CITY OF SAN DIMAS

GREENHOUSE GAS INVENTORY
AND TECHNICAL SUPPORTING DATA

Prepared for:

City of San Dimas
245 East Bonita Avenue
San Dimas, CA 91773

Prepared by:

CTG Energetics, Inc.

06/01/2010

California

Colorado

Nevada

Rhode Island

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CTG Energetics, Inc.
16 Technology Drive, Suite 109
Irvine, CA 92618
949-790-0010
www.CTGEnergetics.com

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NOMENCLATURE

Abbreviation	Description
CARB	California Air Resources Board
CEUS	California Commercial End-Use Survey
CO2e	carbon dioxide (CO_2) equivalents
GHG	greenhouse gas
GWP	global warming potential
IPCC	Intergovernmental Panel on Climate Change
MTCO2e	metric tons of carbon dioxide (CO_2) equivalents
RPS	Renewable Portfolio Standard
SCE	Southern California Edison
SCG	Southern California Gas Company

EXECUTIVE SUMMARY

Overview

A greenhouse gas (GHG) emissions inventory has been performed for the City of San Dimas. A GHG inventory provides information on the activities that cause emissions and removals, as well as background on the methods used to make the calculations. Policy makers use greenhouse gas inventories to track emission trends, develop strategies and policies and assess progress. The distinct inventories have been presented below. These include a 2006 "baseline", 2020 "business-as-usual", and 2020 "business-as-usual" with State Actions.

The "baseline" inventory represents the City's calculated 2006 emissions generated by activities associated with the City of San Dimas. The 2020 "business-as-usual" inventory assumes that any projected growth would occur at the same carbon intensities as is typical practice in 2006. In other words, each new dwelling unit or square foot of commercial space would be accompanied by the same amount of new emissions as is the case today. This approach mirrors the California Air Resources Board Scoping Plan's definition and use of the business-as-usual concept. The 2020 "business-as-usual" inventory with State Actions applies specific State policies designed to reduce GHG emissions economy-wide moving forward.

For the purposes of this analysis, city-wide emissions have been defined as the summation of municipal/public emissions and community emissions. Community emissions are those associated with the operation of buildings, land, or other such items not owned and operated by the City of San Dimas. Community emissions were calculated using estimated residential energy use, commercial building energy use, water use, solid waste, and community-wide transportation. Municipal/public emissions are those associated with the operation of office buildings, public land, infrastructure, or other such items operated by the City of San Dimas. Municipal emissions have been broken out of the City-wide emission profile for reference. The goal of this inventory is to help the City of San Dimas understand its greenhouse gas emissions profile to help inform policy and achieve the most effective greenhouse gas emission reductions. This inventory has been compiled using data provided by City staff. Where data is missing, estimates have been made using the best available data and methodologies.

City-Wide Emissions

Table 1 summarizes estimated City-wide GHG emissions for the 2006 baseline, 2020 business-as-usual (BAU), and 2020 business-as-usual with State action inventories. Emissions are reported in metric tons of carbon dioxide equivalents (MTCO2e). The 2020 emissions estimated in the BAU inventory including state actions reflect full implementation of the Renewable Portfolio Standards, Corporate Average Fuel Economy Standards, Low Carbon Fuel Standards, and Title 24 Code cycle updates.

Table 2 summarizes the estimated upstream and downstream emissions reduction benefits associated with San Dimas' diverted solid waste. These values include the emissions reductions associated with decreases in raw materials acquisition and manufacturing emissions and increases in forest and soil carbon sequestration associated with diverting solid waste. For more discussion of San Dimas solid waste emissions, see Section 2.4.

Table 1: Historical and projected City-wide greenhouse gas emissions by sector (MTCO2e)[1]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
Residential	57,536	19%	59,447	19%	45,257	18%
Non-residential	54,815	18%	57,894	18%	43,433	17%
Water	4,195	1%	4,975	2%	4,229	2%
Transportation	159,007	52%	162,426	51%	128,317	51%
Infrastructure[2]	5,611	2%	6,198	2%	5,268	2%
Landfilled Solid Waste[3]	24,728	8%	26,334	8%	26,334	10%
Total Emissions	**305,893**		**317,274**		**252,838**	
Total Emissions per Capita	***8.55***		***8.21***		***6.54***	

Table 2: Lifecycle emissions reductions associated with solid waste diversion (MTCO2e)[4]

City of San Dimas Emission Reduction Sectors	2006 Baseline *(MTCO2e)*	2020 Business-As-Usual *(MTCO2e)*	2020 Business-As-Usual with Statewide Action *(MTCO2e)*
Diverted Solid Waste Lifecycle Benefits	(168,351)	(179,280)	(179,280)

[1] Numbers vary slightly due to rounding.

[2] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[3] Landfilled solid waste includes waste-to-energy municipal solid waste.

[4] Diversion includes recycled materials, green waste, source reduction, and other diversion.

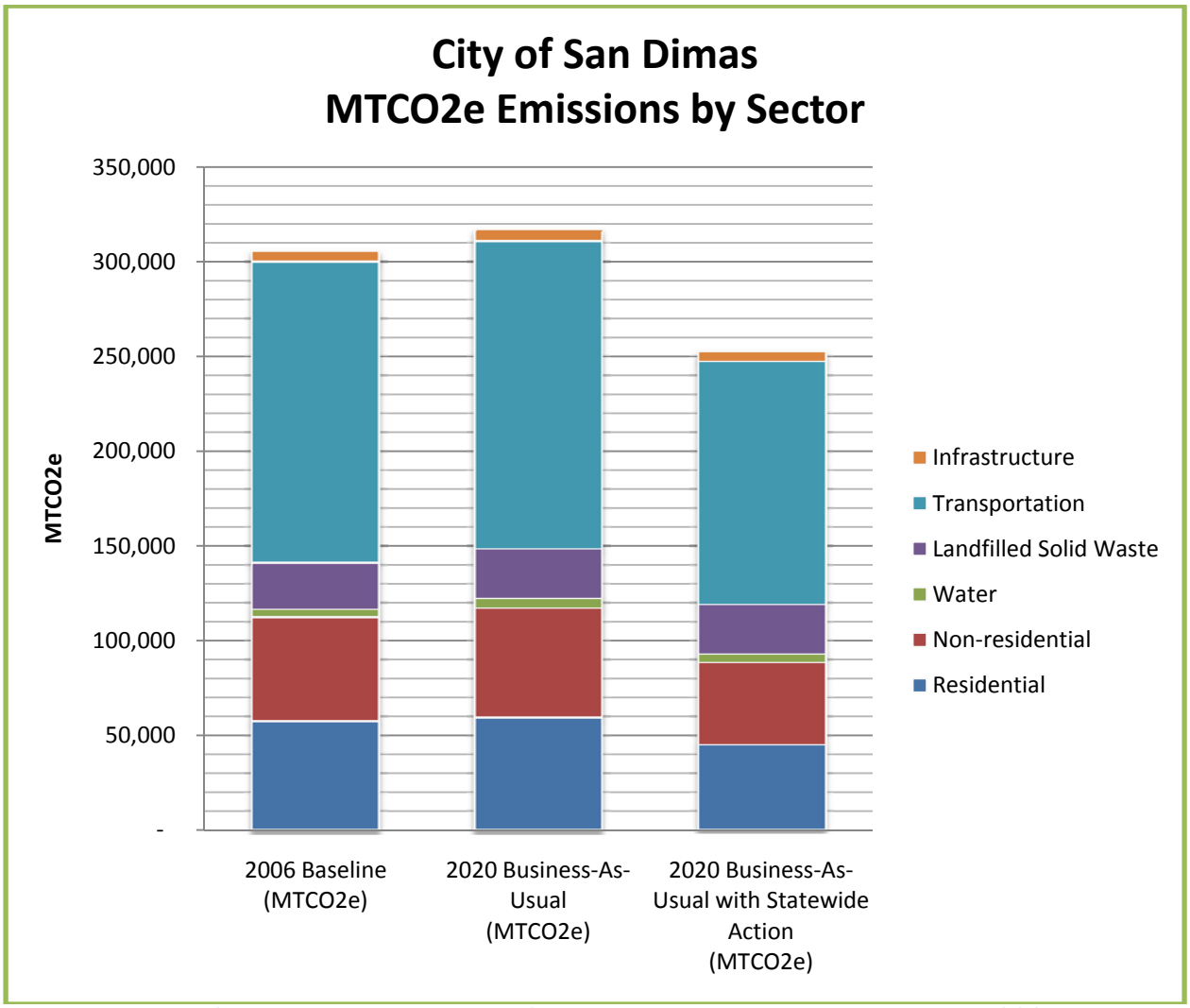

Figure 1: Historical and projected City-wide greenhouse gas emissions (MTCO2e)

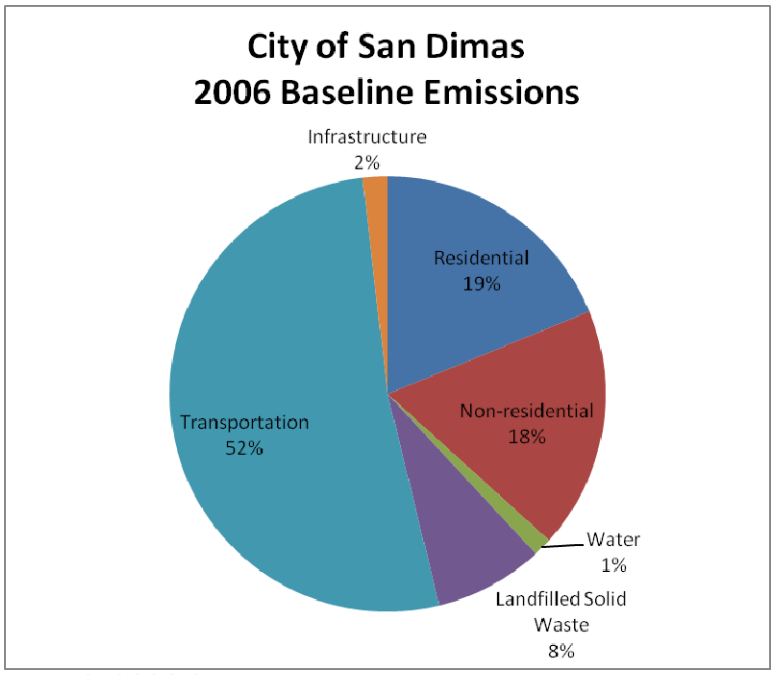

Figure 2: 2006 City-wide baseline emissions by emissions sector

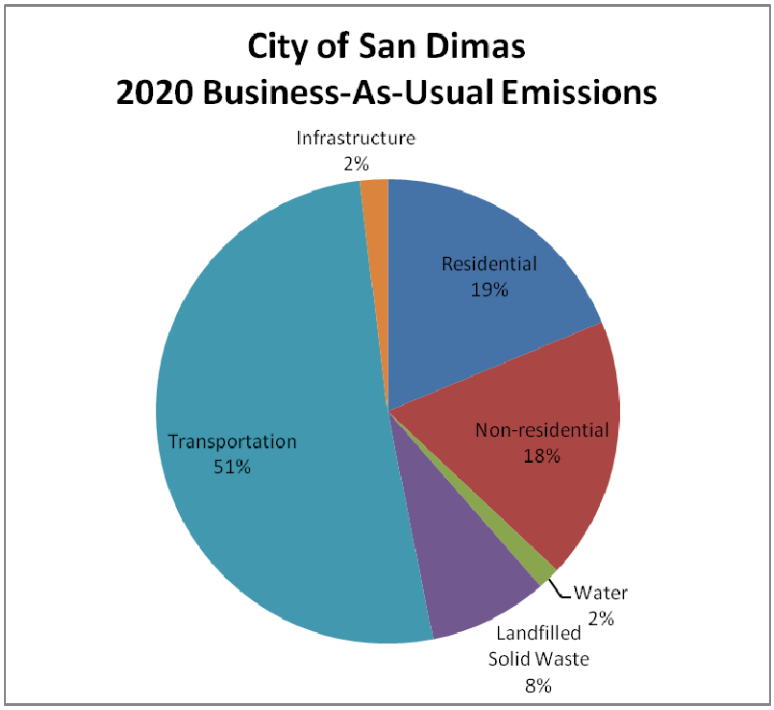

Figure 3: Projected City-wide 2020 business-as-usual emissions by emissions sector

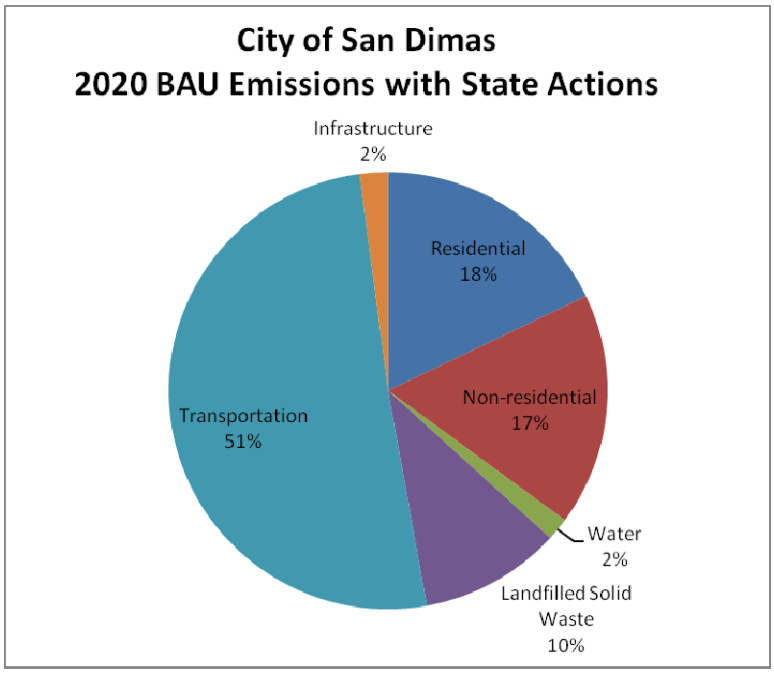

Figure 4: Projected City-wide 2020 business-as-usual emissions considering State actions

There are a number of relevant observations and notes on the City-wide greenhouse gas emission data:

- Transportation is clearly the largest contributor to the City's GHG footprint.
  - Reducing the City's transportation greenhouse gas emissions will be an important element of reducing overall greenhouse gas emissions. Measures that promote bicycling, walking and other alternative transportation may facilitate in bringing this source of GHG emissions down.
- Residential and non-residential building energy use is the next largest greenhouse gas emitter. Policies and actions that promote building energy efficiency for home and business improvements will play an important role in reducing the City's greenhouse gas footprint.
- The City's solid waste practices result in both GHG emissions and reductions. While the City's landfilled solid waste is a significant contributor to citywide emissions, the lifecycle impacts of solid waste diversion indirectly reduce emissions. These solid waste diversion greenhouse gas reductions are mainly due to source reductions which decrease the amount of materials or products generated before they become municipal solid waste, thus impacting the reduced energy required to mine and process materials.
- The relative percent contribution of emissions from different sectors remains consistent throughout the 2006 and 2020 estimates. This means that even with anticipated state actions, San Dimas' 2020 emissions profile is expected to remain comparable in the future.

Municipal Emissions

A sub-section of City-wide emissions has been broken out below to represent those emissions directly related to municipal operations, municipally-owned office buildings, and other emissions associated with municipal operations. Table 3 summarizes municipal GHG emissions in the 2006 baseline inventory. Emissions are reported in metric tons of carbon dioxide equivalents (MTCO2e). As shown, the City of San Dimas' municipal emissions represent only a small fraction of absolute emissions, equal to only 0.45% of total City emissions.

Table 3: City of San Dimas Municipal GHG Emission Data Summary

Sector	2006 CO2e	Percentage of Municipal	Percentage of Total
Public Buildings	485	36%	0.16%
Vehicle Fleet	220	16%	0.07%
Employee Commute	290	21%	0.09%
Street Lighting	262	19%	0.09%
Traffic Lights	79	6%	0.03%
Landfilled Solid Waste[5]	29	2%	0.01%
Total	**1,365**	**100%**	**0.45%**

Table 4: Historical and projected Municipal greenhouse gas emissions by sector (MTCO2e)[6]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	485	36%	485	34%	412	35%
Vehicle Fleet	220	16%	220	16%	174	15%
Employee Commute	290	21%	290	21%	229	20%
Street Lighting	262	19%	314	22%	267	23%
Traffic Lights	79	6%	96	7%	82	7%
Landfilled Solid Waste[7]	29	2%	29	2%	29	2%
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

[5] Landfilled solid waste includes waste-to-energy municipal solid waste.

[6] Numbers vary slightly due to rounding.

[7] Landfilled solid waste includes waste-to-energy municipal solid waste.

