F.2 - Greenhouse Gas Reduction Plan

DRAFT
Fresno General Plan Update
Greenhouse Gas Reduction Plan
City of Fresno, California

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SECTION 1: INTRODUCTION

1.1 - Purpose



The City of Fresno (City) has prepared a Greenhouse Gas Reduction Plan (GHG Plan) as its primary strategy for reducing emissions that scientific consensus has concluded are responsible for human-induced climate change. The GHG Plan focuses on emissions generated by activities under the control or influence of the City. The GHG Plan is designed to ensure that the development accommodated by the buildout of the General Plan supports the goals of Assembly Bill (AB) 32—the Global Warming Solutions Act of 2006. AB 32 requires California to reduce statewide greenhouse gas emissions to 1990 levels by the year 2020. This GHG Plan would reduce community-related and City operations-related greenhouse gas emissions to a degree that would not hinder or delay implementation of AB 32. Although the State has not adopted a comprehensive target and strategy for achieving targets beyond 2020, other general targets for later years have been discussed. The Fresno Green Sustainability Strategy also includes a commitment to meet the 2020 AB 32 goal and to meet a reduction of 80 percent below 1990 levels by 2050 stated in Executive Order S-03-05.

The California Air Resources Board (ARB) adopted the State's strategy for achieving AB 32 targets in its Climate Change Scoping Plan (Scoping Plan) in 2008. The Scoping Plan greenhouse gas reduction goal is to reduce statewide emissions to 1990 levels by 2020. This would require a 21.7 percent reduction from business as usual (BAU) emissions predicted for 2020. Local governments that achieve reductions greater than or equal to reductions from sources under their control or influence would be supportive of the State's efforts. The Greenhouse Gas Reduction Plan (GHG Plan) includes strategies that will achieve this target. The strategy will continue to provide reductions past 2020 and includes "interim" targets for 2035 and 2050 that show the amount of reductions that would be required to be on a path to achieve the State's long-term goal of reducing emissions to 80 percent below 1990 levels by 2050. The GHG Plan includes projections that show the amount of emission reduction that will be required to achieve consistency with percentage reductions meets targets in later years, but the GHG Plan does not include a comprehensive strategy to achieve the later targets pending adoption of a statewide strategy for those later years.

1.2 - Relationship to the General Plan Update

The General Plan Update provides a clear mandate for action on greenhouse gas emissions with greenhouse gas policies and an implementation measure for the City to prepare a Climate Action

Plan as part of the General Plan Update and Master Environmental Impact Report (MEIR). The measure envisioned that the Climate Action Plan, referred here as the Greenhouse Gas Reduction Plan (GHG Plan) would be concurrently approved with the General Plan Update. The GHG Plan may also be adopted as follow-on action addressed in the MEIR. The intent of the GHG Plan is to achieve compliance with state mandates by focusing on feasible actions the City can take to minimize the adverse impacts of growth and development on climate change and air quality. The GHG Plan includes all required elements to meet this criterion.

1.3 - Organization and Plan Content

The Greenhouse Gas Reduction Plan includes the following four main sections:

- A Background section that describes the environmental and regulatory setting for greenhouse gases
- An Emission Inventory section that accounts for the sources of emissions applicable to the City
- A Strategy Section that details the strategies that will be used to reduce greenhouse gas emissions
- An Implementation and Monitoring section that details how the strategies will be implemented and tracked over time.

The General Plan Resource Conservation Element includes Policy RC-5-b, which outlines the content of the plan that will achieve this objective:

- A baseline inventory of all known or reasonably discoverable sources of greenhouse gases (GHGs) that currently exist in the city and sources that existed in 1990 (Updated to 2010).
- A projected inventory of the GHGs that can reasonably be expected to be emitted in the city in the year 2035 in accordance with discretionary land use decisions pursuant to this General Plan update and foreseeable communitywide and municipal operations.
- A target for the reduction of emissions from those identified sources.
- A list of feasible GHG reduction measures whose purpose shall be to meet the established local reduction target, including energy conservation and “green building” requirements in municipal buildings and private development.
- Periodically update municipal and community-wide GHG emissions inventories to determine the efficacy of adopted measures and to guide future policy formulation needed to achieve and maintain GHG emissions reduction targets.

