Joaquin	2035	SBUS	DSL	25	1438	1307	1176	0.006%
San Joaquin	2035	SBUS	GAS	30	574	619	557	0.002%
San Joaquin	2035	SBUS	DSL	30	1725	1227	1104	0.007%
San Joaquin	2035	SBUS	GAS	35	589	528	475	0.002%
San Joaquin	2035	SBUS	DSL	35	1771	1160	1044	0.007%
San Joaquin	2035	SBUS	GAS	40	398	475	428	0.002%
San Joaquin	2035	SBUS	DSL	40	1195	1107	996	0.005%
San Joaquin	2035	SBUS	GAS	45	191	452	407	0.001%
San Joaquin	2035	SBUS	DSL	45	574	1068	961	0.002%
San Joaquin	2035	SBUS	GAS	50	96	454	409	0.000%
San Joaquin	2035	SBUS	DSL	50	287	1042	938	0.001%
San Joaquin	2035	SBUS	GAS	55	142	482	434	0.001%
San Joaquin	2035	SBUS	DSL	55	428	1030	927	0.002%
San Joaquin	2035	SBUS	GAS	60	79	541	487	0.000%
San Joaquin	2035	SBUS	DSL	60	238	1032	929	0.001%
San Joaquin	2035	T6	GAS	5	475	2513	2262	0.002%
San Joaquin	2035	T6	DSL	5	3544	2560	2304	0.015%
San Joaquin	2035	T6	GAS	10	2386	2036	1833	0.010%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	T6	DSL	10	17641	2115	1903	0.072%
San Joaquin	2035	T6	GAS	15	3014	1392	1253	0.012%
San Joaquin	2035	T6	DSL	15	23810	1736	1563	0.098%
San Joaquin	2035	T6	GAS	20	3127	1006	905	0.013%
San Joaquin	2035	T6	DSL	20	25251	1370	1233	0.104%
San Joaquin	2035	T6	GAS	25	3484	768	691	0.014%
San Joaquin	2035	T6	DSL	25	26298	1278	1150	0.108%
San Joaquin	2035	T6	GAS	30	3939	619	557	0.016%
San Joaquin	2035	T6	DSL	30	31621	1200	1080	0.130%
San Joaquin	2035	T6	GAS	35	4895	528	475	0.020%
San Joaquin	2035	T6	DSL	35	37286	1135	1021	0.153%
San Joaquin	2035	T6	GAS	40	6094	475	428	0.025%
San Joaquin	2035	T6	DSL	40	46284	1083	975	0.190%
San Joaquin	2035	T6	GAS	45	5557	452	407	0.023%
San Joaquin	2035	T6	DSL	45	37901	1044	940	0.156%
San Joaquin	2035	T6	GAS	50	5409	454	409	0.022%
San Joaquin	2035	T6	DSL	50	42417	1019	917	0.174%
San Joaquin	2035	T6	GAS	55	7074	482	434	0.029%
San Joaquin	2035	T6	DSL	55	62159	1008	907	0.255%
San Joaquin	2035	T6	GAS	60	8163	541	487	0.033%
San Joaquin	2035	T6	DSL	60	74694	1009	908	0.306%
San Joaquin	2035	T6	GAS	65	1276	641	577	0.005%
San Joaquin	2035	T6	DSL	65	11755	1024	922	0.048%
San Joaquin	2035	T7	GAS	5	33	2513	2262	0.000%
San Joaquin	2035	T7	DSL	5	6248	3956	3561	0.026%
San Joaquin	2035	T7	GAS	10	160	2036	1833	0.001%
San Joaquin	2035	T7	DSL	10	23869	3268	2942	0.098%
San Joaquin	2035	T7	GAS	15	175	1392	1253	0.001%
San Joaquin	2035	T7	DSL	15	29192	2684	2415	0.120%
San Joaquin	2035	T7	GAS	20	299	1006	905	0.001%
San Joaquin	2035	T7	DSL	20	72122	2117	1905	0.296%
San Joaquin	2035	T7	GAS	25	390	768	691	0.002%
San Joaquin	2035	T7	DSL	25	65934	1975	1778	0.271%
San Joaquin	2035	T7	GAS	30	712	619	557	0.003%
San Joaquin	2035	T7	DSL	30	111315	1854	1669	0.457%
San Joaquin	2035	T7	GAS	35	1267	528	475	0.005%
San Joaquin	2035	T7	DSL	35	200259	1754	1578	0.822%
San Joaquin	2035	T7	GAS	40	1105	475	428	0.005%
San Joaquin	2035	T7	DSL	40	188986	1674	1506	0.775%
San Joaquin	2035	T7	GAS	45	1169	452	407	0.005%
San Joaquin	2035	T7	DSL	45	264593	1614	1453	1.086%
San Joaquin	2035	T7	GAS	50	1223	454	409	0.005%
San Joaquin	2035	T7	DSL	50	275170	1576	1418	1.129%
San Joaquin	2035	T7	GAS	55	1795	482	434	0.007%
San Joaquin	2035	T7	DSL	55	335553	1557	1402	1.377%
San Joaquin	2035	T7	GAS	60	443	541	487	0.002%
San Joaquin	2035	T7	DSL	60	102221	1560	1404	0.419%
San Joaquin	2035	T7	GAS	65	237	641	577	0.001%
San Joaquin	2035	T7	DSL	65	55989	1583	1425	0.230%
San Joaquin	2035	UBUS	GAS	5	60	2513	2262	0.000%
San Joaquin	2035	UBUS	DSL	5	298	2293	2063	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX (Pavley I+LCFS) (gms/mile)	Percent of Total VMT
San Joaquin	2035	UBUS	GAS	10	215	2036	1833	0.001%
San Joaquin	2035	UBUS	DSL	10	1071	2293	2063	0.004%
San Joaquin	2035	UBUS	GAS	15	431	1392	1253	0.002%
San Joaquin	2035	UBUS	DSL	15	2141	2293	2063	0.009%
San Joaquin	2035	UBUS	GAS	20	569	1006	905	0.002%
San Joaquin	2035	UBUS	DSL	20	2826	2293	2063	0.012%
San Joaquin	2035	UBUS	GAS	25	856	768	691	0.004%
San Joaquin	2035	UBUS	DSL	25	4256	2293	2063	0.017%
San Joaquin	2035	UBUS	GAS	30	1072	619	557	0.004%
San Joaquin	2035	UBUS	DSL	30	5327	2293	2063	0.022%
San Joaquin	2035	UBUS	GAS	35	1050	528	475	0.004%
San Joaquin	2035	UBUS	DSL	35	5220	2293	2063	0.021%
San Joaquin	2035	UBUS	GAS	40	757	475	428	0.003%
San Joaquin	2035	UBUS	DSL	40	3763	2293	2063	0.015%
San Joaquin	2035	UBUS	GAS	45	330	452	407	0.001%
San Joaquin	2035	UBUS	DSL	45	1641	2293	2063	0.007%
San Joaquin	2035	UBUS	GAS	50	168	454	409	0.001%
San Joaquin	2035	UBUS	DSL	50	834	2293	2063	0.003%
San Joaquin	2035	UBUS	GAS	55	208	482	434	0.001%
San Joaquin	2035	UBUS	DSL	55	1033	2293	2063	0.004%
San Joaquin	2035	UBUS	GAS	60	340	541	487	0.001%
San Joaquin	2035	UBUS	DSL	60	1691	2293	2063	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.559	(average of 2005-2009 factors)
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	327,589,923	2,800	91561	5.1	1.8	83,668
Commercial	193,134,016	8,877	53981	3.0	1.1	49,327
Industrial			0	0.0	0.0	0
Total	**520,723,939**		**145,542**	**8.1**	**2.9**	**132,995**

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) CO2	CH4	N2O	Emissions MTCO2e
Residential	16,762,097	143	98,058	9.2	0.2	89,186
Commercial	3,517,847	162	20,579	1.9	0.0	18,717
Industrial			0	0.0	0.0	0
Total	**20,279,944**		**118,638**	**11.2**	**0.2**	**107,903**

Sources:

- 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)

- Emission factors for carbon dioxide from: PG&E 2012. Pacific Gas and Electric Company. Community Wide GHG Inventory Report for City of Manteca 2005 and 2010.

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

- Data is forecast by using 2010 per capita usage rates.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2035

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
San Joaquin Valley	998,532	276	0.006	0.00013	251
Manteca	117,010	32	0	0	29
Percent Manteca/SJV	11.7%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
San Joaquin Valley	998,532	349	0.012	0.003	318
Manteca	117,010	41	0	0	37
Percent Manteca/SJV	11.7%				

Total Manteca **67**

Notes:
Emissions for San Joaquin Valley County are from OFFROAD2007 for the year assessed; emissions from Manteca are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, generators, industrial equipment, lawn and garden equipment, light commercial equipment, other portable equipment, and transport refrigeration units. Emissions from pleasure craft (boats), railyard operations, dredging, logging equipment, oil drilling, airport ground support equipment, and military tactical support equipment were not included, as those are not substantial sources within the City.

Community Greenhouse Gas Inventory

Summary

Year: 2035 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

	Data	Source
Manteca Information		
Population	117,010	SJCOG 2004
Housing	31,594	SJCOG 2004
Employment	21,756	SJCOG 2004
San Joaquin County Information		
Population	998,532	SJCOG 2011
State of California Information		
Population	46,330,221	DOF 2012

Summary

Sectors	**MTCO2e**
Motor vehicles	263,767
Electricity - residential	66,597
Electricity - commercial	39,263
Natural gas - residential	89,186
Natural gas - commercial	18,717
Waste	29,505
ODS substitutes	85,686
Total	**592,721**

Sources:

San Joaquin Council of Governments (SJCOG). 2004. Staff Report, 2005-2030 Population and Employment Projections. Website: www.sjcog.org/docs/pdf/census/projections.pdf.

San Joaquin Council of Governments (SJCOG) and Eberhardt School of Business, Business Forecasting Center. June 2011. Website: www.sjcog.org/docs/pdf/census/ra_jun11.pdf. Accessed June 23, 2012.

California Department of Finance (DOF). 2012. Demographic Research Unit. Interim Population Projections for California and its Counties 2010-2050. Website: www.dof.ca.gov/research/demographic/reports/projections/interim/view.php. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Waste

Year: 2035 (with regulation)

Prepared by Michael Brandman Associates

Waste Percentages	*Percent waste*	*Emission Factor (MT methane/wet short ton waste)*	*Weighted EF*
Mixed MSW	28.6%	0.060	0.0172
Newspaper	1.3%	0.043	0.0006
Office paper	1.9%	0.203	0.0039
Corrugated containers	5.2%	0.120	0.0062
Magazines/Third-Class Mail	9.0%	0.049	0.0044
Food scraps	15.5%	0.078	0.0121
Grass	1.9%	0.038	0.0007
Leaves	1.9%	0.013	0.0002
Branches	3.3%	0.062	0.0020
Dimensional lumber	14.5%	0.062	0.0090
Textiles	2.2%	0.073	0.0016
Construction/demolition	14.6%	0.012	0.0018
Medical waste	0.0%	0.045	0.0000
Sludge/manure	0.1%	0.015	0.0000
Total	100.0%		**0.0597**

Methane Emissions

Desination Facility	*LFG Collection Effciency*	*Waste Generated by City (tons)*	*Methane emissions (MTCO2e)*
All landfills	0.75	104607	29505

Emissions (MTCO2e)	29,505	
Emissions (MTCO2e/person)	0.25	Emissions / Manteca population
Waste per person (tons)	0.894	(in 2010)
Manteca population	117,010	

Sources:

Methodology: ICLEI. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Public Comment Draft. July 2012. Website: www.icleiusa.org/tools/ghg-protocol/community-protocol/public-comment-on-the-community-protocol. Accessed July 20, 2012. (Appendix E: Solid Waste Emissions Activities and Sources, Equation SW.4.1 Methane Emissions)

Source of waste generated: Use of 2010 waste per person applied to manteca population.

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.