Table 5: Lifecycle emissions reductions associated Municipal solid waste diversion (MTCO2e)[8]

City of San Dimas Emission Reduction Sectors	2006 Baseline *(MTCO2e)*	2020 Business-As-Usual *(MTCO2e)*	2020 Business-As-Usual with Statewide Action *(MTCO2e)*
Diverted Solid Waste Lifecycle Benefits	(0.67)	(0.67)	(0.67)

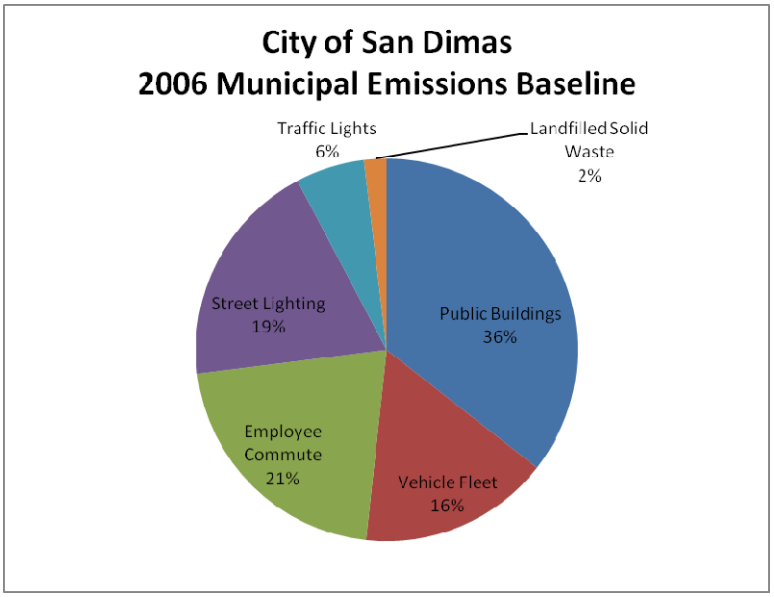

Figure 5: 2006 Municipal baseline emissions by emissions sector[9]

[8] Diversion includes recycled materials, green waste, source reduction, and other diversion.

[9] Numbers vary slightly due to rounding.

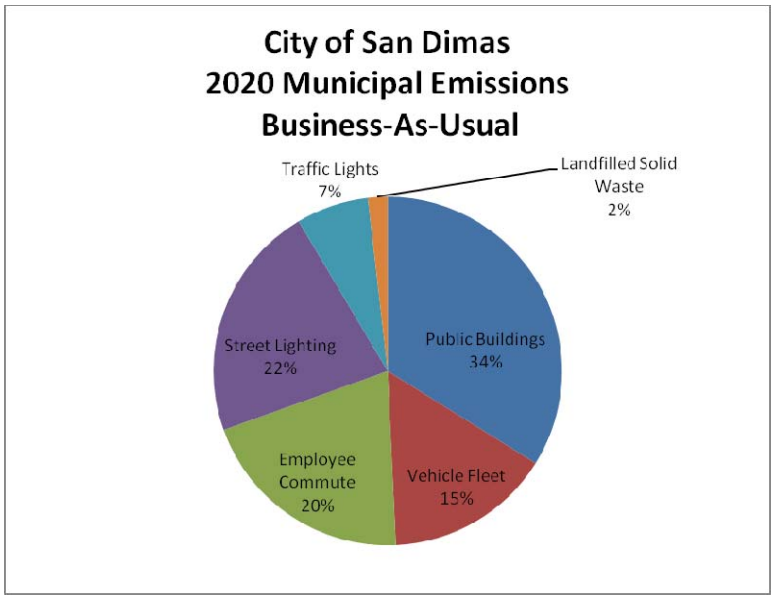

Figure 6: Projected Municipal 2020 business-as-usual emissions by emissions sector[10]

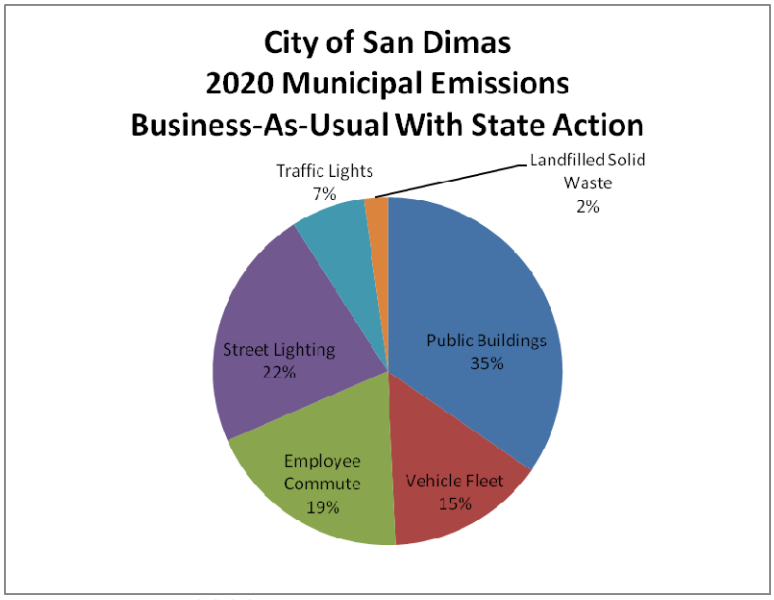

Figure 7: Projected Municipal 2020 business-as-usual emissions considering State Actions[11]

[10] Numbers vary slightly due to rounding.

[11] Numbers vary slightly due to rounding.

1. Emissions Inventory Methodology and Boundaries

1.1. Reporting Time Period

The baseline greenhouse gas inventory reporting year for the City of San Dimas was 2006. Business-as-usual emissions were projected annually through 2020.

1.2. Organizational Boundary

Two organizational boundaries were considered throughout this GHG inventory. The first boundary includes the entire City's greenhouse gas emissions, including emissions from all municipal and community sectors (all residential, commercial, and municipally-owned buildings; solid waste; water use; infrastructure; and transportation). This boundary is defined by the geographic boundary of the City.

The second boundary includes emissions directly related to municipal operations, municipally-owned buildings, and other emissions associated with municipal operations. In other words, the boundary includes those sectors the City of San Dimas has direct operational and financial control over (excluding any municipally-owned residential dwelling units). This does not include emissions associated with the wider San Dimas community (i.e., it does not include GHG emissions from residential buildings, commercial buildings, general transportation, school buildings, etc.).

1.2.1. Population

In order to analyze GHG emissions, City-wide population data was required. City of San Dimas 2006 population data and 2020 projections were provided by the City of San Dimas as shown in Table 6. Population estimates between 2006 and 2020 were linearly interpolated on an annual basis.

Table 6: San Dimas population data

Year	Population
2006	35,774
2007	35,980
2008	36,186
2009	36,393
2010	36,599
2011	36,805
2012	37,011
2013	37,218
2014	37,424
2015	37,630
2016	37,836
2017	38,042
2018	38,249
2019	38,455
2020	38,661

1.3. Emissions Calculation Tools

A variety of data sources and analysis methodologies have been used to determine the various greenhouse gas emissions. Sections 2 and 3 provide detail into how the calculations were performed.

1.4. Emission Coefficients Used

1.4.1. Electricity Emission Factors

Greenhouse gas (GHG) emissions from electricity use are estimated by multiplying annual electricity use (kWh/year) by an appropriate GHG emission factor (e.g., lb CO2/kWh). Electricity GHG emission factors are based on the methodology outlined in the "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories"[12]. This analysis uses SCE's verified 2006 electricity CO_2 emissions shown in Table 7. Emissions for CH_4 and N_2O are based on statewide grid-average reported data from Table 6. CH_4 and N_2O are converted to CO_2-equivalents (CO2e) by multiplying by their global warming potentials (GWP's) of 21 and 310, respectively[13]; CH_4 and N_2O emission factors for historical and future use are extrapolated from this data.

Table 7: Utility-specific electricity CO_2 emission factors[14]

Table G.5 Utility-Specific Verified Electricity CO_2 Emission Factors (2000-2006)

Utility	CO_2 (lbs/MWh)						
	2000	2001	2002	2003	2004	2005	2006
Anaheim Public Utilities						1,399.80	1,416.74
Austin Energy						1,127.37	1,077.97
City and County of San Francisco						76.28	
City of Palo Alto Public Utilities						320.94	39.02
East Bay Municipal Utility District						239.16	
Glendale Water & Power						1,065.00	
Los Angeles Department of Water & Power	1,407.44	1,403.39	1,348.48	1,360.07	1,360.60	1,303.58	1,238.52
Northern California Power Agency						55.38	
Pacific Gas & Electric Company					566.20	489.16	455.81
PacifiCorp					1,811.00	1,812.22	1,747.3
Pasadena Water & Power						1,409.65	
Platte River Power Authority						1,970.93	1,955.66
Riverside Public Utilities						1,333.45	1,346.15
Roseville Electric							565.52
Sacramento Municipal Utility District					769.00	616.07	555.26
Salt River Project							1,546.28
San Diego Gas & Electric					613.75	546.46	780.79
Southern California Edison					678.88	665.72	641.26
Turlock Irrigation District							682.48

Source: California Climate Action Registry Power/Utility Protocol Public Reports (as of June 2008).
http://www.climateregistry.org/CARROT/public/reports.aspx

[12] California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and the Climate Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0." September 25, 2008.

[13] GWP's from the IPCC's Second Assessment Report are used here.

[14] California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and the Climate Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0." September 25, 2008.

Table 8: California grid average electricity emission factors (1990-2004)[15]

Table G.6 California Grid Average Electricity Emission Factors (1990-2004)

Year	CO_2 (lbs/MWh)	CH_4 (lbs/MWh)	N_2O (lbs/MWh)
1990	1,031.14	0.040	0.014
1991	994.03	0.037	0.013
1992	984.42	0.040	0.012
1993	1,007.26	0.037	0.013
1994	1,071.19	0.040	0.013
1995	929.77	0.031	0.012
1996	827.65	0.029	0.011
1997	874.96	0.029	0.011
1998	941.54	0.029	0.011
1999	917.60	0.031	0.011
2000	829.50	0.029	0.009
2001	1,009.75	0.033	0.011
2002	865.28	0.031	0.010
2003	888.41	0.031	0.011
2004	958.49	0.029	0.011

Source: Calculated from total in-state and imported electricity emissions divided by total consumption in MWh. Emissions from California Air Resources Board, Greenhouse Gas Inventory, 1990 – 2004 (November 17, 2007 version), available on line at http://www.arb.ca.gov/cc/inventory/data/data.htm. Consumption data from California Energy Commission, http://www.energy.ca.gov

1.4.2. Natural Gas, Diesel and Onsite Combustion Emission Factors

Onsite combustion GHG emission factors do not change significantly over time. This analysis uses GHG emission factors for onsite combustion found in Table G.1, "Default Factors for Calculating CO_2 Emissions from Fossil Fuel Combustion" from the "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories"[16].

1.5. Global Warming Potentials Used

Global warming potentials (GWPs) are the "equivalent" warming potential different gasses have compared to carbon dioxide. For example, 1 ton of methane (CH_4) released into the atmosphere has the same "equivalent" global warming potential as 23 tons of CO_2[17]. All of the various GHG's emitted from the campus are multiplied by their respective GWP's to get a common unit for GHG emissions impact of carbon dioxide equivalent (CO2e). Research has refined the values of GWPs over time. The Intergovernmental Panel on Climate Change (IPCC) releases updated GWP's in its periodic assessment reports. This GHG inventory uses GWPs from the IPCC's Second Assessment Report.

1.6. Parties Responsible for Conducting the Emissions Inventory

The City of San Dimas is the primary party responsible for providing all inventory data. CTG Energetics, Inc. provided guidance on the data collection, integrated and analyzed the gathered data, and prepared this inventory report.

[15] California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and the Climate Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0." September 25, 2008.

[16] California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and the Climate Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0." September 25, 2008.

[17] Intergovernmental Panel on Climate Change (IPCC)'s Third Assessment Report.

1.7. State Action Assumptions

It is useful to consider the 2020 inventory projections with respect to both current and anticipated future regulatory conditions. Consideration of the business-as-usual growth under regulatory conditions anticipated for 2020 provides a more realistic measure of actual emissions. California has established a number of mandates that will help reduce GHG emissions by 2020. The state actions considered in this inventory include California's state-wide Renewable Portfolio Standard (RPS), California's Low Carbon Fuel Standard (LCFS), the Federal CAFE fuel economy standards, and Title 24 Code Cycles.

1.7.1. California Renewable Portfolio Standard

The California Air Resources Board's (CARB) Adopted Scoping Plan makes it clear that implementation of the Renewable Portfolio Standard (RPS) is a foundational element of the State's emissions reduction plan. In 2002, Senate Bill 1078 established the California RPS program, requiring 20% renewable energy by 2017. In 2006, Senate Bill 107 advanced the 20% deadline to 2010, a goal which was expanded to 33% by 2020 in the 2005 Energy Action Plan II. On September 15, 2009, Governor Arnold Schwarzenegger signed Executive Order S-21-09 directly the California Air Resources Board (CARB) to adopt regulations increasing California's Renewable Portfolio Standard (RPS) to 33 percent by 2020. These mandates apply directly to investor-owned utilities, in this case Southern California Edison (SCE).[18] Consequently, the scenario with 2020 State mandates considered in this analysis assumes that utilities will reduce the carbon intensity of delivered electricity equivalent to meeting the 33% RPS goal by 2020.

1.7.2. California Low Carbon Fuel Standard

On January 18, 2007, Governor Arnold Schwarzenegger issued Executive Order S-1-07 requiring the establishment of a Low Carbon Fuel Standard (LCFS) for transportation fuels. This statewide goal requires that California's transportation fuels reduce their carbon intensity by at least 10 percent by 2020.[19] Regulatory proceedings and implementation of the LCFS have been directed to CARB. The LCFS has been identified by CARB as a discrete early action item in the Adopted Scoping Plan. ARB expects the LCFS to achieve the minimum 10 percent reduction goal; however, many of the early action items outlined in the Scoping Plan work in tandem with one another. To avoid the potential for double-counting emission reductions associated with AB 1493 (Pavley), the Scoping Plan has modified the aggregate transportation sector reduction expected from the LCFS to 6.7 percent from 2020 BAU.[20] In accordance with the Scoping Plan, this analysis incorporates the modified reduction potential for the LCFS.

1.7.3. Federal Corporate Average Fuel Economy (CAFE) Standards

On April 1, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced new light-duty vehicle greenhouse gas emissions standards and corporate average fuel economy standards. The new Federal standards create new requirements for increases in fleet-wide fuel economy for passenger vehicles and light trucks in model years 2012 through 2016. The standards require these vehicles to meet an average emissions level of 250 grams of carbon dioxide per mile in model year 2016, which is approximately equivalent to 35.5 miles per

[18] SCE Renewable Energy (source: Hhttp://www.sce.com/PowerandEnvironment/renewables/H)

[19] California Low Carbon Fuel Standard (source Hhttp://www.arb.ca.gov/fuels/lcfs/lcfs.htmH) (last visited 6/8/2009).

[20] Available at http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm (last visited 5/12/2009).

gallon. The EPA forecasts that these standards will reduce GHG emissions from the U.S. light-duty fleet by approximately 21 percent from 2030 business-as-usual.[21]

1.7.4. Title 24 Code Cycles

California's Title 24 Building Energy Code is updated every three years. Due to the implementation of new Title 24 Codes, there will be a reduction in new residential and non-residential building emissions. Based on the growth projections provided by San Dimas, the City can expect about 3.5% reduction from total city-wide baseline 2020 emissions due to increasing Title 24 Code updates for residential and nonresidential buildings.

[21] U.S. Environmental Protection Agency. "EPA and NHTSA Finalize Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks" Hhttp://www.epa.gov/otaq/climate/regulations/420f10014.htmH.

2. San Dimas City-Wide Greenhouse Gas Emissions and Modeling Assumptions

A greenhouse gas inventory has been conducted to determine total greenhouse gas (GHG) emissions associated with activities supporting the operation of the City of San Dimas. This section presents the greenhouse gas emissions for the wider San Dimas community (i.e., including emissions from municipal operation, residential buildings, commercial buildings, general transportation, etc.).

Table 9 summarizes the estimated city-wide GHG emissions for 2006 through 2020. Emissions are reported in metric tons of carbon dioxide equivalents (MTCO2e). The 2020 emissions are estimated for a business-as-usual (BAU) case as well as a BAU case including state actions. The BAU inventory estimates reductions associated with full implementation of the following state actions: Renewable Portfolio Standards, Corporate Average Fuel Economy Standards, Low Carbon Fuel Standards, and Title 24 Code Updates. For more information about the state actions considered in this report, see Section 1.7.

Table 10 summarizes the estimated upstream and downstream emissions reduction benefits associated with San Dimas' diverted solid waste. These values include the emissions reductions associated with decreases in raw materials acquisition and manufacturing emissions and increases in forest and soil carbon sequestration associated with diverting solid waste. For more discussion of San Dimas solid waste emissions, see Section 2.4.