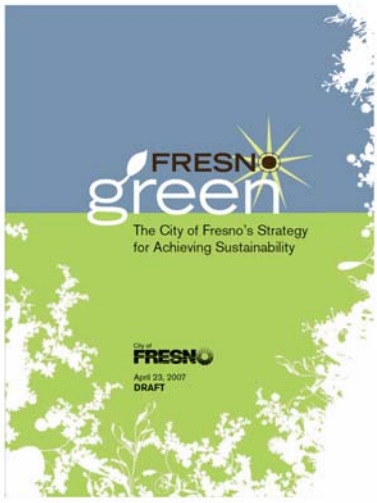
1.4 - Building on Prior Actions

1.4.1 - Fresno Green 2007 Sustainability Strategy

The City of Fresno has taken several important steps to improves the City's sustainability and reduce impacts that include greenhouse gas emissions. The Sustainability Strategy includes Green Visions, described below.

New City Beautiful

Fresno will be nationally recognized for the innovative integration of buildings within their neighborhood context; good urban design; and giving priority to public health, open spaces, public art, historic preservation, urban forests, and the protection of natural habitats.



Sierra View 2025

The Sierra Nevada mountain range will be clearly visible to all Valley residents by 2025. Public health will be improved by having cleaner air, enhanced public transportation, and additional opportunities for walking and cycling.

Solar Valley

Fresno will become a leader in renewable energy use by maximizing new renewable sources as well as increasing the efficiency of its existing uses. Fresno will lead the State in the creation of related innovative technology and new business enterprises. With its abundant sunshine and population growth, the opportunity exists to improve air quality, reduce dependence on foreign energy, and provide attractive new jobs by harnessing solar and other types of renewable energy.

Green Enterprises and Economic Development

The City of Fresno will become a center for innovative business enterprises that focus on the "triple bottom line" of providing environmental, economic, and social benefits.

City as Good Steward

The City of Fresno will lead by example by greening up its facilities and practices, embracing a zero waste initiative, providing appropriate staff resources, and collaborating with other municipalities and agencies to develop regionally based Green programs.

1.4.2 - Zero Waste Strategic Action Plan

The City of Fresno Zero Waste Strategic Action Plan, approved February 11, 2008, aims to achieve 75 percent diversion by 2012 and zero waste status by 2025. Zero Waste is a philosophy and a design principle for the 21st Century that includes recycling but goes beyond recycling by taking a "whole system" approach to the vast flow of resources throughout society. It is a goal and guide for people to emulate sustainable natural cycles, where all discarded materials are resources for others to use.

1.4.3 - City of Fresno Urban Water Management Plan

The Water Conservation Act of 2009 (Senate Bill [SB]x7-7), which was enacted in November 2009. SBx7-7 requires urban retail water suppliers, such as the City of Fresno, to develop per capita water use targets to be met by 2015 and 2020. The overall statewide objective of SBx7-7 is to reduce per capita water use by 20 percent by the year 2020. The 2010 Urban Water Management Plan (UWMP) was adopted by the Fresno City Council on November 29, 2012 to meet this requirement. The UWMP contains water conservation best management practices (BMP) to achieve the required reductions in water use.

1.4.4 - Water Efficient Landscape Standards

The City has adopted water conserving landscape requirements that are specified in the City Municipal Code (Section 6-522. Water Efficient Landscape Standards). These requirements define standards and procedures for the design, installation, and management of landscapes in order to utilize available plant, water, land, and human resources to the greatest benefit of the people of the City.

1.4.5 - General Plan Air Quality Update 2009

The Air Quality Update satisfied the requirements of AB 170 that mandated cities and counties of the San Joaquin Valley to address air quality in their General Plans. Many of the goals, policies, and implementation measures that reduce air pollutant emissions also reduce greenhouse gases. In addition, the Air Quality Update included greenhouse gas specific policies that are carried forward into the General Plan Update and form the basis of the strategy defined in the Greenhouse Gas Plan.