Community Greenhouse Gas Inventory

Ozone Depleting Substance Substitutes

Year: 2035 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

California

Emissions (MMTCO2e)	36.1	Emissions in 2020
Population	40,817,839	Population in 2020
Emissions (MTCO2e per person)	0.88	Per capita in 2020

Manteca

Population	117,010
Emissions (MTCO2e)	103,486
Regulation percent reduction	17.2%
Emissions with regulation (MTCO2e)	85,686
(estimated by using California per person emissions)	
Reductions (MTCO2e)	17,800

California emissions from: California Air Resources Board. Greenhouse Gas Inventory - 2020 Emissions Forecast. Website: http://www.arb.ca.gov/cc/inventory/data/forecast.htm. Accessed June 23, 2012.

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2035 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day	1,865,877	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	681,045,105	Source: VMT per day * 365 days/year

Speed bins	AM peak	PM peak	Off peak	Total	Speed
10-15	1655	1999	542	**4196**	10
15-20	2173	2178	3673	**8024**	15
20-25	23630	28558	57148	**109336**	20
25-30	66695	57511	67138	**191344**	25
30-35	98099	109296	165679	**373074**	30
35-40	62767	56121	61673	**180561**	35
40-45	94789	107263	6567	**208619**	40
45-50	37773	53160	176317	**267250**	45
50-55	3209	2815	94279	**100303**	50
55-60	11697	24581	260608	**296886**	55
60-65	35995	69635	20657	**126287**	60
Total	**438482**	**513117**	**914281**	**1865880**	

Source: Kittelson & Associates. 2012. Development of On-Road Mobile Source Activity Data for GHG Emission Calculations. City of Manteca Climate Action Plan.

Nitrous oxide and methane emissions from 2010 emissions per 1000 VMT/day estimates

Methane (metric tons)	18.82	0.010	emissions per 1000 vmt/day
Nitrous Oxide (metric tons)	22.78	0.012	emissions per 1000 vmt/day

VMT/day per speed bin

Speed (mph)	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
VMT/day	4196	8024	109336	191344	373074	180561	208619	267250	100303	296886	126287

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL	Total
LDA	46.07%	0.13%	46.20%
LDT1	6.48%	0.01%	6.49%
LDT2	15.83%	0.01%	15.84%
LHD1	2.60%	1.80%	4.40%
LHD2	0.18%	0.41%	0.60%
MCY	0.69%	0.00%	0.69%
MDV	16.04%	0.01%	16.06%
MH	0.19%	0.04%	0.23%
OBUS	0.06%	0.06%	0.12%
SBUS	0.01%	0.04%	0.05%
T6	0.23%	1.81%	2.03%
T7	0.04%	7.10%	7.14%
UBUS	0.02%	0.12%	0.15%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	41.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	46.8%	LDA, MCY
DSL	Heavy duty	9.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.2%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emission factors (g CO2/mile)
Note: Pavley I + LCFS factors are used

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	491	376	303	251	216	192	179	172	172	178	192
	LDT1	585	448	361	299	257	229	213	205	204	212	228
	LDT2	763	585	470	389	335	299	277	267	267	276	298
	LHD1	1833	1253	905	691	557	475	428	407	409	434	0
	LHD2	1833	1253	905	691	557	475	428	407	409	434	0
	MCY	218	185	161	144	134	128	125	128	134	146	165
	MDV	1004	769	618	512	441	393	365	351	351	363	391
	MH	1833	1253	905	691	557	475	428	407	409	434	487
	OBUS	1833	1253	905	691	557	475	428	407	409	434	487
	SBUS	1833	1253	905	691	557	475	428	407	409	434	487
	T6	1833	1253	905	691	557	475	428	407	409	434	487
	T7	1833	1253	905	691	557	475	428	407	409	434	487
	UBUS	1833	1253	905	691	557	475	428	407	409	434	487

Emission factors (g CO2/mile)
Note: Pavley I + LCFS factors are used

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	275	231	201	182	170	166	167	175	190	214	250
	LDT1	273	228	199	179	168	163	165	173	188	212	248
	LDT2	310	261	227	206	193	188	189	198	215	242	283
	LHD1	467	467	467	467	467	467	467	467	467	467	0
	LHD2	467	467	467	467	467	467	467	467	467	467	0
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	315	265	230	208	195	190	191	200	218	246	287
	MH	1968	1616	1326	1189	1116	1056	1008	972	949	938	939
	OBUS	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039
	SBUS	1946	1598	1261	1176	1104	1044	996	961	938	927	929
	T6	1903	1563	1233	1150	1080	1021	975	940	917	907	908
	T7	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404
	UBUS	2063	2063	2063	2063	2063	2063	2063	2063	2063	2063	2063

Community Greenhouse Gas Inventory

Motor Vehicle Emissions
Year: 2035 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

VMT/day by Vehicle Class and speed

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	1933	3696	50368	88146	171864	83179	96104	123114	46206	136766	58176
	LDT1	272	520	7089	12407	24191	11708	13527	17329	6504	19250	8189
	LDT2	664	1270	17311	30295	59068	28588	33030	42313	15881	47005	19995
	LHD1	109	209	2844	4977	9704	4697	5426	6951	2609	7722	3285
	LHD2	8	15	202	353	689	334	385	494	185	548	233
	MCY	29	56	757	1324	2582	1250	1444	1850	694	2055	874
	MDV	673	1287	17542	30699	59856	28969	33471	42878	16093	47632	20262
	MH	8	15	205	359	700	339	391	501	188	557	237
	OBUS	2	5	64	111	217	105	121	155	58	173	73
	SBUS	1	1	14	25	49	24	28	35	13	39	17
	T6	9	18	246	431	840	407	470	602	226	669	284
	T7	2	3	40	71	138	67	77	99	37	110	47
	UBUS	1	2	27	48	93	45	52	66	25	74	31

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60
	LDA	6	11	146	255	497	240	278	356	134	395	168
	LDT1	0	1	9	16	32	15	18	23	9	25	11
	LDT2	0	1	8	15	29	14	16	20	8	23	10
	LHD1	76	145	1972	3451	6729	3257	3763	4820	1809	5355	2278
	LHD2	17	33	450	788	1537	744	860	1101	413	1223	520
	MCY	0	0	0	0	0	0	0	0	0	0	0
	MDV	1	1	14	25	48	23	27	34	13	38	16
	MH	2	3	41	72	141	68	79	101	38	112	48
	OBUS	2	5	63	110	215	104	120	154	58	171	73
	SBUS	2	3	43	76	148	72	83	106	40	118	50
	T6	76	145	1977	3459	6745	3264	3772	4832	1813	5368	2283
	T7	298	570	7767	13593	26503	12827	14820	18985	7125	21090	8971
	UBUS	5	10	135	236	461	223	258	330	124	367	156

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035 (with regulation)
Prepared by Michael Brandman Associates
Note: data entry values are in yellow

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	381	559	6,122	8,871	14,885	6,427	6,895	8,504	3,184	9,763	4,476	**70,066**
LDT1	64	94	1,026	1,487	2,496	1,078	1,156	1,426	534	1,637	751	**11,749**
LDT2	204	298	3,267	4,734	7,944	3,430	3,680	4,538	1,699	5,211	2,389	**37,395**
LHD1	80	105	1,034	1,381	2,172	896	932	1,136	428	1,346	0	**9,510**
LHD2	6	7	73	98	154	64	66	81	30	96	0	**675**
MCY	3	4	49	77	139	64	73	95	37	120	58	**718**
MDV	271	398	4,355	6,311	10,590	4,573	4,906	6,050	2,266	6,946	3,185	**49,851**
MH	6	8	75	100	157	65	67	82	31	97	46	**732**
OBUS	2	2	23	31	49	20	21	25	10	30	14	**227**
SBUS	0	1	5	7	11	5	5	6	2	7	3	**52**
T6	7	9	90	120	188	78	81	98	37	117	56	**879**
T7	1	1	15	20	31	13	13	16	6	19	9	**144**
UBUS	1	1	10	13	21	9	9	11	4	13	6	**97**
Total	**1,025**	**1,487**	**16,145**	**23,250**	**38,837**	**16,719**	**17,903**	**22,067**	**8,269**	**25,402**	**10,993**	**182,095**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	1	1	12	19	34	16	19	25	10	34	17	**187**
LDT1	0	0	1	1	2	1	1	2	1	2	1	**12**
LDT2	0	0	1	1	2	1	1	2	1	2	1	**12**
LHD1	14	27	370	647	1,262	611	706	904	339	1,004	0	**5,885**
LHD2	3	6	84	148	288	140	161	207	78	229	0	**1,344**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	1	2	4	2	2	3	1	4	2	**21**
MH	1	2	22	34	63	29	32	39	14	42	18	**298**
OBUS	2	3	38	62	118	56	60	79	29	82	30	**560**
SBUS	1	2	22	36	66	30	33	41	15	44	19	**308**
T6	58	91	978	1,598	2,924	1,338	1,476	1,824	668	1,955	833	**13,742**
T7	352	553	5,942	9,702	17,756	8,128	8,963	11,074	4,057	11,869	5,057	**83,453**
UBUS	4	8	112	196	382	185	213	273	103	304	129	**1,909**
Total	**437**	**694**	**7,583**	**12,446**	**22,901**	**10,536**	**11,667**	**14,472**	**5,315**	**15,572**	**6,107**	**107,730**

Community Greenhouse Gas Inventory

Motor Vehicle Emissions

Year: 2035 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Additional Reductions

	Emissions w/ Pavley, LCFS (metric tons CO2)	Emissions (metric tons methane)	Emissions (metric tons nitrous oxide)	Total w/ Pavley, LCFS (MTCO2e)	Tire Pressure	Emissions w/ Tire Pressure (MTCO2e)	Low Friction Oil	Emissions w/Low Friction Oil (MTCO2e)	Aerodynamic Efficiency	Emissions w/ Aero (MTCO2e)
LDA	63,733	8.70	10.52	67,178	0.5%	66,842	2.2%	65,372		65,372
LDT1	10,669	1.22	1.48	11,153	0.5%	11,098	2.2%	10,854		10,854
LDT2	33,935	2.98	3.61	35,117	0.5%	34,941	2.2%	34,172		34,172
LHD1	13,966	0.83	1.00	14,295	0.5%	14,223	2.2%	13,910		13,910
LHD2	1,832	0.11	0.14	1,877	0.5%	1,868	2.2%	1,826		1,826
MCY	651	0.13	0.16	703		703		703		703
MDV	45,244	3.02	3.66	46,441	0.5%	46,209	2.2%	45,192		45,192
MH	934	0.04	0.05	951		951		951		951
OBUS	714	0.02	0.03	723		723		723		723
SBUS	326	0.01	0.01	330		330		330		330
T6	13,264	0.38	0.46	13,416		13,416		13,416	2.1%	13,134
T7	75,839	1.34	1.63	76,372		76,372		76,372	2.1%	74,768
UBUS	1,820	0.03	0.03	1,831		1,831		1,831		1,831
Total	**262,930**	**18.82**	**22.78**	**270,387**		**269,506**		**265,653**		**263,767**
			Business as usual:	368,297	**Reduction:**	**880**		**3,854**		**1,886**
			Reduction:	97,910						

Community Greenhouse Gas Inventory

Energy

Year: 2035 (with regulation)

Prepared by Michael Brandman Associates

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445
Methane	0.000025
Nitrous oxide	0.000009

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Regulation MTCO2e	Business as usual MTCO2e	Reductions MTCO2e
Residential	327,589,923	2,800	72883	4.0	1.4	66,597	83,668	17,071
Commercial	193,134,016	8,877	42969	2.4	0.8	39,263	49,327	10,065
Industrial			0	0.0	0.0	0	0	0
Total	**520,723,939**		**115,852**	**6.4**	**2.3**	**105,859**	**132,995**	**27,136**

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) CO2	CH4	N2O	Emissions MTCO2e
Residential	16,762,097	143	98,058	9.2	0.2	89,186
Commercial	3,517,847	162	20,579	1.9	0.0	18,717
Industrial			0	0.0	0.0	0
Total	**20,279,944**		**118,638**	**11.2**	**0.2**	**107,903**

Sources:

- 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). According to the Large IOU RPS Procurement Data 2003-2010 (website: http://www.cpuc.ca.gov/PUC/energy/Renewables), PG&E had 12.1% renewable energy in 2005; therefore, an additional 20.9% renewables is required by 2020.