Table 9: Historical and projected City-wide greenhouse gas emissions by sector (MTCO2e)

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
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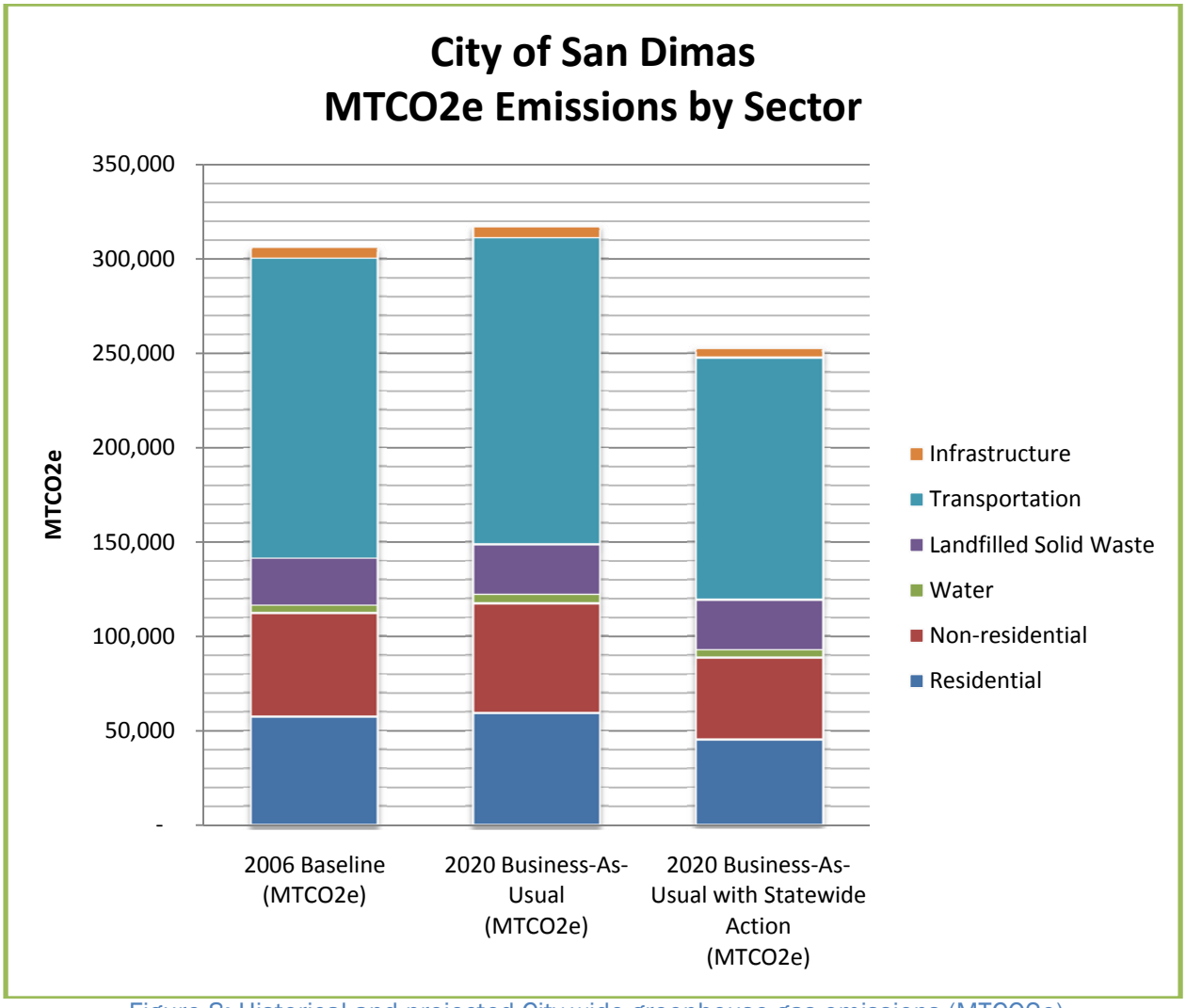
[22] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[23] Landfilled solid waste includes waste-to-energy municipal solid waste.

Table 10: Lifecycle emissions reductions associated with solid waste diversion (MTCO2e)[24]

City of San Dimas Emission Reduction Sectors	2006 Baseline *(MTCO2e)*	2020 Business-As-Usual *(MTCO2e)*	2020 Business-As-Usual with Statewide Action *(MTCO2e)*
Diverted Solid Waste Lifecycle Benefits	(168,351)	(179,280)	(179,280)



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[24] Diversion includes recycled materials, green waste, source reduction, and other diversion.

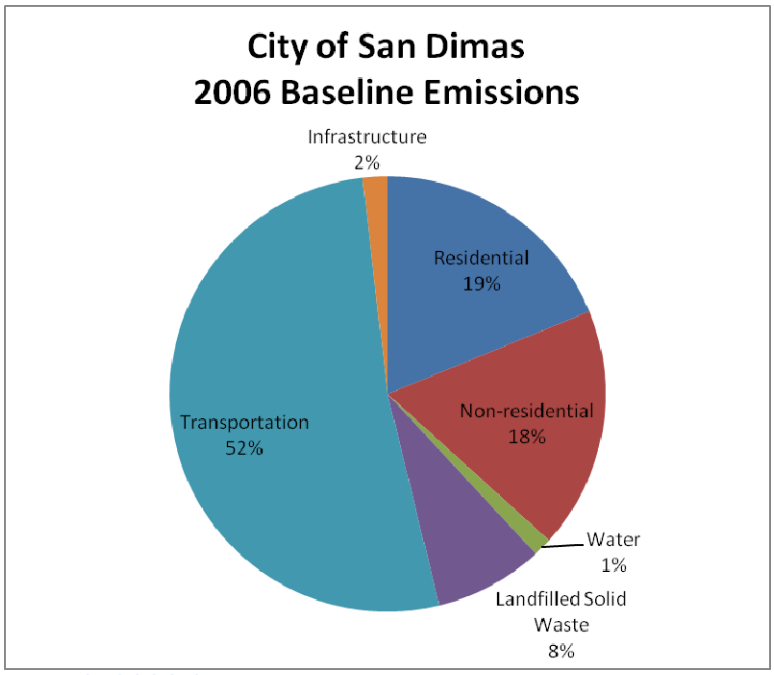

Figure 9: 2006 City-wide baseline emissions by emissions sector

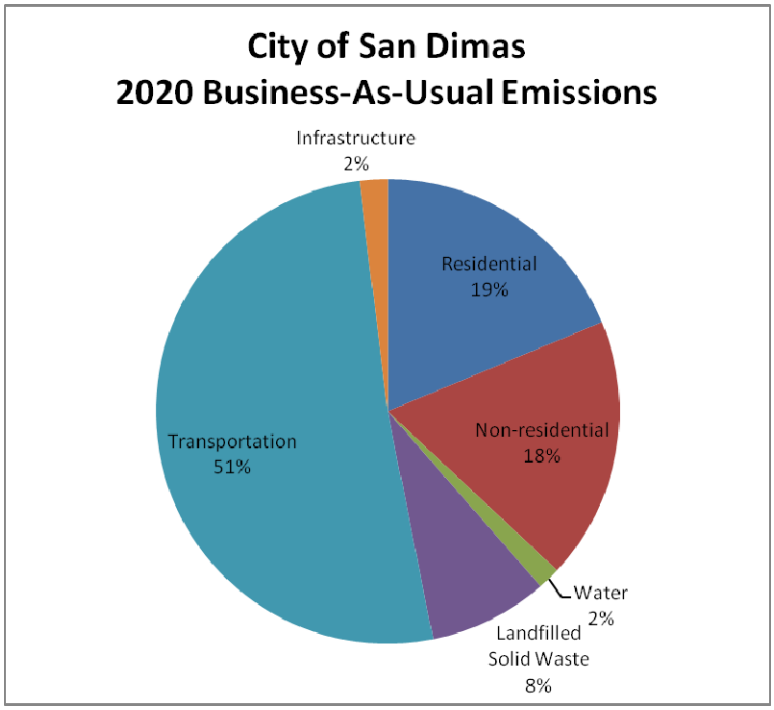

Figure 10: Projected City-wide 2020 business-as-usual emissions by emissions sector

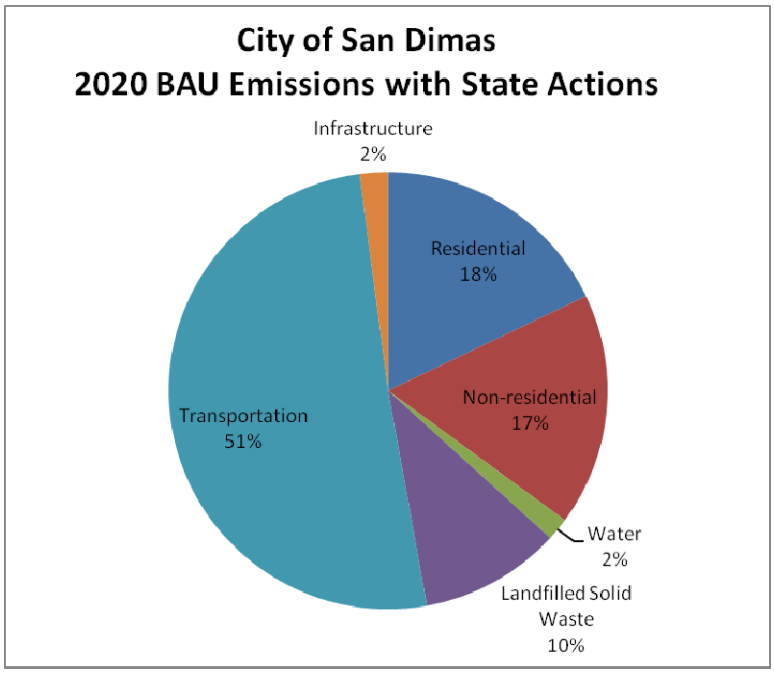

Figure 11: Projected City-wide 2020 business-as-usual emissions considering State actions

There are a number of relevant observations and notes on the city-wide greenhouse gas emission data:

- Transportation is clearly the largest contributor to the City GHG footprint.
  - Reducing the City's transportation greenhouse gas emissions will be an important element of reducing overall greenhouse gas emissions. Measures such as promoting bicycling, walking and other alternative transportation will significantly impact GHG emission levels.
- Residential and non-residential building energy use is the next largest greenhouse gas emission sectors. Policies and actions that promote building energy efficiency will play an important role in reducing the City's greenhouse gas footprint.
- The City's solid waste practices result in both GHG emissions and reductions. While the City's landfilled solid waste is a significant contributor to citywide emissions, the lifecycle impacts of solid waste diversion indirectly reduce emissions. These solid waste diversion greenhouse gas reductions are mainly due to source reductions which decrease the amount of materials or products generated before they become municipal solid waste, thus impacting the reduced energy required to mine and process materials.
- The relative percent contribution of emissions from different sectors remains consistent throughout the 2006 and 2020 estimates. This means that even with anticipated state actions, San Dimas' 2020 emissions profile is expected to remain comparable in the future.

2.1. City-Wide Transportation

2.1.1. Emissions Summary

Table 11: Transportation emissions relative to City-wide emissions (MTCO2e)

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
Residential	57,536	19%	59,447	19%	45,257	18%
Non-residential	54,815	18%	57,894	18%	43,433	17%
Water	4,195	1%	4,975	2%	4,229	2%
Transportation	**159,007**	**52%**	**162,426**	**51%**	**128,317**	**51%**
Infrastructure[25]	5,611	2%	6,198	2%	5,268	2%
Landfilled Solid Waste[26]	24,728	8%	26,334	8%	26,334	10%
Total Emissions	**305,893**		**317,274**		**252,838**	
Total Emissions per Capita	***8.55***		***8.21***		***6.54***	

2.1.2. Inventory Assumptions

A variety of data sources were explored to obtain City-wide transportation statistics:

- The City of San Dimas does not have a local traffic model nor specific City-wide transportation statistics and projects available for this audit.
- The Southern California Association of Governments (SCAG) maintains a 6-county Regional Transportation Model (RTP)[27]. This is a high-level model that projects regional transportation statistics. They can provide data on a county basis, but are unable to provide any more geographically specific data. Their primary outputs include vehicle miles traveled (VMT), vehicle hours traveled (VHT), delay (hours), average speed, and other data. The base year for their data is 2003, and they provide projections to 2035.[28]
- SCAG is working on the development of community scale models to facilitate SB 375. However, these are not available at this time.
- LA County Metro maintains an LA County Model, which has a different set of assumptions. This model is not run for air quality compliance purposes, and does not have the same level of detail for some of the modeling assumptions. However, it may provide more regionally

[25] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[26] Landfilled solid waste includes waste-to-energy municipal solid waste.

[27] The primary data for the RTP can be found at Hhttp://www.scag.ca.gov/rtp2008/pdfs/finalrtp/reports/fHighwaysandArterials.pdfH

[28] Data provided by Ryan Kuo, (213) 236-1873. Additional data on SCAG's model may be obtained from Jonathon Nadler, who manages SCAG's transportation modeling and air quality compliance, (213) 236-1884.

specific information. This model was not able to be obtained for this study, and it is unclear if this has the necessary data.

- The California Air Resources Board (CARB) maintains a variety of relevant models and data. Its EMFAC model provides mobile emissions and fuel consumption data and projections[29].
- Results from CARB's EMFAC model (including historical data and CARB projections) are available through the California EPA's "2009 Almanac – Population and Vehicle Trends Tool."[30] This provides data down to the county level on population, vehicle miles traveled, vehicle population, and vehicle fuel use (both gasoline & diesel). Data and projections are available for 1980 through 2020 for the following types of vehicles:

    - Passenger Cars
    - Light-Duty Trucks 1 (<3,750 lbs)
    - Light-Duty Trucks 2 (3,751-5,750 lbs)
    - Medium-Duty Trucks (5,751-8,500 lbs)
    - Light Heavy-Duty Trucks 1 (8,501-10,000 lbs)
    - Light Heavy-Duty Trucks 2 (10,001-14,000 lbs)
    - Medium Heavy-Duty Trucks (14,001-33,000 lbs)
    - Heavy Heavy-Duty Trucks (>33,000lbs)
    - Urban Buses
    - School Buses
    - Other Buses
    - Motorcycles
    - Motor Homes

The California EPA's "2009 Almanac – Population and Vehicle Trends Tool" was used to estimate city-wide transportation emissions for San Dimas. The Trends Tool was used to determine average per capita vehicle miles traveled (VMT) and fuel use for each vehicle type for Los Angeles County for 1980 – 2020. This data was multiplied by the City's historical and projected population to estimate average transportation statistics, including transportation fuel use. Fuel use was then multiplied by appropriate greenhouse gas emission factors.

[29] EMFAC2007 ver2.3

[30] California EPA, "CEPAM: 2009 Almanac - Population and Vehicle Trends Tool" HHttp://www.arb.ca.gov/app/emsinv/trends/ems_trends.phpH

Table 12: Average daily vehicle miles traveled (VMT) for San Dimas[31]

	All Vehicles	Passenger Cars	Light-Duty Trucks 1 (<3,750 lbs)	Light-Duty Trucks 2 (3,751-5,750 lbs)	Medium-Duty Trucks (5,751-8,500 lbs)	Light Heavy-Duty Trucks 1 (8,501-10,000 lbs)	Medium Heavy-Duty Trucks (14,001-33,000 lbs)	Light Heavy-Duty Trucks 2 (10,001-14,000 lbs)	Heavy Heavy-Duty Trucks (>33,000lbs)	Urban Buses	Motorcycles	School Buses
2006	794,220.09	416,392.25	55,163.82	180,809.71	81,237.65	15,953.59	12,480.11	4,894.30	18,617.18	1,605.83	3,536.32	663.28
2007	760,915.05	401,598.03	52,811.95	173,611.87	77,431.90	14,316.20	11,268.41	4,393.42	16,829.22	1,618.26	3,460.21	671.07
2008	763,895.46	404,025.56	52,801.12	173,736.19	77,002.79	14,568.47	11,420.23	4,439.65	17,172.23	1,629.97	3,497.27	677.12
2009	765,311.21	405,204.95	52,812.05	173,611.96	76,509.86	14,757.54	11,533.47	4,482.33	17,598.21	1,641.66	3,523.82	683.15
2010	765,923.94	405,593.77	52,935.16	173,330.64	75,988.14	14,904.55	11,650.05	4,528.45	18,134.68	1,649.87	3,546.88	692.67
2011	770,733.09	407,686.83	53,382.30	174,459.16	76,203.31	15,080.71	11,763.44	4,565.59	18,613.57	1,662.11	3,605.88	698.92
2012	776,430.68	410,412.57	53,874.31	175,497.08	76,596.08	15,287.95	11,883.68	4,613.13	19,175.07	1,677.82	3,668.27	708.64
2013	783,437.18	413,598.92	54,414.52	176,992.94	77,217.95	15,508.83	12,007.29	4,657.16	19,825.90	1,696.98	3,730.59	718.35
2014	788,053.20	415,254.59	54,749.70	177,641.85	77,544.75	15,864.66	12,248.65	4,767.02	20,683.68	1,712.66	3,772.02	724.59
2015	793,984.86	417,486.45	55,136.78	178,655.08	78,065.70	16,233.81	12,507.00	4,883.65	21,612.76	1,728.33	3,820.33	734.28
2016	795,823.57	417,818.79	55,281.48	178,948.54	78,261.22	16,356.76	12,598.89	4,930.90	22,166.57	1,743.98	3,837.45	743.96
2017	798,918.31	418,932.57	55,502.53	179,550.93	78,623.10	16,472.72	12,676.91	4,971.20	22,640.05	1,756.17	3,861.50	753.63
2018	802,916.81	420,583.86	55,747.89	180,392.33	79,112.90	16,623.17	12,768.72	5,025.29	23,047.25	1,768.35	3,888.99	766.75
2019	807,564.79	422,650.44	55,962.32	181,382.38	79,719.91	16,808.02	12,863.95	5,082.78	23,398.72	1,787.43	3,916.47	772.94
2020	812,694.69	425,013.79	56,194.13	182,513.71	80,402.42	16,996.14	12,962.57	5,140.21	23,691.17	1,799.59	3,947.38	782.58

[31] Derived from: California EPA, "CEPAM: 2009 Almanac - Population and Vehicle Trends Tool" Hhttp://www.arb.ca.gov/app/emsinv/trends/ems_trends.php

Table 13 shows the estimated city-wide transportation fuel use for San Dimas. This is based on a population weighted average of Los Angeles County transportation fuel use.