1.5 - CEQA Tiering and Streamlining Analysis of Greenhouse Gas Emissions

New development that will occur with the buildout of the General Plan must address greenhouse gas impacts to comply with the California Environmental Quality Act (CEQA). The legislature has adopted tiering and streamlining provisions in SB 97 that encourage cities to adopt greenhouse gas reduction plans as a mechanism to assist with project CEQA compliance. The greenhouse gas reduction plans and CAPs must meet the following criteria in order to use CEQA tiering and streamlining provisions.

A. Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;

B. Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;

C. Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;

D. Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;

E. Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;

F. Be adopted in a public process following environmental review.

The GHG Plan is structured to meet the streamlining criteria listed above. Compliance with the applicable General Plan policies and GHG Plan strategies would result in less than significant impacts related to greenhouse gas emissions.

1.6 - How Does the Plan Reduce Greenhouse Gas Emissions?

The largest source of greenhouse gases is the combustion of carbon containing fuels producing carbon dioxide (CO_2). Although there are many other greenhouse gases, the Plan emphasizes actions under the City's control or influence that can reduce CO_2 emissions. Other greenhouse gases such as methane (CH_4), nitric oxide (N_2O) and refrigerants such as hydrofluorocarbons (HFCs) are addressed in the plan, but have fewer sources and fewer control opportunities at the City level.

There are only a few ways to reduce GHG emissions:

- Improve the efficiency of the device using the fuel or power so it achieves the same amount of work using less fuel (e.g. improve aerodynamics in cars and trucks/low friction oils).
- Move to low carbon power generation with zero or low GHG facilities such as solar, wind, biofuels.
- Improve the efficiency of the combustion process to obtain more energy from the fuel being burned (e.g. high efficiency burners, better fuels).
- Conservation programs to reduce water use (reduced energy for water pumping and transport).
- Sequestration in urban forests (storing greenhouse gases).
- Reduce municipal waste to reduce emissions from transport and decomposition (e.g. recycling, reuse, diversion).

The Air Quality Update of the 2025 Fresno General Plan Resource Conservation Element states that greenhouse gas control efforts focus on these multiple aspects of emissions, attempting an integrated, broad-based strategy for "sustainability" to incorporate:

- Heightened energy efficiency incorporated into all aspects of structural design and operations, as appropriate to local climate
- Rehabilitation and renovation of existing structures, incorporating and upgrading energy efficiency measures
- Reduction in vehicle-related emissions
- Utilization of renewable and non-polluting sources of energy

- Incorporation of recycled and renewable materials in construction
- Reduction in use and generation of toxic materials that require special handling and disposal
- Increasing landscaping in ways appropriate to local climate
- Water conservation and water recycling

The GHG Plan provides a comprehensive approach utilizing the available strategies listed above to achieve emission reductions sufficient to demonstrate consistency with State of California targets. The GHG Plan does not reinvent the wheel. It builds on the General Plan policies and implementation measures. Where needed, the GHG Plan provides more details to clarify and focus action and to ensure implementation.

1.7 - Relationship to State and Federal Actions to Reduce Greenhouse Gas Emissions

Efforts by cities to reduce greenhouse gases are an important part of larger effort implemented by the State of California and to a lesser degree the federal government. Limited action has taken place on the federal level to reduce greenhouse gas emissions, making State of California actions the most important to the City. In absence of federal action, California has implemented an ambitious control strategy to reduce greenhouse gas emissions. The State recognized that the magnitude of the challenge of reducing greenhouse gases to the extent needed to prevent catastrophic effects of climate change is such that reductions throughout the economy, including those at the local level, are required. Climate change is a global problem that will take unprecedented cooperation and action at international, national, state, and local levels. California has chosen to be a leader in this effort and a model for others to follow.

1.8 - Community Reduction Targets

The development anticipated for the City of Fresno creates challenges and opportunities for reducing greenhouse gas emissions sufficiently to ensure that growth will not hinder or obstruct the implementation of AB 32 and achievement California targets. Areas with relatively high rates of growth such as Fresno will produce a larger share of greenhouse gas emissions in the future compared with slow-growing and built-out parts of the State. However, new development presents opportunities, with its ability to incorporate the latest technologies into buildings to reduce energy use and its ability to build complete neighborhoods and commercial areas in ways that reduce vehicle travel.