- Emission factor for carbon dioxide: The average of the 2005 through 2009 emission factors is 0.559, which is from the Pacific Gas and Electric Company, Community Wide GHG Inventory Report for City of Manteca 2005 and 2010. According to the Large IOU RPS Procurement Data 2003-2010 (website: http://www.cpuc.ca.gov/PUC/energy/Renewables), PG&E had an average of 12.6% renewable energy 2005 - 2009. At least 33% renewables is required by the year 2020 according to regulation; therefore, 20.4% is subtracted from the average 2005-2009 emission factor to result in the emission factor with regulation.

- Residential per capita is based on the population; commercial per capita is based on the number of employees. Data is forecast by using 2010 per capita usage rates.

B-2: Vehicle Miles Traveled Memorandum

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TRANSPORTATION ENGINEERING / PLANNING
428 J Street, Suite 500, Sacramento, CA 95814 P 916.266.2190 F 916.266.2195

MEMORANDUM

Date:	April 27, 2012	Project #: 15364
To:	Dave Mitchell, Cori Wilson, Michael Brandman Associates	
From:	Jim Damkowitch, Kittelson & Associates Inc.	
Project:	City of Manteca Climate Action Plan	
Subject:	Development of On-Road Mobile Source Activity Data for GHG Emission Calculations	

This memorandum provides the technical basis for developing the on-road mobile source activity inputs to estimate GHG emission estimates within the City of Manteca. These GHG emission estimates will provide the on-road portion of the GHG inventory and future emission projections for the City of Manteca's Climate Action Plan (CAP).

Analysis Years

The following analysis years were selected for GHG emissions estimation:

- 2005 Selected Baseline Analysis Inventory
- 2010 Baseline Inventory Based on Most Recent Activity Data
- 2020 SB 375 Analysis Year for Estimating GHG Target Metric (GHG emissions per capita)
- 2035 SB 375 Analysis Year for Estimating GHG Target Metric (GHG emissions per capita).

GHG On-Road Emissions Analysis

The on-road mobile source GHG emissions estimates for the City of Manteca's CAP will be calculated using the EMFAC2011 emission inventory model developed by the California Air Resources Board (CARB). EMFAC calculates GHG emission factors that are used as input to the activity module to produce an on-road mobile source GHG emissions inventory. EMFAC uses inputs on the types of vehicles in use, vehicle speeds and vehicle operating conditions to generate on-road vehicle GHG emission factors. These GHG emission factors are then applied to the appropriate on-road activity data stratified by time of day (to account for diurnal ambient temperature variations) to produce a countywide on-road mobile source GHG emissions estimate. The following on-road vehicle activity data inputs are required for analysis:

- Citywide vehicle trips: calculated by EMFAC (VMT / San Joaquin County specific mileage accrual rates).
- Citywide vehicle miles of travel (VMT) by time of day – as described herein.
- VMT by Speed Class by time of day – as described herein.

EMFAC distributes the above activity inputs by vehicle classification, vehicle technology class, operating mode and activity based on CARB distributions developed from vehicle registration data for San Joaquin County. For a description of the EMFAC model see EMFAC2011 Technical Support Documentation located on CARB's website at: http://www.arb.ca.gov/msei/on-road

Baseline "Ground Truth" VMT Estimation

For the 2005 and 2010 analysis years, City of Manteca VMT was derived using VMT estimates developed as part of the federal Highway Performance Monitoring Program (HPMS). For a description of the HPMS program see the following websites: http://www.fhwa.dot.gov/policyinformation/hpms.cfm or http://www.dot.ca.gov/hq/tsip/hpms

The HPMS program estimates VMT by multiplying daily traffic counts by centerline miles of roadway using a random sample of roadways stratified by functional classification and volume group for each state and county in the United States. The statistical veracity (i.e., sample size of roadways within each functional class and volume group stratification) is dependent the geographical unit of analysis (state, county, local jurisdiction) and the federal air quality attainment status of the area. At the statewide level – minimum precision limits for VMT estimation are established at the 90:10 confidence level for each functional classification of roadway. A 90:10 confidence level is also maintained for county's located within federal air quality non-attainment areas designated as either: serious; severe; or, extreme such as San Joaquin County. For smaller geographical units (i.e., local jurisdiction's within a given county), the local roadway portion of the countywide VMT control total is apportioned based on a combination of a local jurisdiction's percent of maintained centerline roadway miles and population[1].

The published[2] 2005 and 2010 HPMS estimates for San Joaquin County are provided in **Table 1** and **Table 2** respectively. Given that the City of Manteca's GHG on-road emission estimates must reflect travel on state highway facilities, the portion of the state highway VMT traveled with the city limits of Manteca must be extracted from the state highway VMT portions reported **Table 1** and **Table 2**. Two state highway facilities traverse the City of Manteca: 4.34 miles of SR-99; and, 4.72 miles SR-120 (distances based on GIS street layer calculation of centerline miles relative to jurisdictional boundary layer overlay). Multiplying the published 2005 and 2010 annual average daily traffic volume data for SR-99 (average of AADT volume for post miles 5.822 to 8.829) and SR-120 (average of AADT volume for post miles 3.323 to 6.197) yields the following Manteca specific state highway VMT estimates:

2005 SR-120 Miles (4.72) x SR-120 AADT (61,000)	= SR-120 VMT (287,920)
2005 SR-99 Miles (4.34) x SR-99 AADT (89,333)	= SR-99 VMT (387,705)
2005 Total SHS VMT in City of Manteca	= **675,625**
2010 SR-120 Miles (4.72) x SR-120 AADT (72,000)	= SR-120 VMT (339,840)
2010 SR-99 Miles (4.34) x SR-99 AADT (83,000)	= SR-99 VMT (360,220)[3]
2010 Total SHS VMT in City of Manteca	= **700,060**

[1] As the metropolitan planning organization (MPO) for San Joaquin County, the San Joaquin Council of Governments is required to validate and track its' regional travel demand model baseline and VMT projections with the sample based "ground truth" HPMS VMT estimates (Section 187 CAAA).

[2] Source: 2005 and 2010 publications of: HPMS California Public Road Data, Transportation System Information, California Department of Transportation.

[3] Lower SR-99 AADT in 2010 relative to 2005 due to the housing market bubble collapse and economic recession in California.

These VMT estimates are then subtracted from the HPMS state highway VMT total and added to the City of Manteca local roadway HPMS to yield the 2005 and 2010 City of Manteca VMT estimates.

2005 Total City of Manteca VMT:	438,580 + 675,625	=	**1,114,205**
2010 Total City of Manteca VMT:	444,650 + 700,060	=	**1,144,710**

Table 1. 2005 Maintained Miles and VMT for San Joaquin County

Jurisdiction	Rural Maintained Centerline Miles	Urban Maintained Centerline Miles	Total Maintained Centerline Miles	Rural VMT	Urban VMT	Total VMT
City of Escalon	3.73	26.91	30.64	2,740	41,220	43,960
City of Lathrop	5.53	58.16	63.69	3,590	118,970	122,560
City of Lodi	1.61	179.07	180.68	560	507,310	507,870
City of Manteca	**11.30**	**132.56**	**143.86**	**17,760**	**420,820**	**438,580**
City of Ripon	2.49	61.77	64.26	6,360	114,630	120,990
City of Stockton	2.15	732.56	734.71	9,600	2,624,680	2,634,270
City of Tracy	18.05	138.66	156.71	21,690	576,330	598,030
County	1353.72	320.45	1674..17	1,542,710	838,250	2,380,960
State Highways	184.76	75.88	260.64	5,481,320	6,098,960	11,580,280
Park Service	48.71	0.00	48.71	4,380	0	4,380
U.S. Army	0.00	32.30	0.00	0	26,840	26,840
Total	1,632.05	1,758.32	3,390.37	7,090,710	11,368,010	18,458,720

Table 2. 2010 Maintained Miles and VMT for San Joaquin County

Jurisdiction	Rural Maintained Centerline Miles	Urban Maintained Centerline Miles	Total Maintained Centerline Miles	Rural VMT	Urban VMT	Total VMT
City of Escalon	3.73	27.81	31.54	2,650	41,270	43,930
City of Lathrop	11.92	60.29	72.21	29,840	123,860	153,690
City of Lodi	1.82	181.10	182.92	650	523,380	524,030
City of Manteca	**13.30**	**134.47**	**147.76**	**17,870**	**426,780**	**444,650**
City of Ripon	2.86	70.57	73.43	6,900	113,380	120,280
City of Stockton	2.90	757.55	760.45	9,710	2,645,320	2,655,020
City of Tracy	18.40	138.86	157.26	25,280	564,600	589,870
County	1351.30	319.26	1670.56	1,510,170	802,610	2,312,780
State Highways	185.59	75.88	261.47	4,850,080	5,453,560	10,303,640
Park Service	48.71	0.00	48.71	4,380	0	4,380
U.S. Army	0.00	32.30	32.30	0	26,840	26,840
Total	1,640.53	1,798.08	3,438.61	6,457,530	10,721,590	17,179,120

Forecast VMT Estimation

For the future analysis years, the 2010 HPMS VMT estimate described above was "grown" to reflect 2035 conditions by applying a Manteca sub-area specific modeled VMT growth factor. The VMT growth factor was developed by executing the 2010 and 2035 SJCOG travel demand model[4] – using CUBE scripts that automatically isolate only those model links that traverse within the City of Manteca sub-area of the model. Based on this analysis, VMT is estimated to grow by 63 percent over the 25 year period. This growth factor is then multiplied by the 2010 "ground truth" VMT estimate to yield the City of Manteca 2035 VMT. The 2020 interim analysis year VMT estimate was developed by linearly interpolating between the 2035 "out-year" and the 2010 "ground truth" VMT estimate.

2020 Total City of Manteca VMT:	=	**1,443,281**
2035 Total City of Manteca VMT:	=	**1,865,877**

On-Road Activity Data Inputs

For each SJCOG travel demand model run, model output was automatically generated and tailored for input into EMFAC2011. The following model output was generated:

- Requisite AM peak period, PM peak period and off-peak period VMT estimates.
- Requisite VMT stratifications into 5 mph speed bins.
- External traffic stratifications (i.e., internal-internal VMT, external-internal VMT, internal-external VMT and external-external VMT (I-I, I-X, X-I and X-X)).

Although the latter external trip VMT breakdowns are not required for air quality analyses – they do figure prominently in addressing SB375 GHG performance measures i.e., emission per capita estimates.

The VMT speed class distributions were applied for each analysis year is as follows:

Time Period	Source of Distribution
12-6	Off-Peak – SJCOG Model Off-Peak Assignment)
7-10	AM Peak - SJCOG Model AM Peak Period Assignment)
11-3	Off-Peak – SJCOG Model Off-Peak Assignment)
4-7	PM Peak – SJCOG Model PM Peak Period Assignment)
8-11	Off-Peak - SJCOG Model (Off-Peak Assignment)

[4] The most recently updated travel demand model developed by SJCOG was used. The model uses the most recent baseline population, household, and employment estimates developed by the Business Forecasting Center at University of Pacific (UOP) for 2010. All future model land use assumptions are based on the most recently approved regional growth forecasts for San Joaquin County. SJCOG develops its population and employment projections based on historic trends. The projections are based on historical trends from past census, Department of Finance estimates, and Office of Economic Development estimates. County and city projections are adopted by the SJCOG Board. A projected countywide control total is adopted first, and then projected growth is apportioned to cities - down to the traffic analysis zone (TAZ) level. Some TAZ's in urban areas are determined to be "built out" and no new growth is attributed to these zones. General Plan information from the cities and San Joaquin County are considered at the local level but not directly used by SJCOG as part of this process. The projections are reviewed by the SJCOG Technical Advisory Committee, and published for public review as part of the board approval process.

Model output was used to yield the VMT stratification activity percentages. These percentages were used to allocate the HPMS based 2005, 2010, 2020 and 2035 VMT control totals. The City of Manteca specific VMT stratifications by trip type and speed class for each analysis year are provided in **Table 3** through **Table 6**.

Note that when input into EMFAC, the vehicle activity presented herein will be further stratified by vehicle model year (i.e., fleet demographics) vehicle type and fuel type (i.e., distribution of vehicles by vehicle type and technology group) based on EMFAC2011 defaults for San Joaquin County. These stratifications will vary by analysis year as appropriate to reflect the natural attrition of the vehicle fleet (i.e., vehicle fleet turnover) based on data pertaining to vehicle life-span and market penetration of newer vehicles resident within EMFAC. Ambient temperature will also be meteorological inputs specific to San Joaquin County.