Table 13: Estimated San Dimas community-wide transportation fuel use

	All Vehicles		Passenger Cars		Light-Duty Trucks 1 (<3,750 lbs)		Light-Duty Trucks 2 (3,751-5,750 lbs)	
Year	**Gas**	**Diesel**	**Gas**	**Diesel**	**Gas**	**Diesel**	**Gas**	**Diesel**
2006	15,610,136	2,116,434	7,381,399	14,016	1,174,806	20,387	3,906,675	3,823
2007	14,901,866	1,939,118	7,072,677	11,482	1,123,923	17,860	3,748,111	3,827
2008	14,808,465	1,970,810	7,034,785	10,192	1,114,712	16,561	3,726,321	2,548
2009	14,774,078	2,010,079	7,022,553	8,905	1,115,721	15,266	3,722,462	2,544
2010	14,728,580	2,058,164	7,001,570	7,623	1,116,745	13,975	3,714,860	2,541
2011	14,890,088	2,103,041	7,066,827	6,346	1,133,383	12,692	3,766,944	2,538
2012	14,956,349	2,152,923	7,088,924	5,072	1,142,393	11,411	3,787,268	2,536
2013	15,050,507	2,205,263	7,122,454	5,067	1,152,665	11,400	3,818,993	1,267
2014	15,128,194	2,279,036	7,148,404	3,796	1,161,663	10,123	3,840,575	1,265
2015	15,198,306	2,357,748	7,166,794	3,793	1,169,392	8,849	3,860,891	1,264
2016	15,303,811	2,399,706	7,201,645	2,526	1,179,645	8,841	3,890,050	1,263
2017	15,334,824	2,437,824	7,204,957	2,524	1,182,320	7,571	3,902,790	1,262
2018	15,383,583	2,470,853	7,215,900	2,521	1,186,262	7,564	3,919,328	1,261
2019	15,447,522	2,500,068	7,235,713	1,259	1,190,209	6,297	3,939,654	1,259
2020	15,524,077	2,527,995	7,260,592	1,258	1,194,160	6,292	3,962,496	1,258

Table 10: Estimated San Dimas community-wide transportation fuel use (continued)

	Medium-Duty Trucks (5,751-8,500 lbs)		Light Heavy-Duty Trucks 1 (8,501-10,000 lbs)		Medium Heavy-Duty Trucks (14,001-33,000 lbs)		Light Heavy-Duty Trucks 2 (10,001-14,000 lbs)	
Year	**Gas**	**Diesel**	**Gas**	**Diesel**	**Gas**	**Diesel**	**Gas**	**Diesel**
2006	2,400,579	3,823	421,758	47,145	75,177	564,467	90,468	564,467
2007	2,286,118	2,551	376,342	44,651	67,614	509,018	81,647	509,018
2008	2,257,450	2,548	378,365	44,588	67,520	517,226	81,533	517,226
2009	2,240,347	2,544	380,388	45,799	67,427	522,875	81,421	522,875
2010	2,223,326	2,541	382,412	47,007	66,065	527,246	82,581	527,246
2011	2,245,190	2,538	388,371	49,498	67,267	533,058	82,497	533,058
2012	2,254,356	2,536	390,518	50,717	67,200	537,597	83,683	537,597
2013	2,272,396	1,267	395,199	51,933	67,133	543,399	83,600	543,399
2014	2,285,363	1,265	402,406	53,148	68,333	554,258	84,784	554,258
2015	2,299,594	1,264	409,603	55,625	69,531	565,101	87,230	565,101
2016	2,318,874	1,263	416,791	55,572	70,728	569,614	88,410	569,614
2017	2,329,308	1,262	420,184	56,782	70,662	572,863	89,589	572,863
2018	2,341,007	1,261	422,314	57,989	70,596	576,112	90,766	576,112
2019	2,357,747	1,259	425,704	57,936	70,531	580,620	91,942	580,620
2020	2,376,994	1,258	430,351	59,142	71,725	585,126	93,117	585,126

Table 10: Estimated San Dimas community-wide transportation fuel use (continued)

	Heavy Heavy-Duty Trucks (>33,000lbs)		Urban Buses		Motorcycles	School Buses	
Year	Gas	Diesel	Gas	Diesel	Gas	Gas	Diesel
2006	42,048	1,223,225	11,468	129,968	33,129	3,823	31,855
2007	35,721	1,112,441	11,482	130,125	33,169	3,827	33,169
2008	31,849	1,136,369	12,740	128,670	33,123	2,548	33,123
2009	29,261	1,170,426	12,722	128,492	34,349	2,544	33,077
2010	27,950	1,210,760	12,705	128,318	35,573	2,541	33,032
2011	25,384	1,250,148	12,692	128,188	35,537	2,538	34,268
2012	22,823	1,292,007	13,947	128,060	35,502	2,536	35,502
2013	21,533	1,341,398	13,933	125,400	36,733	2,533	35,467
2014	18,981	1,402,094	15,185	125,277	36,697	2,531	36,697
2015	17,699	1,469,009	15,170	123,892	36,662	2,528	36,662
2016	16,419	1,508,026	16,419	122,511	37,890	2,526	36,627
2017	15,142	1,543,198	16,404	122,396	37,854	2,524	37,854
2018	13,867	1,573,278	17,649	119,761	37,819	2,521	37,819
2019	13,854	1,599,540	17,633	118,391	37,784	2,519	37,784
2020	12,583	1,621,994	18,875	115,767	37,750	2,517	39,008

Table 14: Estimated San Dimas community-wide transportation greenhouse gas emissions ($MTCO_2e$)

	All Vehicles	Passenger Cars	Light-Duty Trucks 1	Light-Duty Trucks 2	Medium-Duty Trucks	Light Heavy-Duty Trucks 1	Medium Heavy-Duty Trucks	Light Heavy-Duty Trucks 2	Heavy Heavy-Duty Trucks	Urban Buses	Motorcycles	School Buses
2006	159,007	65,172	10,557	34,457	21,188	4,194	6,392	6,526	12,786	1,420	292	357
2007	150,967	62,427	10,083	33,060	20,167	3,769	5,762	5,886	11,606	1,422	292	370
2008	150,466	62,080	9,989	32,855	19,914	3,786	5,845	5,968	11,815	1,418	292	359
2009	150,562	61,959	9,984	32,821	19,763	3,816	5,901	6,024	12,138	1,416	303	358
2010	150,649	61,761	9,980	32,754	19,613	3,846	5,934	6,079	12,535	1,414	313	358
2011	152,528	62,323	10,114	33,213	19,806	3,924	6,003	6,137	12,913	1,413	313	370
2012	153,618	62,505	10,180	33,392	19,887	3,955	6,049	6,194	13,315	1,423	313	383
2013	154,978	62,800	10,271	33,658	20,033	4,009	6,107	6,252	13,805	1,396	324	382
2014	156,412	63,016	10,337	33,848	20,147	4,085	6,228	6,373	14,398	1,405	323	395
2015	157,828	63,178	10,392	34,027	20,272	4,173	6,348	6,504	15,066	1,391	323	394
2016	159,184	63,472	10,482	34,284	20,442	4,236	6,405	6,560	15,451	1,388	334	394
2017	159,844	63,501	10,493	34,396	20,534	4,278	6,437	6,604	15,797	1,387	333	406
2018	160,609	63,598	10,528	34,542	20,637	4,309	6,469	6,647	16,091	1,371	333	406
2019	161,468	63,759	10,550	34,721	20,785	4,339	6,515	6,703	16,357	1,357	333	406
2020	162,426	63,979	10,584	34,922	20,954	4,392	6,571	6,759	16,574	1,341	333	418

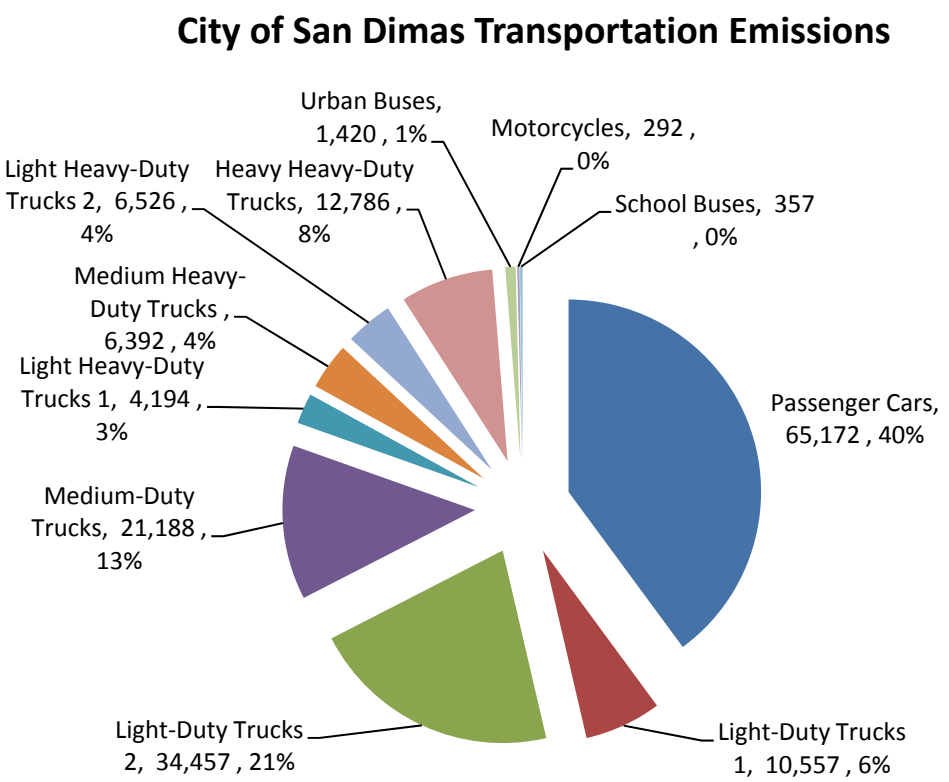

Figure 12: City-wide transportation-related GHG emissions (MTCO2e/year), 2006

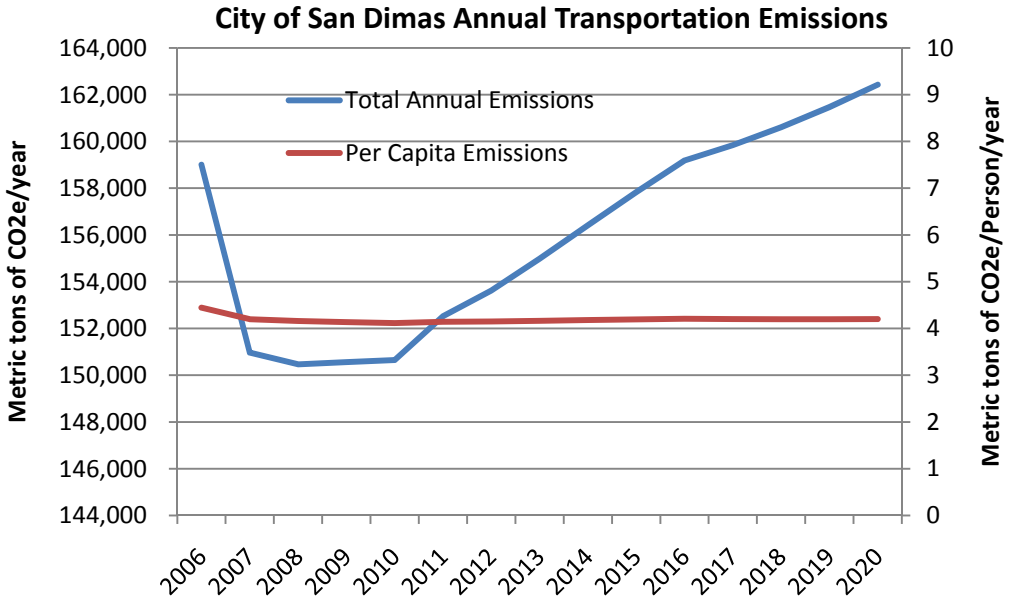

Figure 13: Historical and projected community-wide transportation emissions

2.2. Residential Energy Use

2.2.1. Emissions Summary

Table 15: Residential building emissions relative to total City-wide emissions (MTCO2e)

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
Residential	**57,536**	**19%**	**59,447**	**19%**	**45,257**	**18%**
Non-residential	54,815	18%	57,894	18%	43,433	17%
Water	4,195	1%	4,975	2%	4,229	2%
Transportation	159,007	52%	162,426	51%	128,317	51%
Infrastructure[32]	5,611	2%	6,198	2%	5,268	2%
Landfilled Solid Waste[33]	24,728	8%	26,334	8%	26,334	10%
Total Emissions	**305,893**		**317,274**		**252,838**	
Total Emissions per Capita	***8.55***		***8.21***		***6.54***	

2.2.2. Inventory Assumptions

Data for city-wide residential electricity use was obtained from Southern California Edison's "Electricity Use Report for City of San Dimas, Year 2006" report Version 5.0. This report provided total annual kWh by rate group. The account summary for San Dimas is shown in Table 16. Emissions due to residential building energy use used SCE's "Domestic" annual kWh. Emissions were calculated using the 2006 Southern California Edison utility-specific emissions factor provided in the Local Government Operations Protocol.[34]

[32] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[33] Landfilled solid waste includes waste-to-energy municipal solid waste.

[34] California Air Resources Board's Local Government Operations Protocol, Version1, September 2008. Appendix Table G.5 provides lbs CO2 per MWh (megawatt hour) by utility, while Table G.6 provides statewide average CH4 and N20 electric emissions factors.

Table 16: Total of Account Summary Data for Bundled and Direct Access Customers[35]

RATE GROUP	ANNUAL KWH	% of TOTAL	NONCOINCIDENT PEAK	CALCULATED COINCIDENT PEAK	NUMBER OF ACCOUNTS	% OF TOTAL
AG TOU	5,421,040	2.1%	2,060	1,277	29	0.2%
DOMESTIC	99,731,038	38.5%	-	-	11,049	83.2%
GS-1	16,237,842	6.3%	-	-	1,664	12.5%
GS-2	52,883,457	20.4%	17,888	12,700	389	2.9%
STREET LIGHTING	13,478,720	5.2%	-	-	66	0.5%
TC-1	271,102	0.1%	-	-	52	0.4%
TOU-8	70,761,939	27.3%	16,180	11,326	37	0.3%
Grand Total	258,785,138				13,286	
DA % of kWh	6.1%					

Application of 15/15 Rule (Section VIII, Release of Aggregated Customer Information, p. 8)
The PA-1, PA-2, TOU-PA-5 rate groups were combined into the AG TOU rate group.
The TOU-GS rate group was combined into TOU-8 rate group.

Actual natural gas consumption data for 2006 was provided by Southern California Gas Company (SCG). The natural gas consumption for residential buildings includes both the residential individual metered and residential master metered data provided in this table. Natural gas consumption was then multiplied by a weighted US average emissions factor provided in the Local Government Operations Protocol.[36]

Table 17: Historical City-wide residential natural gas consumption data from SCG.

Year 2006 Use (therm) by Rates														
Residential individual metered														
Rates	LJ_DESC	Total use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G-NGVR	CITY OF SAN DIMAS	757	118	-	3	-	-	83	62	110	102	77	84	118
GO-SSA	CITY OF SAN DIMAS	25,354	3,694	2,963	3,284	2,588	1,965	1,770	1,320	1,065	1,096	1,222	1,539	2,848
GO-SSB	CITY OF SAN DIMAS	60,446	8,406	6,796	8,181	5,978	4,268	3,401	3,091	3,087	3,232	3,061	3,950	6,995
GR	CITY OF SAN DIMAS	3,939,470	614,046	503,731	523,053	440,193	281,390	188,816	153,992	165,283	155,557	185,806	251,935	475,668
GRL	CITY OF SAN DIMAS	393,125	58,822	52,426	48,891	43,048	30,609	20,321	16,220	17,084	15,125	19,291	25,883	45,405
GT-R	CITY OF SAN DIMAS	28,117	4,495	3,542	3,234	3,181	2,194	1,585	1,296	1,346	1,250	1,392	1,686	2,916
GT-RL	CITY OF SAN DIMAS	2,735	413	400	310	319	187	114	120	142	122	148	153	307
GTO-SSA	CITY OF SAN DIMAS	644	67	52	67	35	23	51	64	24	13	16	-	232
GTO-SSB	CITY OF SAN DIMAS	1,001	114	72	126	96	80	69	69	50	58	58	69	140
Residential master metered														
GM-C	CITY OF SAN DIMAS	74,471	7,941	6,813	6,037	6,042	6,590	7,084	4,574	3,394	5,603	7,691	6,565	6,137
GM-E	CITY OF SAN DIMAS	350,253	49,004	29,867	27,997	38,181	36,470	22,095	22,648	21,160	23,729	23,092	25,400	30,610
GS	CITY OF SAN DIMAS	94,528	10,737	7,914	8,285	9,361	9,088	6,962	7,051	6,738	6,226	6,566	7,408	8,192
GSL	CITY OF SAN DIMAS	357,517	52,084	31,324	60,050	38,785	24,032	16,490	14,408	14,089	12,318	21,862	26,401	45,674
Comercial & Industrial G-10 rates														
GN-10	CITY OF SAN DIMAS	2,438,775	285,852	286,372	158,803	242,581	221,652	182,540	161,802	170,024	167,875	154,944	192,912	213,418
GN-10L	CITY OF SAN DIMAS	24,648	3,319	2,593	3,246	3,055	2,032	1,167	1,044	888	1,287	1,513	1,515	2,989
GT-10	CITY OF SAN DIMAS	144,322	15,130	13,083	14,449	12,919	11,746	11,060	6,246	11,941	6,609	20,432	13,026	7,681

Further resolution regarding the relative square footages of residential building types was provided by the City of San Dimas. This square footage data was used to estimate the emissions due to different types of residential buildings in San Dimas, as shown in Table 18. It is important to note

[35] Southern California Edison's "Electricity Use Report for City of San Dimas, Year 2006" report Version 5.0, Table C.