2020 Reduction Target

The ARB in its Status Report on compliance with AB 32 indicates that a 21.7 percent reduction from BAU emissions in 2020 will be required to meet the AB 32 2020 target of achieving 1990 rates. If per capita emission rates in Fresno decline by at least 21.7 percent compared with BAU emissions in 2020, the City would be supporting the State's ability to meet its 2020 target. Reductions will be achieved by existing development and new projects. Residents of new development projects will achieve lower per capita rates than residents of existing development. This is because of greater

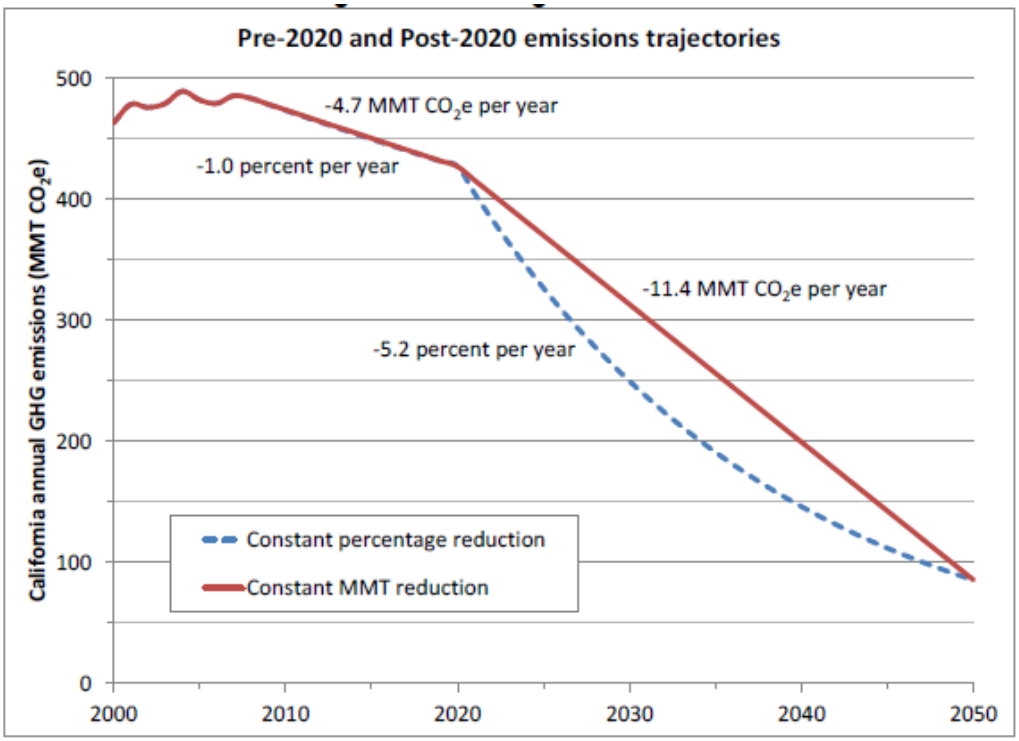
energy efficiency in new structures and lower motor vehicle travel resulting from the project designs and higher development densities anticipated from General Plan implementation. The target is based on per capita emissions from all city residents. It should be noted that the State also reports reduction goals in terms of both total emissions and per capita emissions for all of California.

Targets After 2020

The State has not adopted comprehensive targets or a new Scoping Plan to address emissions after 2020. The GHG Plan includes interim targets for later years (2035 and 2050) pending new legislation that sets later targets similar to AB 32 or adoption of a Scoping Plan Update that addresses these years. Targets after 2020 show the trajectory required to reduce per capita emissions to 80 percent below 1990 by 2050; however, once the State adopts targets for later years, new community targets that match the new state target years will be needed to ensure consistency.