Scaling for Emissions Analysis

Given that EMFAC output is expressed in tons per day and that the smallest geographical unit of measurement is by county – to ensure appropriately scaled output is generated when analyzing sub-county geographies such as the City Manteca, the following steps are recommended:

1. Scale sub-area VMT by a factor of "10"

2. Input into EMFAC the scaled VMT inputs and run EMFAC to generate regional emissions estimates.

3. Convert the EMFAC emission output (expressed in tons/day) to grams/day as follows: EMFAC output x 2000 (lbs per ton) x 453.6 (grams per lbs) to yield scaled emissions expressed in grams/day.

4. Divide the result of Step 3 by the chosen scale factor (in this example 10) to yield grams/day of emissions for the geographic area of interest. Convert back to tons/day or lbs/day of emissions as desired.

Following these steps will ensure that emission categories that include vehicle activity will generate non-zero emission levels within the EMFAC software (which rounds to two significant digits).

Table 3. 2005 City of Manteca Activity Inputs

2005 AM PEAK PERIOD (3 HOURS: 7 - 10)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
20-25	13148	5.0%	81.16%	7.82%	8.91%	2.11%	10670	1028	1172	277
25-30	14131	5.4%	69.81%	21.16%	11.43%	0.00%	9864	2990	1615	0
30-35	35290	13.5%	68.97%	14.51%	15.26%	1.26%	24338	5119	5387	446
35-40	48372	18.5%	36.57%	18.55%	15.71%	29.18%	17687	8975	7597	14113
40-45	23422	8.9%	9.12%	19.54%	18.28%	53.06%	2136	4577	4282	12426
45-50	13573	5.2%	9.93%	59.27%	3.28%	27.51%	1348	8045	446	3734
50-55	1459	0.6%	21.21%	10.87%	43.67%	24.24%	310	159	637	354
55-60	24681	9.4%	22.18%	43.13%	14.48%	20.21%	5474	10644	3574	4989
60-65	87762	33.5%	17.07%	49.65%	14.28%	19.00%	14981	43575	12531	16337
TOTAL	261838	100%	33.2%	32.5%	14.2%	20.1%	86809	85112	37240	52677

2005 PM PEAK PERIOD (3 HOURS: 4 - 7)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
20-25	18771	6.1%	81.42%	6.94%	9.22%	2.42%	15284	1303	1731	453
25-30	17798	5.8%	77.14%	11.01%	14.83%	0.00%	13730	1959	2639	0
30-35	43609	14.2%	73.60%	12.98%	12.74%	0.68%	32098	5661	5555	296
35-40	37559	12.3%	55.10%	13.04%	17.35%	14.50%	20697	4900	6516	5447
40-45	39465	12.9%	10.03%	18.04%	21.26%	50.67%	3957	7121	8391	19995
50-55	2533	0.8%	21.24%	39.04%	17.19%	22.52%	538	989	435	571
55-60	95198	31.1%	17.71%	6.68%	53.79%	21.83%	16855	6359	51204	20779
60-65	51472	16.8%	21.92%	40.15%	20.27%	17.66%	11283	20668	10431	8561
TOTAL	306407	100%	37.3%	16.0%	28.4%	18.3%	114442	48960	86902	56103

2005 OFF PEAK PERIOD (18 HOURS)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
15-20	450	0.1%	58.48%	16.96%	15.76%	8.80%	263	76	71	40
20-25	40351	7.4%	85.90%	4.95%	7.19%	1.95%	34661	1999	2902	789
25-30	37952	7.0%	83.68%	10.19%	9.41%	0.00%	31758	3868	3570	0
30-35	80953	14.8%	80.93%	10.21%	9.84%	0.00%	65517	8263	7965	0
35-40	47991	8.8%	78.64%	10.34%	10.53%	0.49%	37739	4962	5053	237
40-45	32763	6.0%	19.68%	23.64%	22.13%	34.55%	6447	7745	7251	11320
45-50	58091	10.6%	15.40%	18.48%	22.86%	43.26%	8945	10735	13279	25133
50-55	41064	7.5%	13.19%	31.74%	14.57%	40.50%	5418	13033	5982	16630
55-60	3884	0.7%	13.63%	55.06%	2.70%	28.60%	530	2139	105	1111
60-65	202462	37.08%	20.18%	26.52%	30.38%	23.70%	40863	53694	61503	44365
TOTAL	545960	100%	42.5%	19.5%	19.7%	18.2%	232141	106513	107681	99625

Table 4. 2010 City of Manteca Activity Inputs

2010 AM PEAK PERIOD (3 HOURS: 7 - 10)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
20-25	13508	5.0%	81.16%	7.82%	8.91%	2.11%	10962	1056	1204	285
25-30	14518	5.4%	69.81%	21.16%	11.43%	0.00%	10135	3071	1659	0
30-35	36256	13.5%	68.97%	14.51%	15.26%	1.26%	25004	5259	5534	459
35-40	49697	18.5%	36.57%	18.55%	15.71%	29.18%	18172	9221	7805	14499
40-45	24063	8.9%	9.12%	19.54%	18.28%	53.06%	2195	4702	4399	12767
45-50	13945	5.2%	9.93%	59.27%	3.28%	27.51%	1385	8266	458	3836
50-55	1499	0.6%	21.21%	10.87%	43.67%	24.24%	318	163	655	363
55-60	25356	9.4%	22.18%	43.13%	14.48%	20.21%	5623	10936	3672	5125
60-65	90165	33.5%	17.07%	49.65%	14.28%	19.00%	15391	44768	12874	16785
TOTAL	269007	100%	33.2%	32.5%	14.2%	20.1%	89186	87442	38260	54120

2010 PM PEAK PERIOD (3 HOURS: 4 - 7)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
20-25	19285	6.1%	81.42%	6.94%	9.22%	2.42%	15703	1339	1778	466
25-30	18286	5.8%	77.14%	11.01%	14.83%	0.00%	14106	2012	2711	0
30-35	44803	14.2%	73.60%	12.98%	12.74%	0.68%	32976	5816	5707	304
35-40	38587	12.3%	55.10%	13.04%	17.35%	14.50%	21263	5034	6694	5596
40-45	40546	12.9%	10.03%	18.04%	21.26%	50.67%	4066	7316	8621	20543
50-55	2603	0.8%	21.24%	39.04%	17.19%	22.52%	553	1016	447	586
55-60	97804	31.1%	17.71%	6.68%	53.79%	21.83%	17316	6534	52606	21348
60-65	52881	16.8%	21.92%	40.15%	20.27%	17.66%	11591	21234	10716	8795
TOTAL	314795	100%	37.3%	16.0%	28.4%	18.3%	117575	50300	89281	57638

2010 OFF PEAK PERIOD (18 HOURS)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
15-20	462	0.1%	58.48%	16.96%	15.76%	8.80%	270	78	73	41
20-25	41455	7.4%	85.90%	4.95%	7.19%	1.95%	35610	2054	2982	810
25-30	38991	7.0%	83.68%	10.19%	9.41%	0.00%	32628	3974	3668	0
30-35	83170	14.8%	80.93%	10.21%	9.84%	0.00%	67311	8490	8183	0
35-40	49305	8.8%	78.64%	10.34%	10.53%	0.49%	38773	5098	5191	244
40-45	33660	6.0%	19.68%	23.64%	22.13%	34.55%	6624	7957	7449	11630
45-50	59681	10.6%	15.40%	18.48%	22.86%	43.26%	9190	11029	13642	25821
50-55	42188	7.5%	13.19%	31.74%	14.57%	40.50%	5566	13390	6146	17086
55-60	3990	0.7%	13.63%	55.06%	2.70%	28.60%	544	2197	108	1141
60-65	208005	37.08%	20.18%	26.52%	30.38%	23.70%	41982	55164	63187	45580
TOTAL	560908	100%	42.5%	19.5%	19.7%	18.2%	238497	109430	110629	102353

Table 5. 2020 City of Manteca Activity Inputs

2020 AM PEAK PERIOD (3 HOURS: 7 - 10)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
10-15	508	0.2%	49.13%	19.98%	25.19%	5.70%	250	102	128	29
15-20	668	0.2%	26.64%	44.36%	9.65%	19.35%	178	296	64	129
20-25	17408	5.2%	72.83%	11.24%	11.78%	4.16%	12678	1957	2050	724
25-30	31400	9.3%	55.42%	28.07%	11.06%	6.88%	17402	8812	3474	2161
30-35	57380	17.0%	57.00%	19.75%	15.66%	7.60%	32704	11333	8985	4358
35-40	56621	16.8%	37.82%	22.39%	14.29%	25.49%	21416	12678	8093	14434
40-45	47202	14.0%	10.46%	33.14%	11.80%	44.59%	4937	15645	5572	21049
45-50	22082	6.6%	9.35%	54.04%	4.86%	31.75%	2064	11934	1073	7012
50-55	2112	0.6%	18.59%	8.65%	35.80%	36.96%	393	183	756	781
55-60	22643	6.7%	27.11%	34.11%	23.14%	15.64%	6138	7724	5239	3541
60-65	78796	23.4%	18.50%	36.38%	24.48%	20.63%	14581	28666	19292	15807
TOTAL	**336821**	**100%**	**33.5%**	**29.5%**	**16.2%**	**20.8%**	**112739**	**99329**	**54728**	**70024**

2020 PM PEAK PERIOD (3 HOURS: 4 - 7)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
10-15	614	0.2%	48.79%	22.08%	21.33%	7.80%	300	136	131	48
15-20	669	0.2%	31.05%	11.90%	36.87%	20.19%	208	80	247	135
20-25	23263	5.9%	78.29%	9.50%	10.58%	1.63%	18213	2211	2461	378
25-30	31408	8.0%	65.47%	11.46%	20.38%	4.48%	20562	3600	6399	1407
30-35	67241	17.1%	62.60%	13.57%	17.48%	6.36%	42090	9121	11756	4274
35-40	46233	11.7%	53.80%	12.42%	19.03%	14.76%	24872	5741	8797	6822
40-45	63418	16.1%	11.67%	12.31%	33.39%	42.62%	7404	7809	21176	27029
45-50	16334	4.1%	9.78%	5.36%	50.15%	34.71%	1598	875	8192	5669
50-55	2820	0.7%	24.09%	39.53%	19.72%	16.67%	679	1115	556	470
55-60	81029	20.6%	22.47%	16.74%	40.21%	20.58%	18209	13567	32578	16674
60-65	61123	15.5%	20.45%	41.60%	15.85%	22.11%	12497	25424	9690	12950
TOTAL	**394152**	**100%**	**37.2%**	**17.7%**	**25.9%**	**19.2%**	**146633**	**69679**	**101983**	**75857**

2020 OFF PEAK PERIOD (18 HOURS)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
10-15	167	0.0%	56.74%	22.02%	20.20%	1.04%	94	37	34	2
15-20	1476	0.2%	62.12%	15.74%	16.67%	5.46%	917	232	246	81
20-25	48703	6.9%	85.21%	5.73%	7.87%	1.19%	41500	2791	3834	578
25-30	49921	7.1%	82.21%	10.46%	9.18%	0.12%	41039	5224	4581	59
30-35	113388	16.1%	77.60%	11.11%	10.96%	0.91%	87995	12602	12425	1032
35-40	55990	8.0%	79.23%	9.80%	10.67%	0.30%	44362	5484	5977	167
40-45	27305	3.9%	32.73%	23.95%	22.59%	20.73%	8936	6540	6168	5661
45-50	99011	14.1%	16.08%	24.19%	23.17%	36.56%	15924	23950	22936	36201
50-55	60662	8.6%	16.68%	28.35%	19.85%	35.13%	10119	17196	12039	21309
55-60	83073	11.8%	14.68%	43.91%	14.57%	26.84%	12197	36474	12102	22300
60-65	162612	23.2%	22.65%	26.07%	28.73%	23.03%	36824	42390	46716	35034
TOTAL	**702308**	**100%**	**42.7%**	**21.8%**	**18.1%**	**17.4%**	**299909**	**152919**	**127058**	**122422**