[36] California Air Resources Board's Local Government Operations Protocol. Version 1. September 2008. Table G.1

that this estimate is primarily for illustrative purposes. Because residential building energy use differs due to the type of residential building as well as the age of the building, allocating emissions due to square footage is not fully accurate. It does, however, give a good indication of the relative contribution of residential building emissions by type.

Table 18: 2006 Residential buildings' square footage by type.

Residential Building Type	Square Footage	% of Total
SF Condominiums	3,187,646	17%
SF SFR	13,259,772	72%
SF Duplex	288,776	2%
SF Mobile Homes	23,483	0.1%
SF Motel	263,138	1%
SF Multifamily	1,195,351	7%
SF Quadruplex	57,110	0.3%
SF Triplex	50,215	0.3%
Total SF Res	**18,325,491**	**100%**

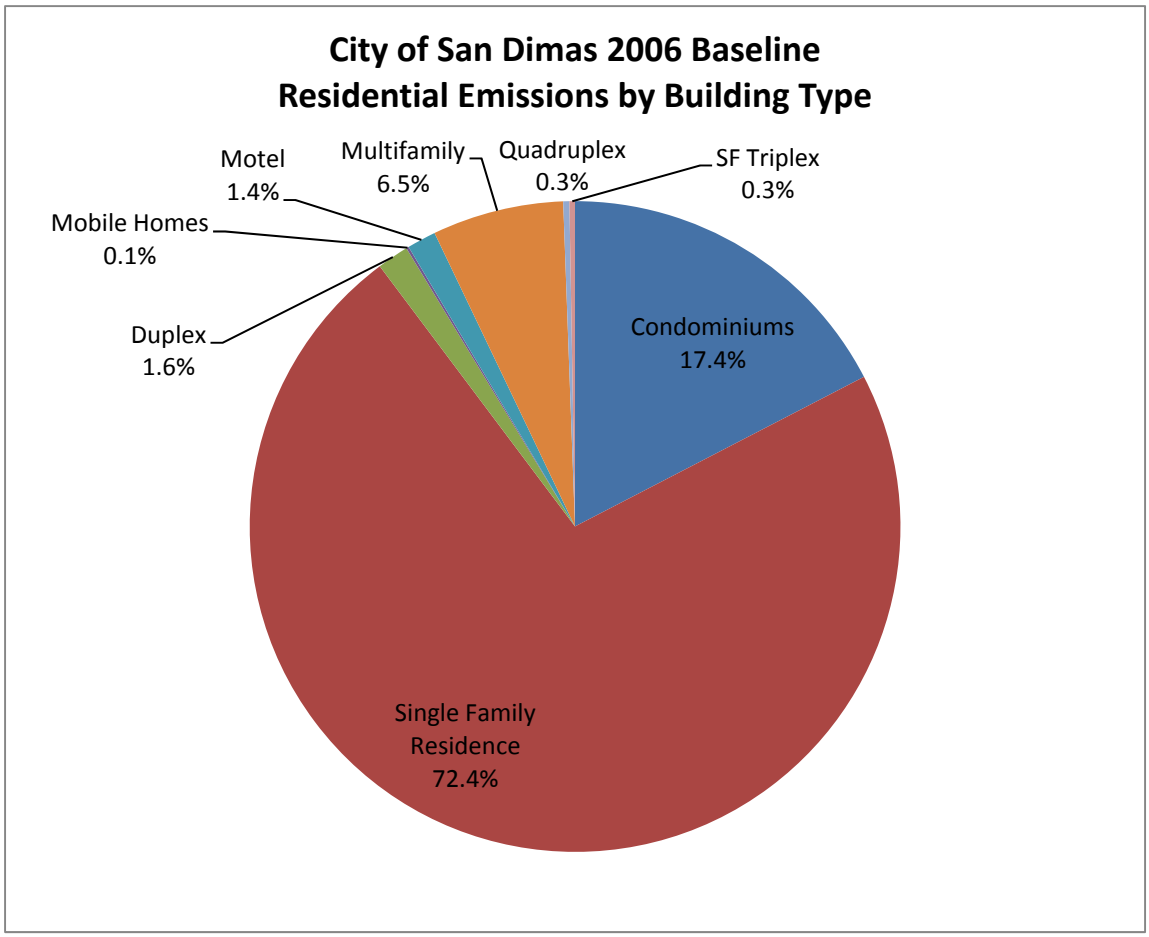

Figure 14: City-wide San Dimas residential emissions by building type

In order to predict the emissions in 2020 due to residential buildings, the residential building energy use was grown according to the dwelling unit growth forecast provided by the City of San Dimas. The growth forecast numbers provided are a data set proposed by the City of San Dimas to the Southern California Association of Governments (SCAG) as adjustments to the projections provided in the RTP 2008 Growth Forecast[37].

[37]SCAG Adopted 2008 RTP Growth Forecast available at Hhttp://www.scag.ca.gov/forecast/index.htmH.

2.3. Non-Residential Energy Use

2.3.1. Emissions Summary

Table 19: Historical and projected City-wide greenhouse gas emissions by sector (MTCO2e)

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
Residential	57,536	19%	59,447	19%	45,257	18%
Non-residential	**54,815**	**18%**	**57,894**	**18%**	**43,433**	**17%**
Water	4,195	1%	4,975	2%	4,229	2%
Transportation	159,007	52%	162,426	51%	128,317	51%
Infrastructure[38]	5,611	2%	6,198	2%	5,268	2%
Landfilled Solid Waste[39]	24,728	8%	26,334	8%	26,334	10%
Total Emissions	**305,893**		**317,274**		**252,838**	
Total Emissions per Capita	***8.55***		***8.21***		***6.54***	

2.3.2. Inventory Assumptions

The data for city-wide non-residential electricity use was obtained from Southern California Edison's "Electricity Use Report for City of San Dimas, Year 2006" report Version 5.0. Emissions due to non-residential building energy use used the sum of SCE's "GS-1, GS-2, and TOU-8" annual kWh, shown in Table 16. Emissions were calculated using the 2006 Southern California Edison utility-specific emissions factor provided in the Local Government Operations Protocol.[40]

SCG has provided actual natural gas consumption data for the commercial and industrial building sector, as shown in Table 17. Natural gas consumption was then multiplied by a weighted US average emissions factor provided in the Local Government Operations Protocol.[41]

The City of San Dimas' parcel data was used to estimate energy use and greenhouse gas emissions for non-residential buildings by building type. The parcel data provides building area (square feet) and general land use information. Because, however, non-residential buildings' energy use varies significantly by building type, allocating non-residential emissions by square footage is not accurate.

[38] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[39] Landfilled solid waste includes waste-to-energy municipal solid waste.

[40] California Air Resources Board's Local Government Operations Protocol, Version1, September 2008. Appendix Table G.5 provides lbs CO2 per MWh (megawatt hour) by utility, while Table G.6 provides statewide average CH4 and N20 electric emissions factors.

[41] California Air Resources Board's Local Government Operations Protocol. Version 1. September 2008. Table G.1

Therefore, electricity use from the California Commercial End-Use Survey (CEUS) was used to estimate non-residential building energy use by building type:[42]

> *"The CEUS is a comprehensive study of commercial sector energy use, primarily designed to support the state's energy demand forecasting activities. A stratified random sample of 2,790 commercial facilities was collected from the service areas of Pacific Gas and Electric, San Diego Gas & Electric, Southern California Edison, Southern California Gas Company, and the Sacramento Municipal Utility District. The sample was stratified by utility service area, climate region, building type, and energy consumption level"."*

The CalArch database tool (which is based on the CEUS study data) was used to obtain typical energy consumption data for non-residential building types appropriate for San Dimas, as shown in Table 20. As shown in Table 21 parcel categories provided by the City of San Dimas were grouped into the building types provided by the CalArch database tool. The summary of building square footages grouped by CalArch building type is presented in Table 22.

Table 20: CEUS/CalArch non-residential energy use data set[43]

	Whole Bldg kBTU/ft2-yr			Elec kWhr/ft2-yr		
Percentile	*25%*	*50%*	*70%*	*25%*	*50%*	*70%*
Office/Professional	22	72	125	7	16	36
Other/Unknown	36	89	270	7	18	38
Public Assembly	8	42	49	8	16	26
Religious Worship				1	2	5
Warehouse (refrigerated)	34	92	177	10	27	41
Warehouse (non-refrigerated)	3	6	12	1	5	8
All Building Types	25	53	114	7	16	34
Agricultural	0	0	0	0	3	3
Education	4	19	28	3	9	25
Education: K-12	0	0	0	3	8	18
Enclosed Shopping Center/Ma	46	61	77	13	17	23
Food Sales	99	176	437	33	50	77
Food Services (restaurants)	0	13	140	30	50	70
Health Care (inpatient)				10	21	36
Health Care (outpatient)	18	33	46	5	11	16
Industrial/Manufacturing	4	19	22	3	8	17
Lodging (hotel, motel, dorm)				4	9	17
Nursing Home				7	13	19

[42] Hhttp://www.energy.ca.gov/ceus/H

[43] CalArch data for natural gas use is not robust for this climate zone. Thus, average natural gas use for City of Claremont (.673 therms/SF) was assumed for all nonresidential buildings for this analysis.

Table 21: Parcel data categories mapping to CalArch building types.

CalArch Category	San Dimas Parcel Category
Office/Professional	FINANCIAL BUILDING OFFICE BUILDING STORES & OFFICES
Other/Unknown	RECREATION FACILITIES
Warehouse (non-refrigerated)	WAREHOUSE MINI WAREHOUSE
Enclosed Shopping Center/Mall	COMMERCIAL (NEC) SHOPPING CENTER STORE BUILDING AUTO SALES DEPARTMENT STORE
Food Sales	SERVICE STATION/MARKET FOOD STORES
Food Services (restaurants)	RESTAURANT BUILDING
Health Care (inpatient)	HOSPITAL ANIMAL HOSPITAL/VET MEDICAL BUILDING
Industrial/Manufacturing	FOOD PROCESSING HEAVY INDUSTRIAL LIGHT INDUSTRIAL LUMBER YARD INDUSTRIAL (NEC)

Table 22: Non-residential building square footages by building type.

Building Type	SF	% of Total
Office/Professional	1,360,371	19%
Warehouse (non-refrigerated)	1,563,047	22%
Enclosed Shopping Center/Mall	1,827,222	25%
Food Sales	144,620	2%
Food Services (restaurants)	78,765	1%
Health Care (inpatient)	728,597	10%
Industrial/Manufacturing	1,439,978	20%
Other	95,694	1%
TOTAL	**7,238,294**	**100%**

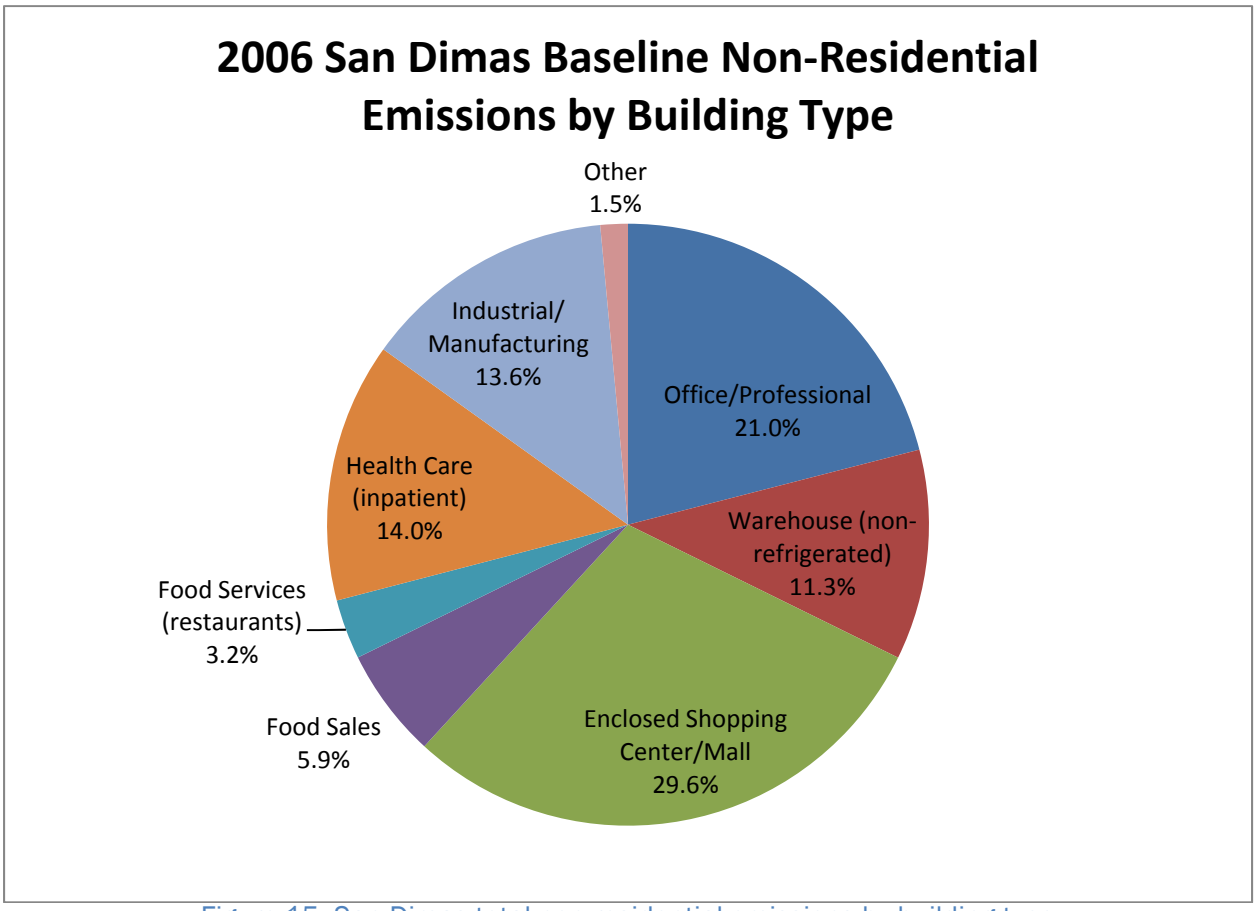

Figure 15: San Dimas total non-residential emissions by building type.

Non-residential growth forecasts were neither available from the City nor SCAG. Thus, in order to predict the emissions in 2020 due to non-residential buildings, the non-residential building energy use was increased according to the employment projections provided by the provided by the City of San Dimas. The growth forecast numbers provided are a data set proposed by the City of San Dimas to the Southern California Association of Governments (SCAG) as adjustments to the projections provided in the RTP 2008 Growth Forecast[44].

[44]SCAG Adopted 2008 RTP Growth Forecast available at Hhttp://www.scag.ca.gov/forecast/index.htmH.

2.4. Solid Waste Emissions

2.4.1. Emissions Summary

Table 23: Solid waste emissions relative to total City-wide emissions (MTCO2e)

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
Residential	57,536	19%	59,447	19%	45,257	18%
Non-residential	54,815	18%	57,894	18%	43,433	17%
Water	4,195	1%	4,975	2%	4,229	2%
Transportation	159,007	52%	162,426	51%	128,317	51%
Infrastructure[45]	5,611	2%	6,198	2%	5,268	2%
Landfilled Solid Waste[46]	**24,728**	**8%**	**26,334**	**8%**	**26,334**	**10%**
Total Emissions	**305,893**		**317,274**		**252,838**	
Total Emissions per Capita	***8.55***		***8.21***		***6.54***	

Table 24: Lifecycle emissions reductions associated with solid waste diversion (MTCO2e)[47]

City of San Dimas Emission Reduction Sectors	2006 Baseline *(MTCO2e)*	2020 Business-As-Usual *(MTCO2e)*	2020 Business-As-Usual with Statewide Action *(MTCO2e)*
Diverted Solid Waste Lifecycle Benefits	**(168,351)**	**(179,280)**	**(179,280)**

2.4.2. Inventory Assumptions

Solid waste generation and disposal is a large contributor to greenhouse gas emissions and the source reduction and diversion of solid waste can cause significant emissions reductions. Thus, solid waste reduction and recycling measures are an important part of the state's AB 32 scoping plan. The scoping plan's recommended measures are shown in Table 25. The measures listed in RW-3 apply to city-wide operations.

[45] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[46] Landfilled solid waste includes waste-to-energy municipal solid waste.

[47] Diversion includes recycled materials, green waste, source reduction, and other diversion.

Table 25: AB 32 Scoping Plan's recycling and waste sector recommendations[48]

(MMTCO$_2$E in 2020)

Measure No.	Measure Description	Reductions
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane • Increase the Efficiency of Landfill Methane Capture	TBD
RW-3	High Recycling/Zero Waste • Mandatory Commercial Recycling • Increase Production and Markets for Organics Products • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	 5 2 2 TBD TBD
	Total	10[44]

San Dimas provided two reports summarizing the City's 2006 solid waste profile. The first document was the "City of San Dimas Tonnage Report 2006," provided by Waste Management San Gabriel/Pomona Valley. Table 26 summarizes the solid waste data provided.

Table 26: San Dimas waste generation statistics.