The ARB released the Proposed First Update to the Climate Change Scoping Plan on February 10, 2014 (ARB 2014). The draft update discusses the need for a mid-term target between 2020 and 2050 to provide a continuum of action to reduce cumulative emissions. As shown in Figure 1, the State would need to reduce emissions after 2020 at a rate of 5.2 percent per year to reach emission levels 80 percent below 1990 by 2050. The Update states that the United States, in support of the Copenhagen Accord, pledged emission reduction of 42 percent below 2005 levels in 2030, which in California translates to 35 percent below 1990 levels. Although the State has not officially adopted this target, this amount or a similar amount of reduction is likely for the mid-term 2030 target.

Figure 1: California GHG Emission Reductions to Achieve 2050 Target



The Scoping Plan Update describes a post-2020 strategy that focuses on six key areas of the State's economy—energy, transportation, agriculture, water, waste management, and natural and working lands—along with short-lived climate pollutants, green buildings, and the Cap-and-Trade Program.

At the growth rates projected for General Plan buildout, the City could continue to grow through 2050 without designating additional land for development. The General Plan Update and the GHG Plan help ensure that the City of Fresno will do its part of reducing greenhouse gas emissions for the short-term (2020) and the long term (2050).

1.9 - Challenges and Opportunities

Greenhouse gas emissions are the ultimate cumulative effect. Global warming and climate change are the result of emissions from every source on the globe that combine to increase greenhouse gas concentrations in the atmosphere. Scientific evidence supports the need for drastic worldwide reductions to prevent catastrophic climate change. A commonly stated amount needed to stabilize the climate is an 80 percent reduction in global GHG emissions from 1990 levels by 2050. This leads to the following questions:

- What is California's responsibility for reducing emissions?
- What is local government's responsibility for reducing emissions?
- What is an individual development project's responsibility for reducing emissions?
- What is each person's responsibility for reducing emissions?

The government structure in the United States with its checks and balances limits the power of the states to take action to reduce greenhouse gases. For example, states are not allowed to interfere with interstate and international commerce; however, powers that are not vested in the federal government are reserved for the states. Individual rights for people to live how and where they want are also highly prized. This structure creates challenges for reducing greenhouse gas emissions that touch every sector of the economy and that are greatly influenced by individual choices and actions. With uneven action among the states and nations, the potential exists for regulations to cause businesses simply to relocate their emissions to nations, states, or cities with weak or no regulations. Fortunately, many actions that reduce GHG emissions produce multiple benefits that offset the cost of implementation. However, it must be recognized that individuals or organizations implementing the action may not directly benefit from cost savings or may have difficulty with initial capital costs.

A thorough discussion of regulatory authority for greenhouse gas emissions is provided in Section 2. In short, the State has broad authority to regulate GHG emission sources. It has authority to regulate greenhouse gases from motor vehicles, power generation, and industrial processes, and sets efficiency standards for buildings, lighting, appliances, water use, and waste management/recycling. On the other hand, local government's role is mostly a supportive one. Local government is called upon to support state programs and to use its land use authority and police power to reduce GHG impacts. For example, local government is authorized by the State to adopt ordinances that exceed energy standards for buildings and exceed water conservation and recycling mandates. Through the development review process and CEQA, local government can require or encourage project designs

that produce fewer vehicle trips and miles traveled and included mitigation measures with which projects must comply as conditions of approval.

Individual choice plays an important role in reducing GHG emissions. The State can mandate increasing numbers of electric vehicles (EVs) to be sold in California to meet emission standards, but it cannot force people to buy them. It can mandate energy efficient appliances and buildings but cannot make people turn out the lights and turn down the thermostat to save energy. It cannot prevent people from buying more and bigger televisions. However, the State and the City can provide incentives and disincentives that affect choice to align with the goal of reducing GHG emissions.

SECTION 2: BACKGROUND INFORMATION

Greenhouse gas emissions and climate change are complex topics that are the topics of hundreds of books, research papers, and policy documents. This section of the GHG Plan provides a brief overview of climate change and the local factors that affect GHG emission growth. The following information provides a discussion in a City of Fresno context.

2.1 - City of Fresno Background

The Greenhouse Gas Reduction Plan uses population, employment, and housing statistics as the basis for estimating current and future year emissions and reduction targets. The data are consistent with the assumptions used for the General Plan Update to the extent possible.