Table 6. 2035 City of Manteca Activity Inputs

2035 AM PEAK PERIOD (3 HOURS: 7 - 10)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
10-15	1655	0.4%	49.13%	19.98%	25.19%	5.70%	813	331	417	94
15-20	2173	0.5%	26.64%	44.36%	9.65%	19.35%	579	964	210	420
20-25	23630	5.4%	60.33%	16.37%	16.07%	7.23%	14256	3868	3798	1708
25-30	66695	15.2%	33.85%	38.43%	10.52%	17.20%	22574	25632	7016	11473
30-35	98099	22.4%	39.04%	27.62%	16.25%	17.09%	38299	27093	15941	16766
35-40	62767	14.3%	39.71%	28.15%	12.18%	19.97%	24925	17667	7642	12532
40-45	94789	21.6%	12.46%	53.55%	2.09%	31.90%	11814	50757	1982	30237
45-50	37773	8.6%	8.47%	46.20%	7.22%	38.12%	3198	17449	2728	14397
50-55	3209	0.7%	14.66%	5.31%	23.99%	56.04%	471	170	770	1799
55-60	11697	2.7%	34.50%	20.59%	36.13%	8.78%	4036	2408	4226	1027
60-65	35995	8.2%	20.66%	16.47%	39.79%	23.08%	7435	5930	14323	8307
TOTAL	**438481**	**100%**	**29.3%**	**34.7%**	**13.5%**	**22.5%**	**128398**	**152269**	**59053**	**98761**

2035 PM PEAK PERIOD (3 HOURS: 4 - 7)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
10-15	1999	0.4%	48.79%	22.08%	21.33%	7.80%	975	441	426	156
15-20	2178	0.4%	31.05%	11.90%	36.87%	20.19%	676	259	803	440
20-25	28558	5.6%	73.60%	13.35%	12.61%	0.44%	21018	3812	3602	126
25-30	57511	11.2%	47.96%	12.15%	28.70%	11.20%	27580	6986	16504	6441
30-35	109296	21.3%	46.08%	14.44%	24.60%	14.87%	50367	15784	26891	16254
35-40	56121	10.9%	51.84%	11.48%	21.55%	15.14%	29093	6441	12092	8494
40-45	107263	20.9%	14.15%	3.72%	51.58%	30.55%	15172	3988	55329	32774
45-50	53160	10.4%	9.78%	5.36%	50.15%	34.71%	5202	2847	26661	18450
50-55	2815	0.5%	28.35%	40.26%	23.51%	7.88%	798	1133	662	222
55-60	24581	4.8%	29.62%	31.84%	19.83%	18.70%	7282	7826	4875	4598
60-65	69635	13.6%	18.24%	43.76%	9.24%	28.77%	12699	30470	6432	20034
TOTAL	**513116**	**100%**	**33.3%**	**15.6%**	**30.1%**	**21.0%**	**170862**	**79988**	**154277**	**107989**

2035 OFF PEAK PERIOD (18 HOURS)			Percentage VMT				VMT			
SPEED	VMT	%_Tot_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT	I_I_VMT	XI_VMT	IX_VMT	XX_VMT
11-15	542	0.1%	56.74%	22.02%	20.20%	1.04%	307	119	109	6
15-20	3673	0.4%	67.58%	13.92%	18.04%	0.46%	2482	511	663	17
20-25	57148	6.3%	84.18%	6.89%	8.89%	0.04%	48105	3940	5082	20
25-30	67138	7.3%	80.00%	10.87%	8.83%	0.29%	53711	7300	5929	198
30-35	165679	18.1%	72.61%	12.47%	12.64%	2.28%	120307	20666	20935	3771
35-40	61673	6.7%	80.12%	8.98%	10.89%	0.00%	49414	5538	6719	1
40-45	6567	0.7%	52.30%	24.42%	23.28%	0.00%	3434	1603	1529	0
45-50	176317	19.3%	17.11%	32.75%	23.63%	26.51%	30171	57751	41655	46739
50-55	94279	10.3%	21.91%	23.26%	27.76%	27.07%	20659	21928	26173	25519
55-60	260608	28.5%	16.26%	27.17%	32.37%	24.21%	42366	70807	84350	63085
60-65	20657	2.3%	26.34%	25.39%	26.25%	22.02%	5441	5245	5423	4548
TOTAL	**914280**	**100%**	**41.2%**	**21.4%**	**21.7%**	**15.7%**	**376398**	**195409**	**198568**	**143904**

B-3: PG&E Data

Community Wide GHG Inventory Report for City of Manteca 2005 and 2010

Provided to:	Cori Wilson
	Cori Wilson <CWILSON@brandman.com>
from	Michael Brandman Associates
Date:	5/23/12
Provided by (PG&E Representative):	John Joseph
	Green Communities and Innovator Pilots
Contact Iinformation	GHGDataRequests@pge.com
	(415) 973-5737

Legal Notice

Raw Energy data from PG&E

TOTCITY	YEAR	CATEGORY	RES ELEC AVG (KWH)	RES ELEC USE(KWH)	RES ELEC CLIM USE(KWH)	COM ELEC AVG(KWH)	COM ELEC USE(KWH)	COM ELEC CLIM USE(KWH)	IND ELEC AVG(KWH)	IND ELEC USE(KWH)
MANTECA	2005	NONGOVENT	687	172,699,979		4,551	97,939,112			
MANTECA	2005	(3) COUNTY				2,282	438,507			
MANTECA	2005	(4) CITY				4,810	11,063,320		496,644	3,809,262
MANTECA	2005	(5) DISTRICT				17,617	11,620,515			
MANTECA	2010	NONGOVENT	672	185,366,454	424,407	4,870	121,947,140	312,604		
MANTECA	2010	(3) COUNTY				1,578	338,929			
MANTECA	2010	(4) CITY	6	66		2,543	9,357,640		603,070	7,236,842
MANTECA	2010	(5) DISTRICT				14,456	10,934,609			

Raw Energy data from PG&E

TOTCITY	YEAR	CATEGORY	IND ELEC 1515	DA KWH	RES GAS AVG(THM)	RES GAS USE(THM)	RES GAS CLIM USE(THM)	COM GAS AVG(THM)	COM GAS USE(THM)	COM GAS CLIM USE(THM)
MANTECA	2005	NONGOVENT	FAIL	ZZZZZ	35	8,556,595		175	1,852,345	
MANTECA	2005	(3) COUNTY						41	6,473	
MANTECA	2005	(4) CITY						171	35,004	
MANTECA	2005	(5) DISTRICT						773	205,736	
MANTECA	2010	NONGOVENT	FAIL	ZZZZZ	35	9,484,817	21,741	192	2,221,211	2,411
MANTECA	2010	(3) COUNTY						34	5,313	
MANTECA	2010	(4) CITY			15	98		166	37,531	
MANTECA	2010	(5) DISTRICT						623	179,387	

PG&E Community-Wide GHG Inventory Data Dictionary

Updated 9/24/2011

Field	Description
CITY	Town or township (TOT) associated with the service address of customer accounts.
YEAR	Year of usage.
CATEGORY	This categorization indicates usage and emissions for accounts owned by local government. There are four categories: (1) City; (2) County, (3) District and (4) Non-government based on PG&E account categorizations. These fields are not included in NAICS manuals issued by the Federal Government - they are specific to PG&E. The District category includes accounts like Bay Area Rapid Transit, School Districts, Hospital Districts, Water or Sewer Districts, Fire Districts, Junior College Districts, District Fairs, Public Utility Districts, Community Service Districts, Cemetery Districts, Mosquito Abatement Districts and Park Districts. Any accounts not included in the City, County or District categories are included in the non-government category (including Federal, State, Foreign Government and Private accounts).
RES ELEC AVG(KWH)	Average normalized monthly residential electricity usage in kWh. Average usage is calculated by dividing total residential usage divided by the number of normalized customer months in the year. Customer months are the number of months in a year that a customer has an active account (e.g., if there are 3 accounts in a category, and one account was active 12 months of the year, the other for 10 months, and the other for 5 months, then the AVG value would represent usage divided by 27 months (12+10+5 = 27)). To normalize months, we compare the time between meter readings to a full billing month (28 to 33 days). Full billing months are weighted as 1 and partial billing months are weighted as a fraction above or below the number 1. By using this methodology the average value represents a more accurate monthly usage average for
RES ELEC USE(KWH)	Total annual electricity usage in kWh associated with PG&E residential customers.
RES ELEC CLIM(lbs)	CO2 emission reductions in pounds from residential customers enrolled in PG&E's ClimateSmart program. These reductions can be subtracted from the total annual estimated emissions. See http://www.pge.com/climatesmart for the list and location of ClimateSmart projects.
COM ELEC AVG(KWH)	Average normalized monthly commercial electricity usage in kWh. Average usage is calculated by dividing total commercial usage divided by the number of normalized customer months in the year. Customer months are the number of months in a year that a customer has an active account (e.g., if there are 3 accounts in a category, and one account was active 12 months of the year, the other for 10 months, and the other for 5 months, then the AVG value would represent usage divided by 27 months (12+10+5 = 27)). To normalize months, we compare the time between meter readings to a full billing month (28 to 33 days). Full billing months are weighted as 1 and partial billing months are weighted as a fraction above or below the number 1. By using this methodology the average value represents a more accurate monthly usage average for
COM ELEC USE(KWH)	Total annual electricity usage in kWh associated with PG&E commercial customers.
COM ELEC GHG(tons)	Total annual estimated CO2 emissions from electricity usage in metric tons of CO2. Emission factors for PG&E can be found in the attached reference sheet.
COM ELEC CLIM(lbs)	CO2 emission reductions in pounds from commercial customers enrolled in PG&E's ClimateSmart program. These reductions can be subtracted from the total annual estimated emissions. Not that these emissions are not in the same units as electric GHG emissions, which are in tons.
IND ELEC AVG(KWH)	Average normalized monthly industrial electricity usage in kWh. Average usage is calculated by dividing total industrial usage divided by the number of normalized customer months in the year. Customer months are the number of months in a year that a customer has an active account (e.g., if there are 3 accounts in a category, and one account was active 12 months of the year, the other for 10 months, and the other for 5 months, then the AVG value would represent usage divided by 27 months (12+10+5 = 27)). To normalize months, we compare the time between meter readings to a full billing month (28 to 33 days). Full billing months are weighted as 1 and partial billing months are weighted as a fraction above or below the number 1. By using this methodology the average value represents a more accurate monthly usage average for
IND ELEC USE(KWH)	Total annual electricity usage in kWh associated with PG&E industrial customers.
IND ELEC CLIM(lbs)	CO2 emission reductions in pounds from industrial customers enrolled in PG&E's ClimateSmart program. These reductions can be subtracted from the total annual estimated emissions. Note that these emissions are not in the same units as electric GHG emissions, which are in tons.

IND ELEC 1515	This field indicates whether the "1515 rule" passed or failed for the category of industrial electricity usage. The 15/15 Rule was adopted by the CPUC in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the complied data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released. The Rule further requires that if the 15/15 Rule is triggered for a second time after the data has been screened once already using the 15/15 Rule, the customer be dropped from the information provided
DA KWH	Electricity usage for customers for whom PG&E provides transmission and distribution services, but not electricity generation. If there is Direct Access usage, but the category fails the "1515 Rule", the value field takes the value ZZZZZ.
RES GAS AVG(THM)	Average normalized monthly residential electricity usage in therms. Average usage is calculated by dividing total residential usage divided by the number of normalized customer months in the year. Customer months are the number of months in a year that a customer has an active account (e.g., if there are 3 accounts in a category, and one account was active 12 months of the year, the other for 10 months, and the other for 5 months, then the AVG value would represent usage divided by 27 months (12+10+5 = 27)). To normalize months, we compare the time between meter readings to a full billing month (28 to 33 days). Full billing months are weighted as 1 and partial billing months are weighted as a fraction above or below the number 1. By using this methodology the average value represents a more accurate monthly usage average for
RES GAS USE(THM)	Total annual natural gas usage in therms associated with PG&E residential customers.
RES GAS GHG(tons)	Total annual estimated CO2 emissions from natural gas usage in metric tons of CO2.
RES GAS CLIM(lbs)	CO2 emission reductions in pounds from residential customers enrolled in PG&E's ClimateSmart program. These reductions can be subtracted from the total annual estimated emissions
COM GAS AVG(THM)	Average normalized monthly commercial natural gas usage in therms. Average usage is calculated by dividing total commercial usage divided by the number of normalized customer months in the year. Customer months are the number of months in a year that a customer has an active account (e.g., if there are 3 accounts in a category, and one account was active 12 months of the year, the other for 10 months, and the other for 5 months, then the AVG value would represent usage divided by 27 months (12+10+5 = 27)). To normalize months, we compare the time between meter readings to a full billing month (28 to 33 days). Full billing months are weighted as 1 and partial billing months are weighted as a fraction above or below the number 1. By using this methodology the average value represents a more accurate monthly usage average for
COM GAS USE(THM)	Total annual natural gas usage in therms associated with PG&E commercial customers. But this does include other PG&E gas use, such as natural gas vehicle fueling stations owned by PG&E and gas used at pumping stations along the gas pipeline system.
COM GAS CLIM(lbs)	CO2 emission reductions in pounds from commercial customers enrolled in PG&E's ClimateSmart program. These reductions can be subtracted from the total annual estimated emissions. Not that these emissions are not in the same units as electric GHG emissions, which are in tons.
IND GAS AVG(THM)	Average normalized monthly industrial natural gas usage in therms. Average usage is calculated by dividing total industrial usage divided by the number of normalized customer months in the year.
IND GAS USE(THM)	Total annual natural gas usage in therms associated with PG&E industrial customers. But this does include other PG&E gas use, such as natural gas vehicle fueling stations owned by PG&E and gas used at pumping stations along the gas pipeline system. Note that GEG (electric generation) accounts were excluded from this inventory since the greenhouse effect for
IND GAS CLIM(lbs)	CO2 emission reductions in pounds from industrial customers enrolled in PG&E's ClimateSmart program. These reductions can be subtracted from the total annual estimated emissions. Not that these emissions are not in the same units as electric GHG emissions, which are in tons.
IND GAS 1515	This field indicates whether the "1515 rule" passed or failed for the category of industrial natural gas usage. The 15/15 Rule was adopted by the CPUC in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the complied data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released. The Rule further requires that if the 15/15 Rule is triggered for a second time after the data has been screened once already using the 15/15 Rule, the customer be dropped from the information provided