CITY OF SAN DIMAS TONNAGE REPORT 2006													
Tonnage Collected By Service	Jan-06 Tonnage	Feb-06 Tonnage	Mar-06 Tonnage	Apr-06 Tonnage	May-06 Tonnage	Jun-06 Tonnage	Jul-06 Tonnage	Aug-06 Tonnage	Sep-06 Tonnage	Oct-06 Tonnage	Nov-06 Tonnage	Dec-06 Tonnage	Yearly Totals
Commercial / Multi Family													
Landfilled	1,668.89	1,465.81	1,865.29	1,651.92	1,878.22	1,721.90	1,830.17	1,687.77	1,519.78	1,570.15	1,438.97	1,523.77	19,822.64
Recycled	7.08	7.18	9.29	8.68	5.90	8.99	8.33	6.28	9.31	7.00	4.59	12.56	95.19
Green Waste								7.88					7.88
Waste-to-Energy							16.32		8.46				24.78
Puente Hills MRF				5.44	-	11.53	3.65	3.36	2.62			7.50	34.10
Total Tonnage Collected	**1,675.97**	**1,472.99**	**1,874.58**	**1,666.04**	**1,884.12**	**1,742.42**	**1,858.47**	**1,705.29**	**1,540.17**	**1,577.15**	**1,443.56**	**1,543.83**	**19,984.59**
Commercial Diversion %	**0.4%**	**0.5%**	**0.5%**	**0.8%**	**0.3%**	**1.2%**	**1.5%**	**1.0%**	**1.3%**	**0.4%**	**0.3%**	**1.3%**	**0.8%**
Residential													
Landfilled	1,167.14	896.17	906.26	879.43	1,239.18	956.48	784.44	1,241.63	885.39	1,043.09	951.94	957.39	11,908.54
Recycling	281.69	238.57	255.42	231.19	301.70	257.31	222.97	284.30	238.67	272.78	260.78	266.11	3,111.49
Green Waste	523.49	388.16	396.09	554.14	812.49	567.48	483.30	798.17	522.62	584.36	353.56	376.75	6,360.61
Waste-to-Energy													-
Other Diversion	-	-											-
Total Tonnage Collected	**1,972.32**	**1,522.90**	**1,557.77**	**1,664.76**	**2,353.37**	**1,781.27**	**1,490.71**	**2,324.10**	**1,646.68**	**1,900.23**	**1,566.28**	**1,600.25**	**21,380.64**
Residential Diversion %	**40.8%**	**41.2%**	**41.8%**	**47.2%**	**47.3%**	**46.3%**	**47.4%**	**46.6%**	**46.2%**	**45.1%**	**39.2%**	**40.2%**	**44.3%**
Roll-off Service													
Landfilled	637.55	563.64	508.85	546.06	717.29	643.93	645.49	757.60	335.08	582.08	472.06	456.65	6,866.28
Downtown Diversion residual	5.74	8.31	4.46	-	1.51	5.28	2.14				1.71		29.15
Downtown Diversion recycled	18.96	27.46	14.76	-	5.00	17.44	7.09				5.66		96.37
Green Waste	23.99	14.89	8.10	13.25	14.86	19.30	4.66	12.27	4.89	22.03	13.17	9.09	160.50
Waste-to-Energy													-
Other Diversion	90.88	30.32	9.20	32.00	67.10	120.00	80.00	96.00	58.62	82.81	93.06	64.00	823.99
Total Tonnage Collected	**777.12**	**644.62**	**545.37**	**591.31**	**805.76**	**805.95**	**739.38**	**865.87**	**398.59**	**686.92**	**585.66**	**529.74**	**7,976.29**
Roll-off Diversion %	**17.2%**	**11.3%**	**5.9%**	**7.7%**	**10.8%**	**19.4%**	**12.4%**	**12.5%**	**15.9%**	**15.3%**	**19.1%**	**13.8%**	**13.6%**
Total Tonnage Collected (All Services)													
Landfilled	3,479.32	2,933.93	3,284.86	3,077.41	3,836.20	3,327.59	3,262.24	3,687.00	2,740.25	3,195.32	2,864.68	2,937.81	38,626.61
Recycled	307.73	273.21	279.47	239.87	312.60	283.74	238.39	290.58	247.98	279.78	271.03	278.67	3,303.05
Green Waste	547.48	403.05	404.19	567.39	827.35	586.78	487.96	818.32	527.51	606.39	366.73	385.84	6,528.99
Waste-to-Energy	-	-	-	-	-	-	16.32	-	8.46	-	-	-	24.78
Other Diversion	90.88	30.32	9.20	37.44	67.10	131.53	83.65	99.36	61.24	82.81	93.06	71.50	858.09
Total Tons Collected	**4,425.41**	**3,640.51**	**3,977.72**	**3,922.11**	**5,043.25**	**4,329.64**	**4,088.56**	**4,895.26**	**3,585.44**	**4,164.30**	**3,595.50**	**3,673.82**	**49,341.52**
Total Tons Diverted	**946.09**	**706.58**	**692.86**	**844.70**	**1,207.05**	**1,002.05**	**826.32**	**1,208.26**	**845.19**	**968.98**	**730.82**	**736.01**	**10,714.91**
Total Diversion % All Services	**21.4%**	**19.4%**	**17.4%**	**21.5%**	**23.9%**	**23.1%**	**20.2%**	**24.7%**	**23.6%**	**23.3%**	**20.3%**	**20.0%**	**21.7%**
Total Waste-to-Energy Diversio	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***

[48] California Air Resources Board, "AB 32 Climate Change Scoping Plan." 2008. Hwww.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Page 66H.

This report, however, does not include diversion programs that are not run by Waste Management. The report also does not consider designs or policies that reduce the amount of materials or products generated before they become municipal solid waste, called "source reduction".

The second report provided by the City was the California Integrated Waste Management Board (CIWMB) Annual Report Summary. This report, which is completed by all California jurisdictions, helps document statewide diversion rates from year to year. Each year, this report estimates current year generation and disposal rates. The estimates are based on 1998 generation and disposal information and inflated by the Board-approved "Adjustment Method (AM)" to estimate current year waste generation. The AM uses change in population, employment, and inflation-adjusted taxable sales to estimate waste generation in the current year.

The report provides an overall "generation tonnage" for the City of San Dimas. The "generation tonnage" includes all waste created within a jurisdiction, including the waste disposed and the waste diverted. In the case of this report, the diversion also includes an assumed amount of source reduction. The report also lists all Source Reduction and Recycling Element (SRRE) and Household Hazardous Waste Element (HHWE) programs. This list of programs includes those run by Waste Management as well as any independent diversion programs. A summary of the CWIMB Annual Report for San Dimas is shown below.

Table 27: Summary of Base Year and Reporting Year data provided in CIWMB Annual Report Summary for San Dimas.

Base Year	**1998**
Base Year Generation Amount (tons)	123,144
Reporting Year	**2006**
Estimated Reporting Year Generation Amount (tons)	159,073
Reporting Year Diversion Rate	73%

Table 28: SSRE and HHWE programs reported in the CIWMB Annual Report Summary for San Dimas.

Existing SSRE and HHWE Programs	Program Tons
Xeriscaping/Grasscycling	N/A
Backyard and On-Site Composting/Mulching	N/A
Business Waste Reduction Program	N/A
Procurement	N/A
Government Source Reduction Programs	N/A
Material Exchange, Thrift Shops	N/A
Residential Curbside	3,112
Residential Drop-Off	N/A
Residential Buy-Back	241
Commercial On-Site Pickup	96
Government Recycling Programs	1
Special Collection Seasonal	100
Special Collection Events	3
Residential Curbside Greenwaste Collection	6,361
Commercial On-Site Greenwaste Pick-up	169
Commercial Self-Haul Greenwaste	500
Tires	N/A
White Goods	N/A
Scrap Metal	N/A
Concrete/Asphalt/Rubble	97
Electronic (radio, TV, web, hotlines)	N/A
Print (brochures, flyers, guides, news articles)	N/A
Outreach (tech assistance, presentations, awards, fairs, field trips)	N/A
Schools (education and curriculum)	N/A
Economic Incentives	N/A
Ordinances	N/A
MRF	67
Alternative Daily Cover	5,731
Permanent Facility	N/A
Mobile or Periodic Collection	N/A
Curbside Collection	N/A
Education Programs	N/A
TOTAL	**16,478**

It is important to note that while the City of San Dimas elected to use the CIWMB Report for their inventory, the report does not reflect actual measured waste streams from 2006. Furthermore, it is probable that the generation rate in this report is over-inflated. For example, growth in big-box developments since 1998, such as Costco, generates major taxable sales but not proportional solid waste generation. This inventory includes the numbers from the CIWMB Report, but recognizes that it is not an actual measured representation of waste disposal in San Dimas.

Because the CIWMB report gives only a total number for diversion, a hybrid between the Waste Management Report and CIWMB report was used to calculate solid waste emissions from the City. This inventory applied the total 2006 estimated generation amount from the CIWMB report. From this overall number, this inventory used all landfilled and diverted tonnage reported in the Waste Management report. In addition, however, the inventory added in diversion tonnages listed in the SRRE and HHWE programs reported in the CIWMB report that are independent of Waste Management such as buy-back centers. Finally, this inventory assumes that the remainder of diverted material listed in the CIWMB report can be attributed to source reduction.

The next step is to determine the GHG emissions for various disposal options. The US EPA has developed a detailed set of GHG emission data for various waste components in its "Waste Reduction Model" (WARM). A GHG emission factor table from WARM's Version 10 Emissions Factors is provided in Table 29.[49] These GHG emission factors are multiplied by the appropriate waste/recycling generation statistics, with results summarized in Table 30.

The greenhouse gases emissions factors reported in WARM include different greenhouse gas sources and sinks in the methods used to calculate diverted and landfilled emissions factors. For example, the emissions factors associated with combustion and landfilling include activities that occur only in the waste management phase, such as direct methane emissions from the landfill and transportation to the landfill. On the other hand, the emissions factors for source reduction, recycling, and composting, include activities that occur in multiple phases of the lifecycle, from raw material acquisition through end of life. These emissions occur at various times throughout a materials lifecycle and are indirectly related to the actual waste management practice. For example, the emissions factors for source reduction and recycling include the decrease in GHG emissions in the raw materials acquisition and manufacturing of products relative to "baseline" emissions. In addition, the emissions factors for source reduction, recycling, and composting incorporate the increase in forest carbon sequestration as a result of those waste management practices.[50] Thus, the emissions reported for diversion using the WARM method are more indirectly related than those reported for landfilled solid waste.

Because WARM includes these particularly indirect, upstream and downstream effects in its emissions factors for source reduction, recycling, and composting, the emissions calculated for diverted solid waste are not directly comparable to the other emissions sources reported in this inventory, which do not include lifecycle emissions. In order to display this distinct difference in the type of emissions being reported, the emissions for source reduction, recycling, and composting are reported separately from the other emissions sources, including those for landfilled solid waste.

As shown in Table 30, due to the high diversion rate reported in the CIWMB Report, San Dimas reports significant greenhouse gas lifecycle reductions for their solid waste diversion efforts. The impact of solid waste diversion on lifecycle emissions is an important aspect of San Dimas' overall GHG mitigation efforts.

[49] Source: EPA WARM Model, Hhttp://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

[50] United States Environmental Protection Agency. 2006. *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks.*
*H*http://www.epa.gov/climatechange/wycd/waste/downloads/fullreport.pdf

Table 29: GHG emission factors for various solid waste management options

MTCO2E per short ton	Source Reduction	Recycling	Landfilling, National Average	Landfilling, No recovery	Landfilling, Flaring	Landfilling, Energy Recovery	Combustion	Composting
Aluminum Cans	-8.27	-13.63	0.04	0.04	0.04	0.04	0.06	N/A
Steel Cans	-3.19	-1.8	0.04	0.04	0.04	0.04	-1.54	N/A
Copper Wire	-7.39	-4.96	0.04	0.04	0.04	0.04	0.05	N/A
Glass	-0.53	-0.28	0.04	0.04	0.04	0.04	0.05	N/A
HDPE	-1.81	-1.4	0.04	0.04	0.04	0.04	1.04	N/A
LDPE	-2.29	-1.71	0.04	0.04	0.04	0.04	1.04	N/A
PET	-2.12	-1.55	0.04	0.04	0.04	0.04	1.14	N/A
Corrugated Box	-5.6	-3.1	0.38	1.49	-0.22	-0.45	-0.61	N/A
Magazines	-8.66	-3.07	-0.31	0.14	-0.55	-0.64	-0.44	N/A
Newspaper	-4.89	-2.8	-0.87	-0.48	-1.09	-1.17	-0.69	N/A
Office Paper	-8	-2.85	1.85	3.71	0.84	0.44	-0.58	N/A
Phonebook	-6.3	-2.66	-0.87	-0.48	-1.09	-1.17	-0.69	N/A
Textbook	-9.15	-3.11	1.85	3.71	0.84	0.44	-0.58	N/A
Dimensional Lumber	-2.02	-2.46	-0.5	0.07	-0.81	-0.93	-0.73	N/A
Fiberboard	-2.23	-2.47	-0.5	0.07	-0.81	-0.93	-0.73	N/A
Food Waste	0	N/A	0.71	1.43	0.33	0.17	-0.16	-0.2
Yard Waste	0	N/A	-0.18	0.2	-0.39	-0.47	-0.2	-0.2
Grass	0	N/A	0.17	0.51	-0.02	-0.1	-0.2	-0.2
Leaves	0	N/A	-0.57	-0.3	-0.72	-0.78	-0.2	-0.2
Branches	0	N/A	-0.5	0.07	-0.81	-0.93	-0.2	-0.2
Mixed Paper Board	N/A	-3.51	0.32	1.35	-0.24	-0.46	-0.61	N/A
Mixed Paper residential	N/A	-3.51	0.23	1.21	-0.3	-0.51	-0.61	N/A
Mixed Paper office	N/A	-3.42	0.43	1.43	-0.12	-0.33	-0.55	N/A
Mixed metals	N/A	-5.41	0.04	0.04	0.04	0.04	-1.05	N/A
Mixed plastics	N/A	-1.53	0.04	0.04	0.04	0.04	1.09	N/A
Mixed recyclables	N/A	-2.87	0.18	1	-0.25	-0.42	-0.53	N/A
Mixed organics	N/A	N/A	0.26	0.7	-0.14	-0.26	-0.18	-0.2
Mixed MSW	N/A	N/A	1.51	3.1	0.64	0.3	-0.14	N/A
Carpets	-4.02	-7.22	0.04	0.04	0.04	0.04	0.47	N/A
PCs	55.76	-2.27	0.04	0.04	0.04	0.04	-0.19	N/A
Claybricks	-0.29	N/A	0.04	0.04	0.04	0.04	N/A	N/A
Aggregate	N/A	-0.01	0.04	0.04	0.04	0.04	N/A	N/A
FlyAsh	N/A	-0.87	0.04	0.04	0.04	0.04	N/A	N/A
Tires	-4.01	-1.84	0.04	0.04	0.04	0.04	0.09	N/A

Table 30: San Dimas city-wide solid waste generation statistics with GHG emissions

2006

Total Annual Solid Waste Generation (tons)
159,073

Solid Waste Content	Tons Generated	% Breakdown	Emission factors (MTCO2e)	MTCO2e
LANDFILLED WASTE				
Landfilled	38,627	24.3%	0.64	24,721
Waste-to-Energy	25	0.0%	0.3	7
TOTAL	**38,651**	24.3%		**24,728**
DIVERTED WASTE				
Recycled	3,644	2.3%	-2.87	-10,458
Green Waste	7,129	4.5%	-0.2	-1,426
ADC	5,731	3.6%	-0.18	-1,032
Other Diversion	955	0.6%	0.04	38
Source reduction	102,962	64.7%	-1.51	-155,473
TOTAL	**120,422**	75.7%		**-168,351**

The solid waste generation for the city was projected to 2020 based on typical generation rates for the particular breakdown of building types in San Dimas. Solid waste generation rates were obtained from CalRecycle's website for commercial, industrial, institutional, service, and residential building types. These rates were adjusted to match the generation provided by the CIWMB annual report, and then projected to 2020 based on SCAG projections of building stock.[51] A summary of the solid waste projections is shown below.

[51] Source: CalRecycle's "Estimated Solid Waste Generation Rates" available at Hhttp://www.calrecycle.ca.gov/wastechar/wastegenrates/Commercial.htmH.

Table 31: 2020 Solid waste projections for the City of San Dimas

	2006						2020	
	Generation Rate		Total (tons)	% of Total	Adjusted Total (tons)	Adjustment Factor	Total (tons)	Adjusted Total (tons)
Residential	12.23	lb/DU/day	28,592	43%	68,519	2.40	29,527	70,760
Office/Professional	0.006	lb/sf/day	1,490	2%	3,570	2.40	1,556	3,730
Warehouse (non-refrigerated)	0.0108	ton/yr	16,881	25%	40,454	2.40	17,638	42,269
Enclosed Shopping Center/Mall	0.025	lb/sf/day	8,337	13%	19,979	2.40	8,711	20,875
Food Sales	0.0108	ton/yr	1,562	2%	3,743	2.40	1,632	3,911
Food Services (restaurants)	0.005	lb/sf/day	72	0%	172	2.40	75	180
Health Care	0.0108	ton/yr	7,869	12%	18,857	2.40	8,222	19,703
Industrial/ Manufacturing	0.006	lb/sf/day	1,577	2%	3,779	2.40	1,648	3,948
Other	0.046	lb/sf/day	803	1%	1,925	2.40	1,679	4,023
TOTAL			**66,378**	**100%**	**159,073**		**70,687**	**169,399**

2.5. Water

2.5.1. Emissions Summary

Table 32: Water emissions relative to total City-wide emissions (MTCO2e)

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Total	2020 Business-As-Usual *(MTCO2e)*	% of Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Total
Residential	57,536	19%	59,447	19%	45,257	18%
Non-residential	54,815	18%	57,894	18%	43,433	17%
Water	**4,195**	**1%**	**4,975**	**2%**	**4,229**	**2%**
Transportation	159,007	52%	162,426	51%	128,317	51%
Infrastructure[52]	5,611	2%	6,198	2%	5,268	2%
Landfilled Solid Waste[53]	24,728	8%	26,334	8%	26,334	10%
Total Emissions	**305,893**		**317,274**		**252,838**	
Total Emissions per Capita	***8.55***		***8.21***		***6.54***	

[52] Infrastructure includes emissions due to street lighting, traffic lighting, and agricultural and pumping energy use.