2.1.1 - Location and Constraints to Growth

The City of Fresno is located in Fresno County, which is generally located in the center of the San Joaquin Valley, the most productive agricultural region in the nation and the world. Fresno's central location in California between San Francisco (184 miles) to the north and Los Angeles (222 miles) to the southwest has made it an important regional center.

There are no significant physical barriers to Fresno's future growth; however, political boundaries and policy considerations are very important in shaping future growth. The San Joaquin River and the Fresno/Madera County line run along the northern edge of the city. The City of Clovis abuts Fresno to the northeast and east, preventing growth in that direction. The land southeast, south and west are mostly prime farmland. The southeast area is a long-term growth area in the General Plan Update. The City has limited development planned south and west of Fresno with no expansion of the sphere of influence planned in the General Plan Update in those directions.

2.1.2 - Transportation Facilities

The City of Fresno is crossed by two important state highways used for regional travel and commerce. State Route 99 (SR-99) runs northwest/southeast through the City, connecting Fresno to northern and southern California. SR-41 connects Fresno to the Central Coast and is a main route to Yosemite National Park. SR-41 also acts as a primary commuter facility between northern and southern parts of Fresno. SR-168 runs north/east to Clovis acting as a commute facility and beyond to the Sierra Nevada. SR-168 intersects with SR-180, which runs east/west through the City, connecting Fresno with the communities of western Fresno County and with Kings Canyon and Sequoia National Parks.

Fresno is on the California High Speed Rail route and a station is planned for Downtown Fresno. High Speed Rail is anticipated to be a major catalyst for development and redevelopment in Fresno, although the General Plan is not reliant on it to achieve its stated infill and development and redevelopment goals. Fresno currently receives rail service from Amtrak. Fresno Area Express (FAX) provides bus transit service. FAX offers 16 fixed-route bus lines and Handy Ride Paratransit Service. FAX operates a modern clean and green fleet of over 100 buses.

2.1.3 - General Plan Footprint and Buildout Statistics

The City of Fresno has a substantial development footprint. The incorporated City is 113 square miles (72,224 acres) and the City's sphere of influence is 157 square miles (100,249 acres). Additionally, there are 11 square miles (31,297 acres) of unincorporated "county islands" inside Fresno's city limits (City of Fresno. 2011 General Plan Map Atlas).

In accordance with the requirements of the State of California, the Local Agency Formation Commission (LAFCO) authorizes a "sphere of influence" (SOI) around municipalities as the probable physical boundary and ultimate service area of that government. The City of Fresno's SOI comprises 68,952 acres of incorporated land and 31,297 acres of unincorporated land. The City is responsible for planning within its entire Sphere of Influence; thus, the 100,240-acre SOI is considered the City of Fresno's "planning area." The City's incorporated area, which is under the direct control of the City of Fresno, comprises just fewer than 69 percent of the City's SOI. Some of the unincorporated land is completely surrounded by the City of Fresno and is referred to as a "county island," whereas other unincorporated land lies adjacent to the outer fringe of the City. Unincorporated land comprises 31 percent of the City's SOI (City of Fresno Working Paper 2, 2011).

Table 1 compares the existing and planned acreage within the plan area. The amount of land within the planning area is not changing with the General Plan Update. Increases in residential and commercial development will be provided by redesignating land currently designated for industrial and "other" uses to residential and commercial. The "Other" category primarily includes agriculture, and the entire Southeast Growth Area.

Table 1: General Plan Update Statistics

Land Use Designation	Existing General Plan Acreage	General Plan Update Acreage	Change in Acreage
Residential	41,688	46,043	4,355
Commercial	6,456	6,913	457
Industrial	12,072	9,578	-2,494
Mixed use	557	4,223	3,666
Public facilities	17,329	17,671	342
Open space	1,665	3,001	1,336
Other	26,260	18,598	-7,662
TOTAL	**106,027**	**106,027**	**0**
Population	790,000	970,000	180,000

Note:
No additional land is being designated for development by the General Plan Update.
Source: City of Fresno Development and Resource Management Department, 2012.

Table 2 provides more detail in terms of land use type for existing development and development anticipated with the General Plan Update. The General Plan Update envisions a substantial increase

in the amount of multi-family residential compared with single-family residential development. Multi-family would increase from 36.3 percent of existing residential development to 46.4 percent with the General Plan Update. The City assumes buildout of the Plan Area would occur by 2056.