PG&E Emission Factors and Other information

Updated 6/27/2011

Conversions

pounds to Metric Tons	2204.6	lbs per MT
kWh to Mmbtu	0.003412	Mmbtu per kWh
therms to Mbtu	0.1	Mmbtu per therm

Emission Factors

More information about Emission Factors available at:
http://www.pge.com/includes/docs/pdfs/mybusiness/energysavingsrebates/incentivesbyindustry/GHG_Emission_Factor_Guidance.pdf

Electricity Emissions Factor

Usage Year	Emission factor	Units	Source
2003	0.6200	lbs CO2 per kWh	PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009)
2004	0.5660	lbs CO2 per kWh	
2005	0.4890	lbs CO2 per kWh	
2006	0.4560	lbs CO2 per kWh	
2007	0.6357	lbs CO2 per kWh	
2008	0.6410	lbs CO2 per kWh	
2009	0.5750	lbs CO2 per kWh	
Average	0.559	lbs CO2 per kWh	Average of PG&E's 2005 to 2009 GHG emission factors. See Note 1 below.

Natural Gas Emissions Factor

Usage Year		
2005	11.70	lbs CO2 per therm
2006	11.70	lbs CO2 per therm
2007	11.70	lbs CO2 per therm
2008	11.70	lbs CO2 per therm
2009	11.70	lbs CO2 per therm
2010	11.70	lbs CO2 per therm

Note 1: PG&E's 2010 emission factor will be available in late December 2011. As the CPUC GHG Calculator does not include a 2011 emission factor, we recommend using the "current" emission factor for 2011. These factors will be reviewed and updated annually.

B-4: Waste Reports

Jurisdiction Disposal By Facility

With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC)

Disposal during 2005 for Manteca

Destination Facility	SWISNo	Qtr	Instate Ton	Transform Ton	Export Ton	Total ADC	Total AIC
Unknown Destination					873		
Altamont Landfill & Resource Recv`ry	01-AA-0009		3				
Azusa Land Reclamation Co. Landfill	19-AA-0013		22				
Bakersfield Metropolitan (Bena) SLF	15-AA-0273		5				
Bonzi Sanitary Landfill	50-AA-0003		6				
Covanta Stanislaus, Inc.	50-AA-0009			32			
Fink Road Landfill	50-AA-0001		25				
Foothill Sanitary Landfill	39-AA-0004		25,933				
Forward Landfill, Inc.	39-AA-0015		45,420			9,922	
L and D Landfill Co	34-AA-0020		10				
North County Landfill	39-AA-0022		90				
Potrero Hills Landfill	48-AA-0075		336				
Recology Hay Road	48-AA-0002		8				
Sacramento County Landfill (Kiefer)	34-AA-0001		22				
Vasco Road Sanitary Landfill	01-AA-0010		311				
Yearly Totals:			72,191.37	31.91	872.8	9,922.98	

Notes:
1. Disposal tonnage is subject to change due to revisions. Report is based upon information provided by County disposal reports.
2. AIC information was not collected prior to 2006.

California Department of Resources Recycling and Recovery (CalRecycle)
Disposal Reporting System (DRS)

Jurisdiction Disposal By Facility

With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC)

Disposal during 2010 for Manteca

Destination Facility	SWISNo	Qtr	Instate Ton	Transform Ton	Export Ton	Total ADC	Total AIC
Altamont Landfill & Resource Recv`ry	01-AA-0009		17				
Azusa Land Reclamation Co. Landfill	19-AA-0013		17				
Bakersfield Metropolitan (Bena) SLF	15-AA-0273						
Covanta Stanislaus, Inc.	50-AA-0009			1			
Fink Road Landfill	50-AA-0001		13				
Foothill Sanitary Landfill	39-AA-0004		16,256				
Forward Landfill, Inc.	39-AA-0015		42,813			33	
Keller Canyon Landfill	07-AA-0032		2				
Kettleman Hills - B18 Nonhaz Codisposal	16-AA-0023						
L and D Landfill Co	34-AA-0020		26			10	2
North County Landfill	39-AA-0022		22				
Potrero Hills Landfill	48-AA-0075		7				
Recology Hay Road	48-AA-0002						
Sacramento County Landfill (Kiefer)	34-AA-0001		6				
Simi Valley Landfill & Recycling Center	56-AA-0007		10				
Vasco Road Sanitary Landfill	01-AA-0010		16				
Yearly Totals:			59,205.25	1.02		43.19	2.02

Notes:
1. Disposal tonnage is subject to change due to revisions. Report is based upon information provided by County disposal reports.
2. AIC information was not collected prior to 2006.

B-5: SEEC Output

Statewide Energy Efficiency Collaborative

AN ALLIANCE TO SUPPORT LOCAL GOVERNMENT

Detailed Report

Report Generation Status: Complete

Report Options:
Run Report | Hide Details | Printable View | Export Details

Generated Report:

Inventory Record Name	Sector	Total Energy (MMBtu)	Total CO2 (metric tons)	Total N2O (metric tons)	Total CH4 (metric tons)	CO2e (metric tons)	Info-Only Item	Scope 3 Item	Municipal Utility	Notes	Inventory Record: Created Date
Annual Inventory: Manteca, CA 2010 Community Inventory **(4 records)**											
		5,855,856.59	408,770.03	28.0317	480.0005	427,539.86					
Residential	Residential	1,580,952.04	103,735.88	8.5028	7.1807	106,522.54				-	6/26/2012
Commercial	Commercial	638,204.74	46,938.32	5.5536	2.7147	48,716.94				-	6/26/2012
Waste	Waste	0.00	0.00	0.0000	458.5580	9,629.72				-	6/26/2012
Transportation	Transportation	3,636,699.81	258,095.83	13.9753	11.5471	262,670.66				-	6/26/2012
Annual Inventory: Manteca 2005 Community Inventory **(4 records)**											
		5,693,230.51	380,239.97	16.9052	580.0869	397,662.40					
Residential	Residential	1,444,911.83	83,685.41	0.9472	6.6284	84,118.24				-	6/24/2012
Commercial non-government	Commercial	519,402.75	31,551.67	0.5071	2.2590	31,756.31				-	6/24/2012
Waste	Waste	0.00	0.00	0.0000	559.1378	11,741.89				-	6/24/2012
Transportation	Transportation	3,728,915.93	265,002.89	15.4509	12.0617	270,045.96				-	6/25/2012
Grand Totals (8 records)											
		11,549,087.10	789,010.00	44.9369	1,060.0874	825,202.26					

Confidential Information - Do Not Distribute

Statewide Energy Efficiency Collaborative

An Alliance to Support Local Government

Coefficients - Waste

Report Generation Status:
Complete

Report Options:
Run Report | Hide Details | Printable View | Export Details

Generated Report:

Waste Material Type	Emissions Output Unit	Per Energy Input Unit	CH4 Coefficient
Paper Products	Metric tons	Tons	0.09237
Food Waste	Metric tons	Tons	0.05229
Plant Waste	Metric tons	Tons	0.02963
Wood/Textile	Metric tons	Tons	0.02614
All Other Waste	Metric tons	Tons	0.00000

Grand Totals (5 records)

B-6: Emissions Reductions

City of Manteca Greenhouse Gas Emissions: Mobile Source, 2020

Emissions without reductions (tons CO2/year)

GAS Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	196	327	8,394	8,759	15,916	9,488	7,636	7,321	3,485	10,327	17,943	**89,793**
LDT1	32	53	1,361	1,420	2,580	1,538	1,238	1,187	565	1,674	2,909	**14,558**
LDT2	93	155	3,978	4,152	7,544	4,497	3,619	3,470	1,652	4,894	8,505	**42,559**
LHD1	28	42	956	921	1,568	892	697	661	317	958	0	**7,041**
LHD2	2	3	67	64	109	62	49	46	22	67	0	**491**
MCY	1	1	41	46	90	57	49	49	24	76	138	**571**
MDV	124	206	5,293	5,524	10,037	5,983	4,815	4,617	2,198	6,512	11,316	**56,628**
MH	2	3	70	67	115	65	51	48	23	70	127	**642**
OBUS	1	1	21	20	34	19	15	14	7	21	37	**188**
SBUS	0	0	5	5	8	4	3	3	2	5	9	**43**
T6	2	4	86	82	140	80	62	59	28	86	156	**786**
T7	0	1	15	15	25	14	11	10	5	15	27	**138**
UBUS	0	0	9	9	15	8	6	6	3	9	16	**82**
Total	**482**	**796**	**20,295**	**21,084**	**38,181**	**22,708**	**18,252**	**17,493**	**8,332**	**24,714**	**41,184**	**213,520**

DSL Speed	10	15	20	25	30	35	40	45	50	55	60	Total
LDA	0	1	17	19	38	25	22	23	12	37	68	**261**
LDT1	0	0	1	1	2	2	1	1	1	2	4	**16**
LDT2	0	0	1	1	2	1	1	1	1	2	4	**15**
LHD1	5	11	343	432	912	609	529	527	251	716	0	**4,335**
LHD2	1	2	76	96	203	136	118	117	56	159	0	**965**
MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	0	2	2	4	2	2	2	1	4	7	**25**
MH	0	1	20	23	45	28	24	23	11	30	48	**252**
OBUS	1	1	33	39	79	52	42	43	20	55	77	**441**
SBUS	1	1	25	29	57	36	30	29	13	38	61	**320**
T6	18	32	807	950	1,882	1,188	984	946	441	1,240	2,013	**10,501**
T7	111	199	4,997	5,878	11,649	7,353	6,093	5,856	2,728	7,677	12,457	**64,998**
UBUS	2	3	108	136	286	191	166	165	79	225	364	**1,725**
Total	**139**	**252**	**6,428**	**7,605**	**15,161**	**9,623**	**8,012**	**7,733**	**3,613**	**10,185**	**15,104**	**83,855**

Total Emissions

	tons/year	metric tons/ year	MTCO2e/ year		tons/year	metric tons/ year	MTCO2e/ year	
Carbon dioxide	297,376	269,779	269,779	Carbon dioxide	147,202	133,542	133,542	
Methane		14	304	Methane		13	278	
Nitrous oxide		17	5,424	Nitrous oxide		16	4,971	
Total			**275,507**	All	**Total**		**138,791**	Lt Duty (LDA, LDT)

LDA and LDT are 91.0% of VMT

Gas		CO2	CO2e
	LDA	89,793	
	LDT1	14,558	
	LDT2	42,559	
	Total	**146,910**	
Diesel			
	LDA	261	
	LDT1	16	
	LDT2	15	
	Total	**292**	