[53] Landfilled solid waste includes waste-to-energy municipal solid waste.

2.5.2. *Inventory Assumptions*

Water consumption data for the City of San Dimas provided by Golden State Water Company is shown below.

Table 33: San Dimas 2006 water consumption.

Golden State Water Company		
San Dimas System		
Water Sales Consumption		
Actual 2006		
Object Account Level	CCF	Gallons
Metered - Residential	5,257,548	3,932,645,904
Metered - Public Auth	399,505	298,829,740
Governmental Agencies	277,631	207,667,988
Metered - Irrigation	97,217	72,718,316
Other Sales or Service	2,195	1,641,860
Private Fire Protection	1,059	792,132
Metered - Industrial	5	3,740
CONS	6,035,160	4,514,299,680
Notes:		
1 ccf = 748 gallons		
Metered Residential includes residential, multi-family and commercial		

Water pumping, conveyance, distribution, treatment, and wastewater treatment is a major energy end-use in California. The California Energy Commission (CEC) estimates that statewide water-related energy consumption accounts for approximately 48,013 GWH of electricity per year, or 19.2% of the state's total electricity use. Of this, approximately 78% is related to urban (i.e., non-agricultural) water uses[54]. Furthermore, approximately 30% of the state's natural gas consumption and 88 billion gallons of diesel fuel per year are used for water heating, the operation of diesel-powered agricultural pumps, and other water-related uses[55]. Water efficiency and related energy/carbon- reduction measures is an important part of the state's AB 32 scoping plan, with the recommended measures shown in Table 34. Measures W-1 and W-2 apply directly to buildings, and are influenced by building design (water fixture flow rate specifications, installation of recycled water piping, etc.).

[54] Navigant Consulting, Inc. "Refining Estimates of Water-Related Energy Use in California," December 2006. California Energy Commission document number CEC-500-2006-118.

[55] California Energy Commission, "California's Water-Energy Relationship," November, 2005. CEC document number CEC-700-2005-011. Hhttp://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDFH

Table 34: AB 32 Scoping Plan's water recommendations[56]

($MMTCO_2E$ in 2020)

Measure No.	Measure Description	Reductions
W-1	Water Use Efficiency	1.4
W-2	Water Recycling	0.3
W-3	Water System Energy Efficiency	2.0
W-4	Reuse Urban Runoff	0.2
W-5	Increase Renewable Energy Production	0.9
W-6	Public Goods Charge	TBD
	Total	4.8(45)

2.5.2.1. Local Water Supplies

There is a series of six interconnected groundwater basins in the San Dimas area, the "Six Basins". These basins include the Canyon, Upper San Dimas Heights, Lower San Dimas Heights, Pomona, Live Oak and Ganesha, as shown in Figure 16. The Six Basins are fed from runoff from the San Gabriel Mountains, primarily the San Antonio Creek watershed.

The Six Basins Watermaster is a group of nine local agencies that administer the groundwater basins, and is governed per a legal judgment from 1999[57]. The Six Basins Watermaster is administered by the Three Valleys Municipal Water District[58], and consists of the following members:

- City of La Verne
- City of Pomona
- City of San Dimas
- San Antonio Water Co.
- Pomona College
- Pomona Valley Protective Association (PVPA)
- Southern California Water Co. (SCWC)
- Three Valleys Municipal Water District
- City of Upland

[56] California Air Resources Board, "AB 32 Climate Change Scoping Plan." 2008. Hwww.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Page 66H.

[57] Three Valleys Municipal Water District. Six Basins Water Master. Hwww.threevalleys.com/SixBasins/index.aspH

[58] Hwww.threevalleys.comH

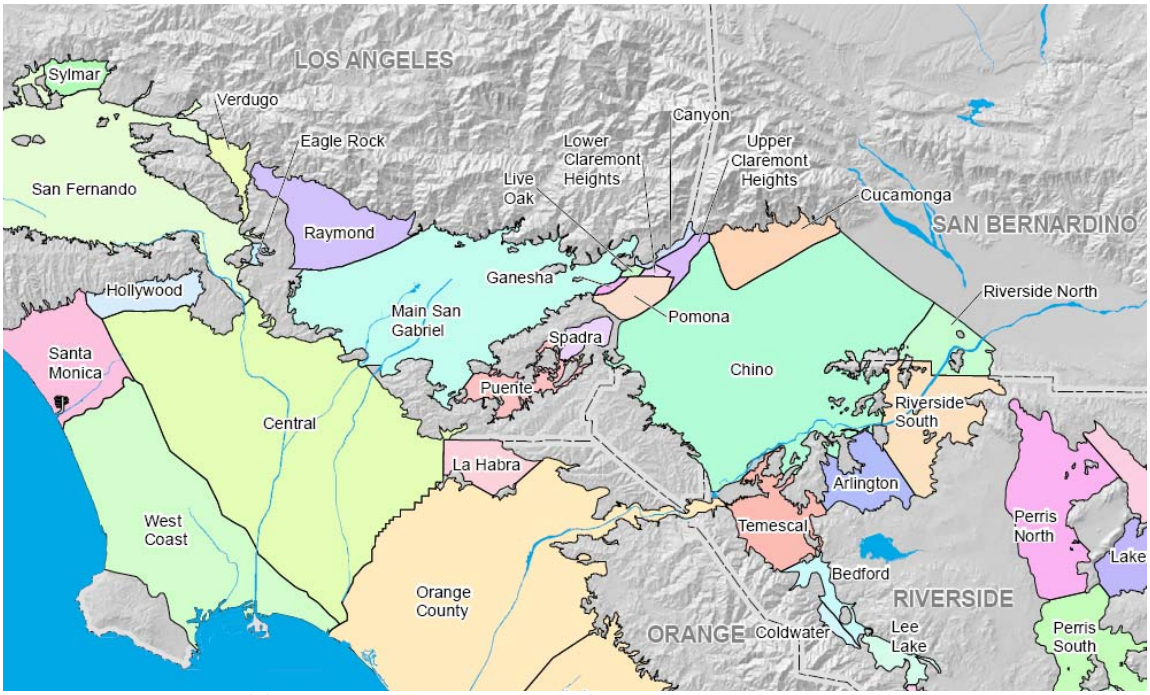

Figure 16: Regional groundwater basins, including the "Six Basins"[59]

2.5.2.2. Imported Water Sources

San Dimas and the rest of Southern California is highly water constrained. The City of San Dimas purchases water from the Golden State Water Company (GSWC). GSWC mixes local water resources with water from other sources, treats the water, and delivers it to the city. For this report, it was assumed that San Dimas receives percentages of local and imported water similar to the City of Claremont.[60]

Water is very energy intensive. Statewide, water is the single biggest consumer of electricity. It is estimated that water consumes 19% of all the state's electricity, consuming 250,494 GWh/year[61],[62]. CTG has assembled a variety of different energy use factors from various sources into CTG's Sustainable Communities Model (SCM)®. Using this model, it is estimated that San Dimas's Water Supply (as purchased from GSWC) has 0.006575 kWh/gallon of water used (2,142 kWh/ AF). These are composed of the following energy components:

[59] Metropolitan Water District of Southern California, September 2007

[60] In 2006, Claremont received 58% of its water from local groundwater and remaining 42% is imported from Northern California down the State Water Project. Source: The League of Women Voters of the San Dimas Area. 2005 (revised March 2006). Water Issues in the City of Claremont. Hhttp://claremont.ca.lwvnet.org/Water.html

[61] Navigant Consulting, Inc. December 2006. "Refining Estimates of Water Related Energy Use in California." California Energy Commission, CEC-500-2006-118.

[62] Pacific Institute. February 2005. "Quantifying the Potential Air Quality Impacts From Electric Demand Embedded in Water Management Choices." California Energy Commission, CEC-500-2005-031

Table 35: Typical embodied energy in San Dimas's potable water supply

Component	Description	kWh/gal (gross)	Source	Pct of Water Use	kWh/gal (net)
Conveyance	State Water Project (CA), delivered to LA Basin	0.008325	(Navigant Consulting, Inc., December 2006)[63]	50%	0.0041625
Supply	Groundwater Pumping (500')	0.002225		50%	0.0011125
Treatment	Typical Water Treatment (EPRI Typical)	0.0001		100%	0.0001
Distribution	Typical Water Distribution (EPRI Typical)	0.0012		100%	0.0012
Total					0.006575

[63] Navigant Consulting, Inc. "Refining Estimates of Water-Related Energy Use in California," December 2006. California Energy Commission document number CEC-500-2006-118.

3. City of San Dimas Municipal Greenhouse Gas Emissions and Modeling Assumptions

In addition to understanding the City's collective greenhouse gas emissions, it is important to understand the greenhouse gas emissions specifically associated with municipal operations. This section presents the emissions directly related to municipal operations, municipally-owned office buildings, and other emissions associated with the municipal operation. This does not include emissions associated with the wider San Dimas community (i.e., it does not include GHG emissions from residential buildings, commercial buildings, general transportation, etc.)

Table 36 summarizes the GHG emissions for 2006. Emissions are reported in metric tons of carbon dioxide equivalents (MTCO2e). As shown, the City of San Dimas' municipal emissions represent only a small fraction of absolute emissions, equal to only 0.45% of total City-wide emissions. Detailed assumptions and data used for estimating these emissions are presented below.

Table 36: City of San Dimas GHG emission summary (2006)

Sector	2006 CO2e	Percentage of Municipal	Percentage of Total
Public Buildings	485	36%	0.16%
Vehicle Fleet	220	16%	0.07%
Employee Commute	290	21%	0.09%
Street Lighting	262	19%	0.09%
Traffic Lights	79	6%	0.03%
Landfilled Solid Waste[64]	29	2%	0.01%
Total	**1,365**	**100%**	**0.45%**

[64] Landfilled solid waste includes waste-to-energy municipal solid waste.

Table 37: Historical and projected Municipal greenhouse gas emissions by sector (MTCO2e)[65]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	485	36%	485	34%	412	35%
Vehicle Fleet	220	16%	220	16%	174	15%
Employee Commute	290	21%	290	21%	229	20%
Street Lighting	262	19%	314	22%	267	23%
Traffic Lights	79	6%	96	7%	82	7%
Landfilled Solid Waste[66]	29	2%	29	2%	29	2%
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

Table 38: Lifecycle emissions reductions associated Municipal solid waste diversion (MTCO2e)[67]

City of San Dimas Emission Reduction Sectors	2006 Baseline *(MTCO2e)*	2020 Business-As-Usual (*MTCO2e)*	2020 Business-As-Usual with Statewide Action *(MTCO2e)*
Diverted Solid Waste Lifecycle Benefits	(0.67)	(0.67)	(0.67)

[65] Numbers vary slightly due to rounding.

[66] Landfilled solid waste includes waste-to-energy municipal solid waste.

[67] Diversion includes recycled materials, green waste, source reduction, and other diversion.

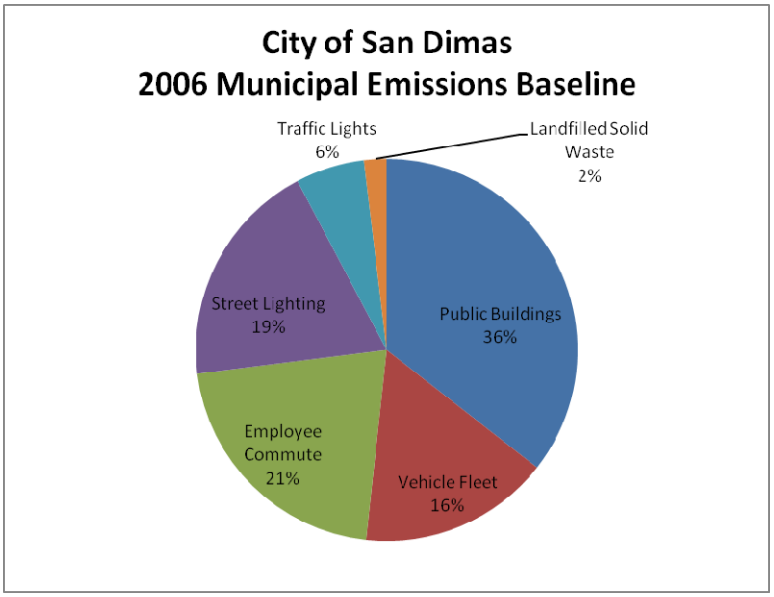

Figure 17: 2006 Municipal baseline emissions by emissions sector[68]

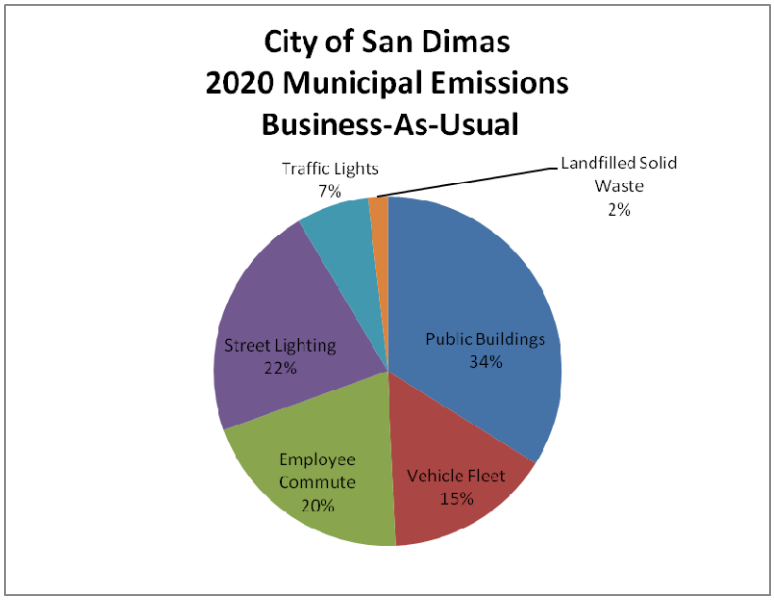

Figure 18: Projected Municipal 2020 business-as-usual emissions by emissions sector[69]

[68] Numbers vary slightly due to rounding.

[69] Numbers vary slightly due to rounding.

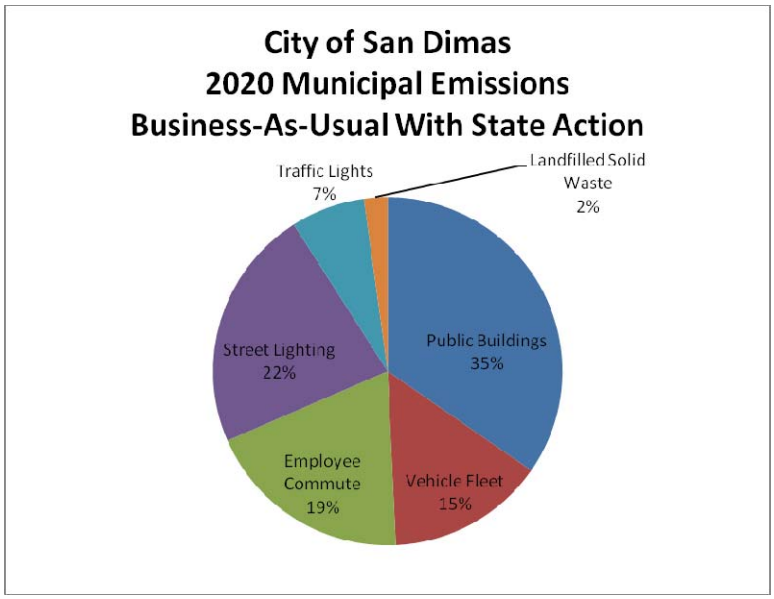

Figure 19: Projected Municipal 2020 business-as-usual emissions considering State Action[70]

[70] Numbers vary slightly due to rounding.

3.1. Municipally-Owned Office Building Energy Use

3.1.1. Emissions Summary

Table 39: Municipally-owned building emissions relative to total Municipal emissions (MTCO2e)[71]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	**485**	**36%**	**485**	**34%**	**412**	**35%**
Vehicle Fleet	220	16%	220	16%	174	15%
Employee Commute	290	21%	290	21%	229	20%
Street Lighting	262	19%	314	22%	267	23%
Traffic Lights	79	6%	96	7%	82	7%
Landfilled Solid Waste[72]	29	2%	29	2%	29	2%
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

3.1.2. Inventory Assumptions

The City of San Dimas provided parcel data for all municipal-owned office building data. The City of San Dimas' parcel data was used to estimate energy use and greenhouse gas emissions for municipal-owned office buildings. The parcel data provides building area (square feet) and general land use information, shown below. For the purposes of this inventory, it was assumed that municipally -owned office building square footage will remain constant between 2006 and 2020.