The growth statistics reveal two important points. First, substantial growth is projected for Fresno over the coming decades and that growth will increase GHG emissions. Second, the proposed mix of land uses that would accommodate the growth in population will increase development density. Increased density when combined with a strong pedestrian and transit orientation can reduce motor vehicle travel and related greenhouse gas emissions.

Table 2: General Plan Buildout Statistics

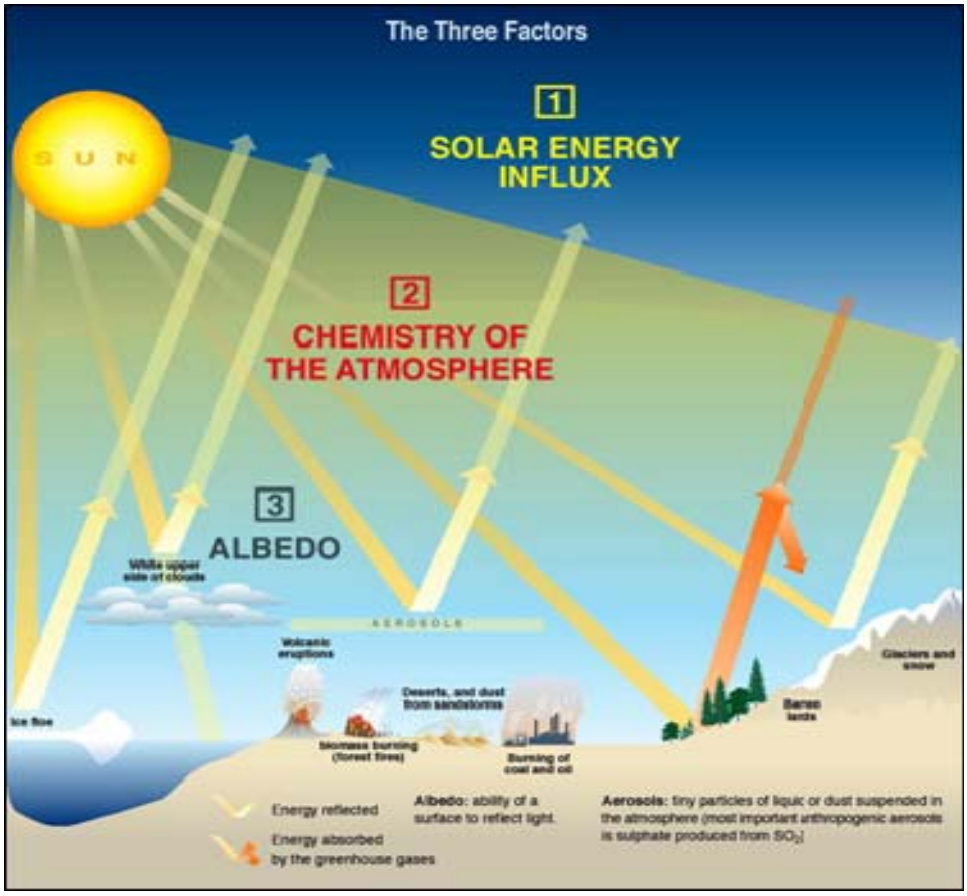
Land Use	Existing Development		General Plan Update		Incremental Increase	
	MSF	Acres	MSF	Acres	MSF	Acres
Single-Family Residential	109,000	26,147	169,626	38,961	60,626	12,814
Multiple-Family Residential	62,288	3,496	146,826	6,605	84,538	3,109
Commercial/Office/ Public Facility	66.4	14,804	129.7	26,517	63.3	11,712
Mixed Use	0.1	10	20.9	4,213	20.8	4,223
Industrial	72.8	6,765	113.3	9,578	40.5	2,813
Open Space	—	12,288	—	1,546	—	-10,742
Agriculture	—	11,714	—	736	—	-10,978
Vacant	—	12,522	—	0	—	-12,522
Other	—	18,281	—	17,861	—	-420
TOTAL		**106,027**	**—**	**106,027**	**—**	**0**
Population (persons)	545,000		970,000		425,000	

Note:
msf = million square feet
Source: City of Fresno Development and Resource Management Department, 2012.