Emissions Subject to LEV III			2020*	
All Light Duty	147,202	138,791	0.03	4164

*ARB estimates that LEV III will provide a 3% reduction beyond Pavley I by 2020

Vehicle miles traveled / day	1,443,281	Source: Kittelson & Associates 2012
Vehicle miles traveled / year	526,797,565	Source: VMT per day * 365 days/year

Pavley I Reductions	60,117
LEV III	4,164
Total	64,281
Percent Red.	0.233

City of Manteca Greenhouse Gas Emissions: Mobile Source, 2035

Emissions without reductions (tons CO2/year)

GAS	Speed	10	15	20	25	30	35	40	45	50	55	60	Total
	LDA	641	939	10,290	14,910	25,019	10,802	11,589	14,293	5,352	16,409	7,523	**117,766**
	LDT1	105	154	1,682	2,438	4,091	1,766	1,895	2,337	875	2,683	1,230	**19,255**
	LDT2	299	439	4,807	6,965	11,687	5,046	5,414	6,677	2,500	7,666	3,514	**55,013**
	LHD1	89	117	1,149	1,535	2,413	995	1,035	1,262	476	1,496	0	**10,567**
	LHD2	6	8	82	109	171	71	74	90	34	106	0	**750**
	MCY	3	5	54	85	154	71	81	105	42	134	64	**798**
	MDV	389	569	6,239	9,041	15,171	6,551	7,027	8,667	3,246	9,951	4,562	**71,415**
	MH	6	8	83	111	174	72	75	91	34	108	51	**814**
	OBUS	2	3	26	34	54	22	23	28	11	33	16	**252**
	SBUS	0	1	6	8	12	5	5	6	2	8	4	**57**
	T6	8	10	99	133	209	86	90	109	41	130	62	**977**
	T7	1	2	16	22	34	14	15	18	7	21	10	**160**
	UBUS	1	1	11	15	23	10	10	12	5	14	7	**108**
	Total	**1,551**	**2,255**	**24,544**	**35,405**	**59,213**	**25,511**	**27,332**	**33,695**	**12,624**	**38,759**	**17,044**	**277,932**

DSL	Speed	10	15	20	25	30	35	40	45	50	55	60	Total
	LDA	1	2	19	31	56	26	31	41	17	56	28	**309**
	LDT1	0	0	1	2	4	2	2	3	1	4	2	**20**
	LDT2	0	0	1	2	3	2	2	2	1	3	2	**18**
	LHD1	16	30	411	719	1,402	679	784	1,005	377	1,116	0	**6,539**
	LHD2	4	7	94	164	320	155	179	229	86	255	0	**1,494**
	MCY	0	0	0	0	0	0	0	0	0	0	0	**0**
	MDV	0	0	2	3	5	3	3	4	2	5	3	**30**
	MH	1	2	24	38	70	32	35	44	16	47	20	**331**
	OBUS	2	4	42	69	131	63	67	87	32	91	34	**622**
	SBUS	1	2	24	40	73	33	37	45	17	49	21	**343**
	T6	64	101	1,087	1,775	3,249	1,487	1,640	2,026	742	2,172	925	**15,269**
	T7	391	614	6,602	10,780	19,729	9,031	9,958	12,305	4,507	13,188	5,619	**92,725**
	UBUS	5	9	124	218	424	205	237	304	114	338	144	**2,121**
	Total	**486**	**772**	**8,433**	**13,841**	**25,467**	**11,717**	**12,975**	**16,096**	**5,912**	**17,324**	**6,796**	**119,819**

Gas		CO2 (tons/year)
	LDA	117,766
	LDT1	19,255
	LDT2	55,013
	Total	**192,034**
Diesel		
	LDA	309
	LDT1	20
	LDT2	18
	Total	**346**

All Light Duty 192,380

VMT per Day 1,865,877

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	192,380	186,994	186,994
Methane		19	395
Nitrous oxide		23	4,784
Total			**192,173**

Nitrous oxide and methane emissions from 2010 emissions per 1000 VMT/day estimates

Methane (metric tons)	18.82	0.010	emissions per 1000 vmt/day
Nitrous Oxide (metric tons)	22.78	0.012	emissions per 1000 vmt/day

LEV III Emission Reductions in 2035

Light Duty (CO2e)	192,173
LEV III Reduction	0.27
Reduction (MTCO2e/yr)	**51887**

Reductions from State Measures

Source Group	State Measures	Emissions (MTCO2e/year) 2020	2035
Motor vehicles	Pavley and Low Carbon Fuel Standard	-60,117	-97,910
	Low Emission Vehicle Program III	-4,164	-51,887
	Tire Pressure Program	-745	-880
	Low Friction Oil	-3,261	-3,854
	Aerodynamic Efficiency	-1,321	-1,886
	Subtotal	**-69,608**	**-156,417**
Electricity - residential	Renewable Portfolio Standards	-12,489	-17,071
	Title 24 Energy Efficiency Standards	-2,594	-4,333
Electricity – commercial	Renewable Portfolio Standards	-7,273	-10,065
	Title 24 Energy Efficiency Standards	-153	-2,128
	Subtotal	**-22,509**	**-33,597**
Natural Gas-Residential	Title 24 Energy Efficiency Standards	-1,382	-2,249
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	-248	-828
	Subtotal	**-1,630**	**-3,077**
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	-13,022	-17,800
	Total	**-106,769**	**-210,891**

Source: Michael Brandman Associates (see CAP)

Sector	Emissions ($MTCO_2e$/year) 2005	2010	2020	2035
Motor vehicles	214,075	210,901	275,507	368,297
Electricity - residential	44,108	47,343	61,212	83,668
Electricity - commercial	25,014	31,146	35,646	49,327
Natural gas - residential	45,527	50,466	65,249	89,186
Natural gas - commercial	9,856	11,818	13,526	18,717
Waste	42,305	30,454	21,586	29,505
Ozone depleting substance (ODS) substitutes	19,461	26,741	75,711	103,486
Total	**400,346**	**408,869**	**548,437**	**742,186**
State Measures			-106,769	-210,891
Adjusted Inventory			441,668	531,295
Percent Reduction from BAU			-19.47	-28.41

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents

	2005	2010	2020	2035
Population	58,368	67,477	87,471	117,010
BAU Emissions	400346	408869	548437	742186
Per Capita BAU	6.86	6.06	6.27	6.34
Adjusted Emissions			441,668	531,295
Population			87,471	117,010
Per Capita Adj			5.05	4.54
Percent Reduction from 2005			26.38	33.80
Percent Reduction from 2020 BAU			**19.47**	

State Targets	**2020**	**Population (millions)**	**Per Capita (MTCO2e per Person)**
BAU (2020)	545	40.82	13.35
Target (1990)	427	40.82	10.46
Percent	21.65		2.89
State Reductions Applicable in Mante	19.47		0.217
Percent Reductions Required	2.18		
Manteca Reduction in MT/year	**11,975**		

Reduction Potential from Emissions after Regulations based on Total Inventory

Mobile Sources	**2020 CO2e (MT/year)**
Light Duty Emissions	138,791
1% VMT Reduction	1,388
2% VMT Reduction	2,776
3% VMT Reduction	4,164
4% VMT Reduction	5,552
5% VMT Reduction	6,940
10% VMT Reduction	13,879

Electricity Reductions	**2020 CO2e (MT/year)**
Residential	61,212
Commercial	35,646
Total Res and Comm	96,858
5% Building Energy Efficiency	4,843
6% Building Energy Efficiency	5,811
10% Building Energy Efficiency	9,686
15% Building Eneragy Efficiency	14,529

Natural Gas Reductions	
Natural gas - residential	65,249
Natural gas - commercial	13,526
Total Natural Gas	78,775
State Reductions	1,630
Adjusted Nat Gas 2020	77,145
2% Energy Efficiency Improvement	1,543
4% Energy Efficiency Improvement	3,086

Waste Reductions	**2020 CO2e (MT/year)**
Waste Emissions	21,586
10% Waste Reduction	2,159
20% Waste Reduction	4,317

Reduction Scenarios that Demonstrate Consistency with State Target

	2020 CO2e (MT/year)
2% VMT Reduction	4,164
5% Electricity Reduction	4,843
2% Natural Gas Reduction	1,543
10% Waste Reduction	2,159
	12,708

2% VMT Reduction	2,776
10% Electricity Reduction	9,686
2% Natural Gas Reduction	1,543
10% Waste Reduction	2,159
	12,462

1% VMT Reduction	1,388
6% Electricity Reduction	5,811
4% Natural Gas Reduction	3,086
10% Waste Reduction	2,159
	12,444

		Per Capita Emissions	
2020 BAU Inventory	548,437	6.27	
2020 Adjusted Inventory	441,668	5.05	
2020 Target Inventory	429,693	4.91	0.217

Comparison of California Per Capita Emissions and Manteca Per Capita Emissions

	1990	2005	2010	2020	2035	2050
California Population	29.758	35.87	37.31	40.82	46.33	51.01
California Emissions (millions)	427	482.54	462.04	427	333	85.4
California Per Capita Emissions	14.35	13.45	12.38	10.46	7.19	1.67
Percent Reduction		0.115	0.076	0.222	0.466	0.876

Per Capita Emissions	**2005**	**2010**	**2020**	**2035**
Manteca Population	58,368	67,477	87,471	117,010
Manteca Emissions	400,346	408,869	441,668	531,295
Manteca Per Capita Emissions	6.9	6.1	5.0	4.5
Percent Reduction from 2005			0.26	

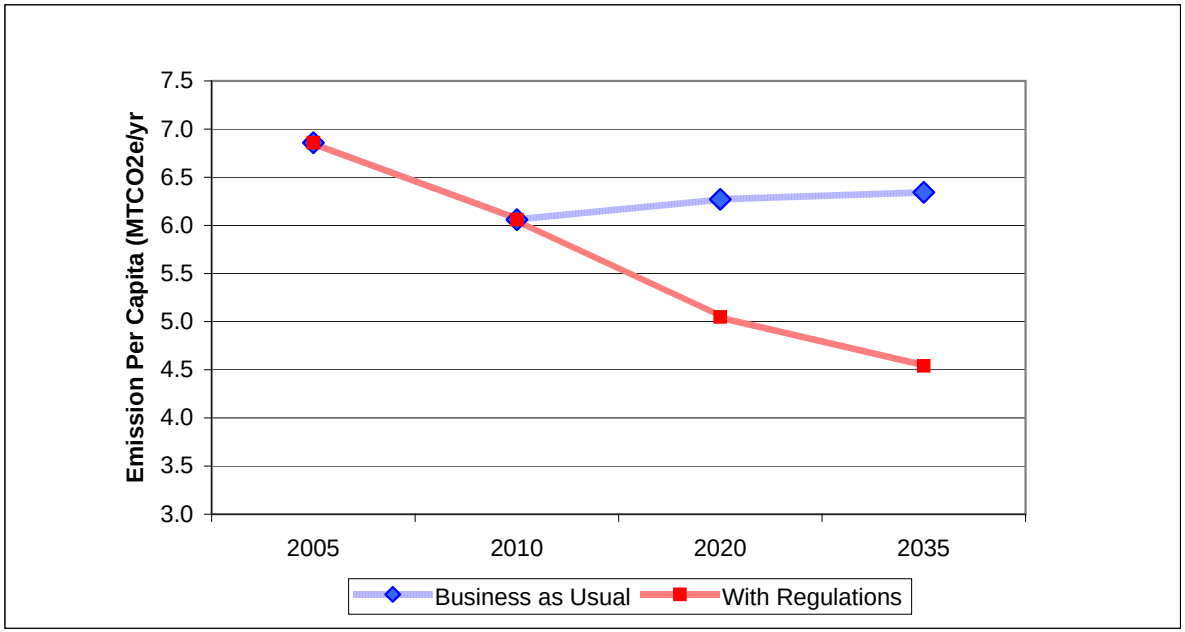
Increase in Population 2010 to 2020	32,799
Rate of Increase	0.080

Per Service Population Emissions

	2005	2010	2020	2035
Manteca Population	58,368	67,477	87,471	117,010
Manteca Jobs	13,364	14,823	17,815	21,756
Manteca Service Population	71,732	82,300	105,286	138,766
Manteca Emissions	400,346	408,869	441,668	531,295
Manteca Per SP Emissions	5.6	5.0	4.2	3.8
Percent Reduction from 2005			0.25	