Table 40: Parcel data provided for Municipal-owned office buildings

Property Address	Owner Name	Year Built	Building Square Feet
344 W BONITA AVE	SAN DIMAS CITY	1924	9,160
124 W RAILWAY ST	SAN DIMAS CITY	1904	4,542
100 W RAILWAY ST	SAN DIMAS CITY	1960	3,144
	SAN DIMAS CITY	1915	1,744
301 S WALNUT AVE	SAN DIMAS CITY	1927	5,700
	SAN DIMAS CITY	1966	2,496
	SAN DIMAS CITY	1950	528
	SAN DIMAS CITY	1924	2,100
	SAN DIMAS CITY	1974	29,000
	SAN DIMAS CITY	1982	240

[71] Numbers vary slightly due to rounding.

[72] Landfilled solid waste includes waste-to-energy municipal solid waste.

Average energy use data from the California Commercial End-Use Survey (CEUS) was used to estimate municipal-owned office building energy use:[73]

> *"The CEUS is a comprehensive study of commercial sector energy use, primarily designed to support the state's energy demand forecasting activities. A stratified random sample of 2,790 commercial facilities was collected from the service areas of Pacific Gas and Electric, San Diego Gas & Electric, Southern California Edison, Southern California Gas Company, and the Sacramento Municipal Utility District. The sample was stratified by utility service area, climate region, building type, and energy consumption level"."*

The CalArch database tool (which is based on the CEUS study data) was used to obtain typical "All Building Types" energy consumption data appropriate for San Dimas municipal office buildings, as shown in Table 41. This data was multiplied by building square footages and MTCO2e emissions factors to calculate the total emissions due to municipal-owned office buildings, as shown in Table 42 and Table 43.

Table 41: CEUS/CalArch non-residential energy use data for San Dimas[74]

	Whole Bldg kBTU/ft2-yr			Elec kWhr/ft2-yr		
Percentile	*25%*	*50%*	*70%*	*25%*	*50%*	*70%*
Office/Professional	22	72	125	7	16	36
Other/Unknown	36	89	270	7	18	38
Public Assembly	8	42	49	8	16	26
Religious Worship				1	2	5
Warehouse (refrigerated)	34	92	177	10	27	41
Warehouse (non-refrigerated)	3	6	12	1	5	8
All Building Types	25	53	114	7	16	34
Agricultural	0	0	0	0	3	3
Education	4	19	28	3	9	25
Education: K-12	0	0	0	3	8	18
Enclosed Shopping Center/Ma	46	61	77	13	17	23
Food Sales	99	176	437	33	50	77
Food Services (restaurants)	0	13	140	30	50	70
Health Care (inpatient)				10	21	36
Health Care (outpatient)	18	33	46	5	11	16
Industrial/Manufacturing	4	19	22	3	8	17
Lodging (hotel, motel, dorm)				4	9	17
Nursing Home				7	13	19

[73] Hhttp://www.energy.ca.gov/ceus/H

[74] CalArch data for natural gas use is not robust for San Dimas' climate zone. Thus, average natural gas use for City of Claremont (.673 therms/SF) was assumed for all nonresidential buildings for this analysis.

Table 42: Estimated electricity consumption and MTCO2e emissions for Municipal-owned office buildings.

2006 YEAR			Emission Factors						
City Facility	Electricity Use (kWh) [1]	Electricity Use (MWh)	lbs CO2 / MWh [2]	lbs CH4 / MWh [3]	lbs N2O / MWh [3]	CO2 (metric tons) [4]	CH4 (metric tons) [5]	N2O (metric tons) [6]	CO2e (metric tons [7]
344 W BONITA AVE	146,560	146.6				43	0.001928	0.000731	42.90
124 W RAILWAY ST	72,672	72.7				21	0.000956	0.000363	21.27
100 W RAILWAY ST	50,304	50.3				15	0.000662	0.000251	14.72
	27,904	27.9				8	0.000367	0.000139	8.17
301 S WALNUT AVE	91,200	91.2				27	0.001200	0.000455	26.69
	39,936	39.9				12	0.000525	0.000199	11.69
	8,448	8.4				2	0.000111	0.000042	2.47
	33,600	33.6				10	0.000442	0.000168	9.83
	464,000	464.0	641.26	0.029	0.011	135	0.006103	0.002315	135.81
	3,840	3.8				1	0.000051	0.000019	1.12
		0.0				0	0.000000	0.000000	0.00
		0.0				0	0.000000	0.000000	0.00
		0.0				0	0.000000	0.000000	0.00
		0.0				0	0.000000	0.000000	0.00
		0.0				0	0.000000	0.000000	0.00
		0.0				0	0.000000	0.000000	0.00
		0.0				0	0.000000	0.000000	0.00
TOTAL	938,464	938				272.97	0.01	0.005	274.68

Table 43: Estimated natural gas consumption and MTCO2e emissions for Municipal-owned office buildings.

2006 YEAR			Emission Factors						
City Facility	Natural Gas Use (Therms) [1]	Natural Gas Use (million BTU) [2]	kg CO2/ million BTU [3]	g CH4/ million BTU [4]	g N2O/ million BTU [4]	CO2 (Metric tons) [5]	CH4 (metric tons) [6]	N2O (metric tons) [7]	CO2e (metric tons [8]
344 W BONITA AVE	6,161	616.1				32.7	0.00308	0.00006	32.77
124 W RAILWAY ST	3,055	305.5				16.2	0.00153	0.00003	16.25
100 W RAILWAY ST	2,115	211.5				11.2	0.00106	0.00002	11.25
	1,173	117.3				6.2	0.00059	0.00001	6.24
301 S WALNUT AVE	3,834	383.4				20.3	0.00192	0.00004	20.39
	1,679	167.9				8.9	0.00084	0.00002	8.93
	355	35.5				1.9	0.00018	0.00000	1.89
	1,412	141.2				7.5	0.00071	0.00001	7.51
	19,506	1,950.6				103.5	0.00975	0.00020	103.76
	161	16.1	53.06	5	0.1	0.9	0.00008	0.00000	0.86
		0.0				0.0	0.00000	0.00000	0.00
		0.0				0.0	0.00000	0.00000	0.00
		0.0				0.0	0.00000	0.00000	0.00
		0.0				0.0	0.00000	0.00000	0.00
		0.0				0.0	0.00000	0.00000	0.00
		0.0				0.0	0.00000	0.00000	0.00
		0.0				0.0	0.00000	0.00000	0.00
TOTAL	39,451	3,945				209.33	0.02	0.000	209.86

3.2. Street Lighting and Traffic Signals

3.2.1. Emissions Summary

Table 44: Street lighting and traffic signals emissions relative to total Municipal emissions (MTCO2e)[75]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	485	36%	485	34%	412	35%
Vehicle Fleet	220	16%	220	16%	174	15%
Employee Commute	290	21%	290	21%	229	20%
Street Lighting	**262**	**19%**	**314**	**22%**	**267**	**23%**
Traffic Lights	**79**	**6%**	**96**	**7%**	**82**	**7%**
Landfilled Solid Waste[76]	29	2%	29	2%	29	2%
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

3.2.2. Inventory Assumptions

City street light counts and traffic signal counts for 2006 and estimates for 2020 are shown in Table 45 and Table 46. The 2020 estimates shown are based on data provided by the City. Electricity consumption associated with street lights and traffic lights was provided in Southern California Edison's "Electricity Use Report for City of San Dimas, Year 2006" report Version 5.0. This report provided total annual kWh by rate group. The account summary, shown in Table 47, details street lighting totals ("STREET LIGHTING") and traffic signals totals ("TC-1" traffic control service) .

Table 45: San Dimas street light counts[77]

Year	2006	2020
Municipal Owned	245	297
Utility Owned	3,439	4,168
Total	3,684	4,465

[75] Numbers vary slightly due to rounding.

[76] Landfilled solid waste includes waste-to-energy municipal solid waste.

[77] Data provided by the City of San Dimas

Table 46: San Dimas traffic light counts[78]

Year	2006	2020
Municipal Owned	33	40
Utility Owned	0	0
Total	33	40

Table 47: Total of Account Summary Data for Bundled and Direct Access Customers[79]

RATE GROUP	ANNUAL KWH	% of TOTAL	NONCOINCIDENT PEAK	CALCULATED COINCIDENT PEAK	NUMBER OF ACCOUNTS	% OF TOTAL
AG TOU	5,421,040	2.1%	2,060	1,277	29	0.2%
DOMESTIC	99,731,038	38.5%	-	-	11,049	83.2%
GS-1	16,237,842	6.3%	-	-	1,664	12.5%
GS-2	52,883,457	20.4%	17,888	12,700	389	2.9%
STREET LIGHTING	13,478,720	5.2%	-	-	66	0.5%
TC-1	271,102	0.1%	-	-	52	0.4%
TOU-8	70,761,939	27.3%	16,180	11,326	37	0.3%
Grand Total	258,785,138				13,286	
DA % of kWh	6.1%					

Application of 15/15 Rule (Section VIII, Release of Aggregated Customer Information, p. 6)
The PA-1, PA-2, TOU-PA-5 rate groups were combined into the AG TOU rate group.
The TOU-GS rate group was combined into TOU-8 rate group.

[78] Data provided by the City of San Dimas

[79] Southern California Edison's "Electricity Use Report for City of San Dimas, Year 2006" report Version 5.0, Table C.

3.3. Municipally-Owned vehicles

3.3.1. Emissions Summary

Table 48: Municipally-owned vehicle emissions relative to total municipal emissions (MTCO2e)[80]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	485	36%	485	34%	412	35%
Vehicle Fleet	**220**	**16%**	**220**	**16%**	**174**	**15%**
Employee Commute	290	21%	290	21%	229	20%
Street Lighting	262	19%	314	22%	267	23%
Traffic Lights	79	6%	96	7%	82	7%
Landfilled Solid Waste[81]	29	2%	29	2%	29	2%
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

3.3.2. Inventory Assumptions

Fuel use data for the municipal vehicle fleet was provided by the City, and is summarized in Table 49. The calculations for the 4 RAV 4 electric vehicles assumed the vehicles are driven 12,000 miles per year at 0.235 kWh/mile.[82] Emissions factors were referenced from the Local Government Operations Protocol; the total fuel use values were multiplied by motor gasoline and diesel fuel emissions factors, while the electricity consumption was multiplied by an SCE specific electricity emissions factor. [83] For the purposes of this inventory, it was assumed that the municipal vehicle fleet will remain constant between 2006 and 2020.

[80] Numbers vary slightly due to rounding.

[81] Landfilled solid waste includes waste-to-energy municipal solid waste.

[82] RAV 4 electric vehicle efficiency provided by RAV4 EV Vehicle Specifications at Hhttp://avt.inel.gov/pdf/fsev/eva/toyrav96.pdfH,

[83] California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and the Climate Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0." September 25, 2008.

Table 49: Fuel use for City-owned vehicles (2006)[84]

Fuel Type	Quantity	Units	Emission Factor (kg CO2/gallon)	MTCO2	% Breakdown
Gasoline	14,519	Gallons	8.81	128	58%
Diesel	8,987	Gallons	10.15	91	41%
Electric	2,820	kWh/yr		0.83	0%
TOTAL	**26,326**			**220**	**100%**

3.4. Commuting

3.4.1. Emissions Summary

Table 50: Employee commuting emissions relative to total Municipal emissions (MTCO2e)[85]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	485	36%	485	34%	412	35%
Vehicle Fleet	220	16%	220	16%	174	15%
Employee Commute	**290**	**21%**	**290**	**21%**	**229**	**20%**
Street Lighting	262	19%	314	22%	267	23%
Traffic Lights	79	6%	96	7%	82	7%
Landfilled Solid Waste[86]	29	2%	29	2%	29	2%
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

3.4.2. Inventory Assumptions

Table 51 summarizes municipal employee commuting data, provided by the City of San Dimas. Commuting data has been used to calculate total gallons of gasoline consumed, which was then multiplied by default motor gasoline emissions factor provided in the Local Government Operations Protocol.[87] This inventory assumes no growth in municipal employees between 2006 and 2020.

[84] Data provided by the City of San Dimas

[85] Numbers vary slightly due to rounding.

[86] Landfilled solid waste includes waste-to-energy municipal solid waste.

[87] California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and the Climate Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0." September 25, 2008.

Table 51: Municipal employee commuting data[88]

	2006 Year
Total # of full-time City employees	77
Average miles per gallon	18.17
Average miles/day/employee	35.5
# of work days	209
Annual miles traveled by entire City staff	570,779
Total gallons of gasoline	31,410
kg CO2/gallon	8.81
g CH4 / mile	0.0647
g N2O / mile	0.0704
CO2 Emissions (metric tons)	**277**
CH4 Emissions (metric tons)	**0.03693**
N2O Emissions (metric tons)	**0.04018**
CO2e Emissions (metric tons)	**289.95**

[88] Round trip miles and employee counts provided by City of San Dimas. Annual mileage estimates are based on 9 work days in 2 weeks, 15 vacation/sick days, and 10 holidays. Assumed that part time employees are half time, and travel only half the week.

3.5. Solid Waste

3.5.1. Emissions Summary

Table 52: Municipal solid waste emissions relative to total municipal emissions (MTCO2e)[89]

City of San Dimas Emissions Sectors	2006 Baseline *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual *(MTCO2e)*	% of Municipal Total	2020 Business-As-Usual with Statewide Action *(MTCO2e)*	% of Municipal Total
Public Buildings	485	36%	485	34%	412	35%
Vehicle Fleet	220	16%	220	16%	174	15%
Employee Commute	290	21%	290	21%	229	20%
Street Lighting	262	19%	314	22%	267	23%
Traffic Lights	79	6%	96	7%	82	7%
Landfilled Solid Waste[90]	**29**	**2%**	**29**	**2%**	**29**	**2%**
Total	**1,365**	**100%**	**1,433**	**100%**	**1,192**	**100%**

Table 53: Lifecycle emissions reductions associated Municipal solid waste diversion (MTCO2e)[91]

City of San Dimas Emission Reduction Sectors	2006 Baseline *(MTCO2e)*	2020 Business-As-Usual (*MTCO2e)*	2020 Business-As-Usual with Statewide Action *(MTCO2e)*
Diverted Solid Waste Lifecycle Benefits	(0.67)	(0.67)	(0.67)

3.5.2. Inventory Assumptions

Because municipal solid waste values were not available, this inventory assumed an average generation rate of 0.59 tons of solid waste per employee[92]. The municipal emissions calculations assume the average commercial/multi-family solid waste breakdown provided by Waste Management San Gabriel/Pomona Valley's "City of San Dimas Tonnage Report 2006". Projected 2020 municipal waste generation was increased according to number of municipal employees, which was assumed to be constant. A summary of municipal solid waste emissions is provided below.

[89] Numbers vary slightly due to rounding.

[90] Landfilled solid waste includes waste-to-energy municipal solid waste.

[91] Diversion includes recycled materials, green waste, source reduction, and other diversion.

[92] Value provided by the City of San Dimas

As was reported in the city-wide inventory for solid waste, municipal solid waste emissions for landfilled solid waste and diverted solid waste are reported separately. This is to account for the upstream and downstream emissions impacts that are incorporated in the emissions factors for diversion, but not included in the other emissions sources included in the inventory. For more information, see Section 2.4.

Table 54: Municipal solid waste emission summary

2006 YEAR

Solid waste generation rate (tons/employee/yr)	Total # of City Employees	Total Solid Waste Landfilled (tons)	Total Solid Waste Generated (tons)
0.59	77	**45.12**	**45.43**

Solid Waste Content	% Breakdown	Generation (tons)	Emission factors (MTCO2e)	MTCO2e
LANDFILLED WASTE				
Landfilled	99.2%	45.06	0.64	28.84
Waste-to-Energy	0.1%	0.06	0.3	0.02
TOTAL	**99.3%**	**45.12**		**28.86**
DIVERTED WASTE				
Recycled	0.5%	0.21	-2.87	-0.62
Green Waste	0.0%	0.02	-0.18	0.00
Other Diversion (Mixed Recyclables)	0.0%	0.02	-2.87	-0.04
Other Diversion –(Inerts)	0.1%	0.06	0	0.00
TOTAL	**.69%**	**.31**		**-.67**

4. Conclusions

A number of factors have converged over the past few years to create new requirements for the consideration of climate change and greenhouse gas (GHG) emissions in the design of projects, particularly during the preparation of environmental documentation. Key issues include:

- State goals for greenhouse gas emissions reduction articulated in California's Global Warming Solutions Act (AB 32).
- Interpretations of these new goals with respect to existing environmental policy, most notably the California Environmental Quality Act (CEQA).
- Amendments to the State CEQA Guidelines published pursuant to SB 97 addressing analysis and mitigation of greenhouse gas emissions for project-level GHG analysis.
- Publication of the California Air Resources Board (ARB) Scoping Plan for the implementation of AB 32.
- Private legal action against individual projects, such as lawsuits by non-profit groups.

The City San Dimas Greenhouse Gas Inventory provides a roadmap to support California's transition to a clean, low-carbon economy and prepare for changing climatic conditions. The roadmap makes it clear that success will rely on a broad-base of participation – no single sector can achieve these goals on its own. This is a challenge that will be shared by the entire city.

The municipal government can lead the way through improvements its own activities and operations. It can also serve as a catalyst for the types of changes needed throughout the City's economy. However, municipal actions cannot do it alone. Everyone who lives, works, or plays in the City contributes to its greenhouse gas (GHG) footprint, and everyone will need to be part of the solution.