Manteca Greenhouse Gas Per Capita Emission Trends

	2005	2010	2020	2035
Business as Usual	6.9	6.1	6.3	6.3
With Regulations	6.9	6.1	5.0	4.5

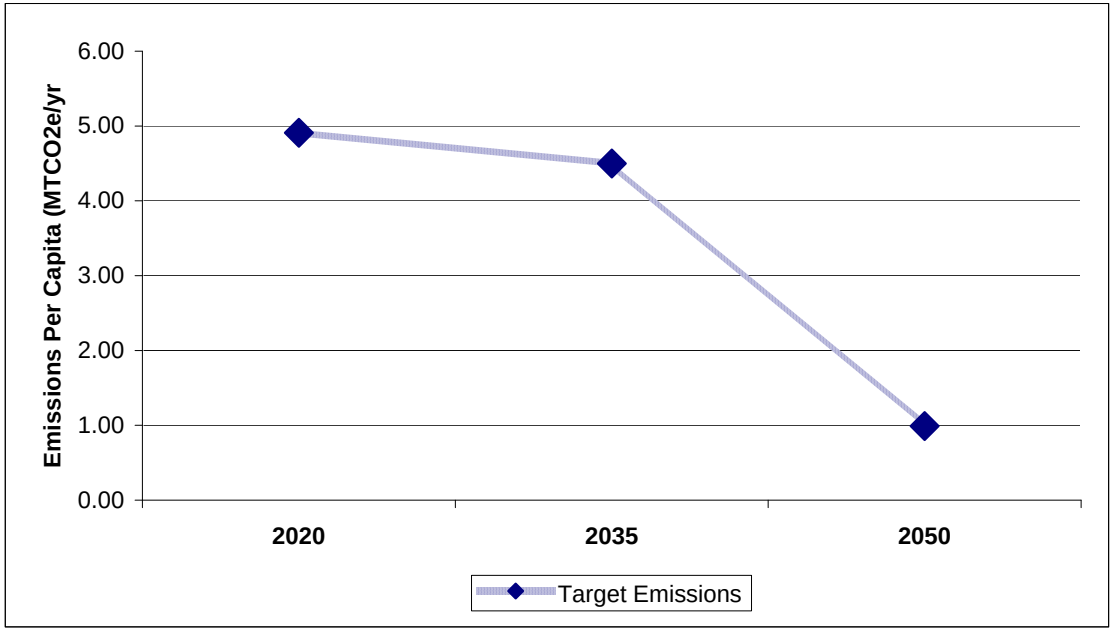


Per Capita Emissions in 1990

California Population 1990	29,758,213
Emissions 1990 MT	427,000,000
Per Capita Emissions MTCO2e	14.35

DOF Report E-4 Population Estimates for Counties and State, 1990-2000 with Census Counts

	2020	2035	2050
Target Emissions	4.91	4.5	0.99



City of Manteca Growth Statistics

	2010	2020	2035
Employment	14,823	17,815	21,756
Growth		2,992	6,933
Annual Growth in Jobs		299	277
Percent Increase		0.202	0.468
Population	82,300	105,286	138,766
Growth		22,986	56,466
Annual Growth in Population		2,299	2,259
Percent Increase		0.279	0.686
Housing	20,839	24,936	31,594
Growth		4,097	10,755
Annual Growth in Housing Units		410	430
Percent Increase		0.197	0.516

Mobile Sources	**2020 CO2e (MT/year)**	**Emissions from New Growth (MT/yr)**	**VMT Reduction 2%**	**VMT Reduction 5%**	**VMT Reduction 10%**
Light Duty Emissions (LDA and LDT 1&2)	138,791	38,764	775	1,938	3,876

Emissions from new growth based percent on population growth from 2010 to 2020

Project Reduction Potential From Land Use and Transportation Measures

Land Use and Transportation		Reduction Range (percent)	Global Maximum Suburban (percent)	Global Max Suburban Center (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 Commm	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

Source: CAPCOA 2010 Table 6.2

General Plan Land Uses	Acres	Average Density	Dwelling Units	Persons/HH	Population	Percent of Total Units	Units due to Growth by 2020
HDR 15.1-25 du/ac	229.8	20.0	4,596			0.15	628
MDR 8.1-15 du/ac	319.8	11.5	3,678			0.12	503
LDR 2.1-8 du/ac	4021.7	5.1	20,511			0.68	2,804
VLDR .5-2 du/ac	1189.5	1.0	1,190			0.04	163
Total			29,974	2.98	89,322	1.00	4,097

GP accommodates pop from 94,000 to 140,000 depending on actual density of projects
Persons per household from the Manteca General Plan Housing Element
Average density represents the mid-point in the density range for each designation

Reductions from Increased Land Use Density

	Density (Units/Acre) Net	Trip Generation Rate	Reduction Compared to Baseline	Percent of Units at Each Density	Weighted Reduction	Weighted by Development Type	Units at Each Density	Acres	Average Density
Single Family LDR	3	9.57	0	0.5	0		1,402	467.3	**3.00**
	5	8.78	0.083	0.3	0.025		841	168.2	
	8	8.01	0.163	0.2	0.033		561	70.1	
					0.057	0.039	2,804	705.6	**3.97**
Medium Density Res MDR	8.1	7.99	0	0.6	0		302	37.2	
	10	7.64	0.044	0.4	0.018		201	20.1	
					0.018	0.002	503	57.3	**8.77**
High Density Res HDR	16	6.9	0	0.4	0		251	15.7	
	20	6.57	0.048	0.3	0.014		188	9.4	
	25	6.27	0.091	0.3	0.027		188	7.5	
					0.042	0.006	628	32.7	**19.23**
						0.048			

Trip generation rates from ITE fitted curve equation used in URBEMIS 2007
Baseline Rates are from URBEMIS 2007
New development that achieves the weighted average densities for each General Plan designation will achieve a 4.8 percent reduction in trips compared to default.

Increased Residential Development Density

LDA/LDT Growth 2010-2020	38,764
Residential/Non Residential Growth	0.500
Residential Growth in Emissions	19,382
Reduction factor for Compact Growth	0.048
Compact Growth Red. (MTCO2e)	926.6

Non Residential Density/Mixed Use

LDA/LDT Growth 2010-2020	38,764
Residential/Non Residential Growth	0.500
Non Residential Growth	19,382
Reduction factor for Mixed Use/Comp	0.050
Compact Growth Red. (MTCO2e)	969.1

Bicycle Infrastructure in New Development

Increase bicycle mode share in new development by 1 percent

2010 VMT	1,144,719
2020 VMT	1,443,781
VMT Growth 2010 to 2020	299,062
Bike VMT/day @ 1 percent	2,991
Reduce Trip Length by 50%	1,495
Annual Bike VMT	545,788
2020 Mobile Emissions MTCO2e	210,901
MTCO2e/VMT/year	0.000504762
Bike emission reduction MTCO2e	275

Pedestrian Infrastructure in New Development

Increase pedestrian share of trips by 1 percent	
VMT Growth 2010 to 2020	299,062
Ped VMT/day @ 1%	2,991
Reduce Trip Length by 90%	299
Annual Ped VMT Red	109,158
MTCO2e/VMT/year	0.000504762
Ped Emission Reduction MTCO2e/yr	55

Total Mobile Reductions New Development

Residential Density	927
Non Residential Density/Mix	969
Bicycling	275
Pedestrian	55
	2,226

Energy Efficiency from New Development Electricity

	2020 Inventory MTCO2e	2020 New Growth Emissions (MTCO2e)
Residential 19.7% growth	61,212	12,059
Commercial (20.2% growth)	35,646	7,200
Total Res and Comm	96,858	19,259
10 percent beyond Title 24		1,926

Energy Efficiency from New Development Natural Gas

	2020 Inventory MTCO2e	2020 New Growth Emissions (MTCO2e)
Residential 19.7% growth	65,249	12,854
Commercial (20.2% growth)	13,526	2,732
Total Res and Comm	78,775	15,586
8 percent beyond Title 24		1,247

Reductions from Existing Development

	2020 Total LDA/LDT	Growth	Existing
2020 Mobile Emissions	138,791	38,764	100,027
Reduce City-wide LDA/LDT VMT by 1.5%			1,500

Reductions from city-wide improvements in bicycle and pedestrian infrastructre and TDM measures

Reductions from Electricity	Existing (2010) MTCO2e
Residential	47,343
Commercial	31,146
Total	78,489
1% retrofit/year for 10 years	7,849
20% reduction/retrofit	1,570

Reductions from Nat gas	**Existing (2010) MTCO2e**
Residential	50,466
Commercial	11,818
Total	62,284
1% retrofit/year for 10 years	6,228
15% reduction/retrofit	934

Solid Waste	**Solid Waste Emissions Inventory**
2020 Inventory (MTCO2e)	21,586
10 percent City-wide reduction	2,159

Reductions from achieving statewide reduction targets for diversion and recycling

Water Conservation Energy Savings

New Development 20% Reduction in Water Use

	MTCO2e
Residential and Commercial	
Electricity	19,259
Electricity Fraction for Water	0.111
Electricity Use for Water	2,138
20 percent Reduction	428

Fraction for water from CEC Water Energy Report estimate for residential and commercial development

Total Reductions from All Measures	**MTCO2e/year**
Mobile New Development	2,226
Mobile Existing Development	1,500
Energy Efficiency New Dev Electricity	1,926
Energy Efficiency Existing Dev Electricity	1,570
Energy Efficiency New Dev Nat Gas	1,247
Energy Efficiency Existing Natural Gas	934
Water Conservation Energy Savings	428
Solid Waste	2,159
Total	**11,990**

Reductions from State Measures

Source Group	State Measures	Emissions (MTCO2e/year)	
		2020	2035
Motor vehicles	Pavley and Low Carbon Fuel Standard	-60,117	-97,910
	Low Emission Vehicle Program III	-4,164	-51,887
	Tire Pressure Program	-745	-880
	Low Friction Oil	-3,261	-3,854
	Aerodynamic Efficiency	-1,321	-1,886
	Subtotal	**-69,608**	**-156,417**
Electricity - residential	Renewable Portfolio Standards	-12,489	-17,071
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	Subtotal	**-22,509**	**-33,597**
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	Subtotal	**-1,630**	**-3,077**
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	-13,022	-17,800
	Total	**-106,769**	**-210,891**

Source: Michael Brandman Associates

Sector	Emissions ($MTCO_2e$/year)			
	2005	2010	2020	2035
Motor vehicles	214,075	210,901	275,507	368,297
Electricity - residential	44,108	47,343	61,212	83,668
Electricity - commercial	25,014	31,146	35,646	49,327
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Natural gas - commercial	9,856	11,818	13,526	18,717
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State Measures			-106,769	-210,891
Adjusted Inventory			441,668	531,295
Percent Reduction from BAU			-19.47	-28.41

Notes:

$MTCO_2e$ = metric tons of carbon dioxide equivalents

Source: Michael Brandman Associates 2012.

Sector	Emissions ($MTCO_2e$/year)		
	2020	Emission Reductions	2020 With State Measures
Motor vehicles	275,507	-69,608	205,899
Electricity - residential	61,212	-15,083	46,129
Electricity - commercial	35,646	-7,426	28,220
Natural gas - residential	65,249	-1,382	63,867
Natural gas - commercial	13,526	-248	13,278
Waste	21,586	0	21,586
Ozone depleting substance (ODS) substitutes	75,711	-13,022	62,689
Total	**548,437**	**-106,769**	**441,668**

Notes:

$MTCO_2e$ = metric tons of carbon dioxide equivalents

Source: Michael Brandman Associates

Sector	Emissions ($MTCO_2e$/year)		
	2035	Emission Reductions	2035 With State Measures
Motor vehicles	368,297	-156,417	211,880
Electricity - residential	83,668	-21,404	62,264
Electricity - commercial	49,327	-12,193	37,134
Natural gas - residential	89,186	-2,249	86,937
Natural gas - commercial	18,717	-828	17,889
Waste	29,505	0	29,505
Ozone depleting substance (ODS) substitutes	103,486	-17,800	85,686
Total	**742,186**	**-210,891**	**531,295**

Notes:

$MTCO_2e$ = metric tons of carbon dioxide equivalents

Source: Michael Brandman Associates