2.2 - Climate Change Background

Climate scientists refer to gases that trap heat in the atmosphere as greenhouse gases. The effect is analogous to the way a greenhouse retains heat. As shown in Figure 2, the energy influx is maintained by three main factors: the amount of energy coming in, which depends on the earth's distance from the sun and solar activity; the albedo (the ability of the earth's surface to reflect light); and the chemical composition of the atmosphere. The presence of greenhouse gases in the atmosphere regulates the earth's temperature.

Figure 2: Factors Affecting the Earth's Temperature



The chemical composition of the atmosphere changes over time. Natural processes and human activities emit greenhouse gases. As shown in Figure 3, carbon dioxide concentrations in the atmosphere have increased over time. The global atmospheric concentration of carbon dioxide (CO_2) data in Figure 3 prior to 1958 is from ice core measurements and post-1958 data are from the Mauna Loa, Hawaii site.

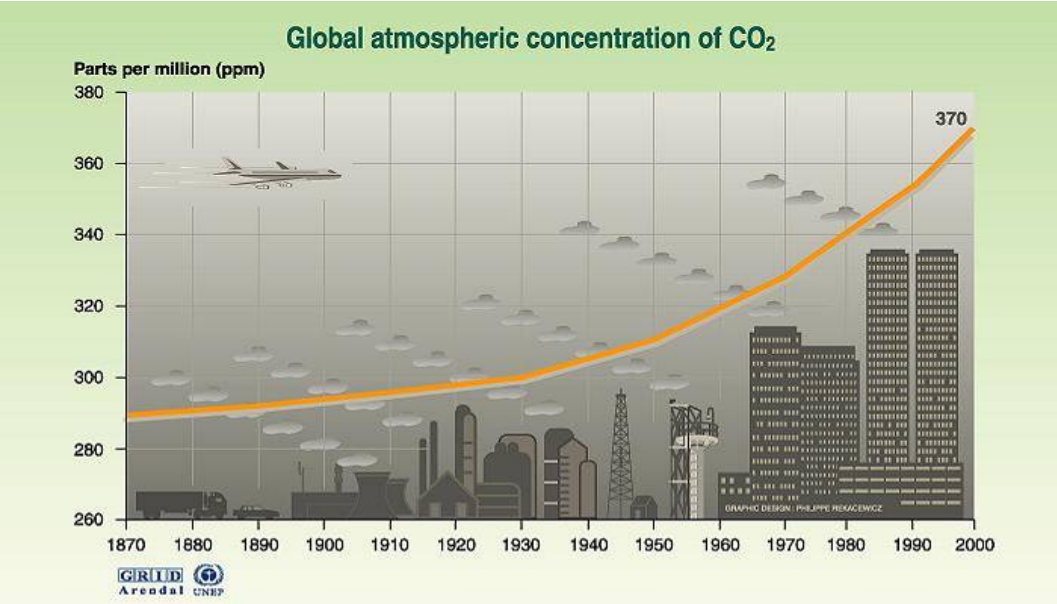
2.2.1 - Global Warming Potential

Greenhouse gases have varying global warming potential and atmospheric lifetimes. Carbon dioxide, the reference gas for global warming potential, has a global warming potential of 1. The calculation of the carbon dioxide equivalent (CO_2e) is a consistent methodology for comparing emissions, since it normalizes various emissions to a consistent metric. Methane's warming potential of 21 indicates that methane has a 21 times greater warming affect than carbon dioxide on a molecule per molecule basis. A carbon dioxide equivalent is the mass emissions of an individual greenhouse gas multiplied by its global warming potential. Emissions are typically shown in metric tons of carbon dioxide equivalents ($MTCO_2e$) or a million times that, million metric tons of carbon dioxide equivalents ($MMTCO_2e$). Global warming potentials are shown in Table 3.

Table 3: Global Warming Potentials

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous oxide (N_2O)	310
Source: Intergovernmental Panel on Climate Change 2007a	

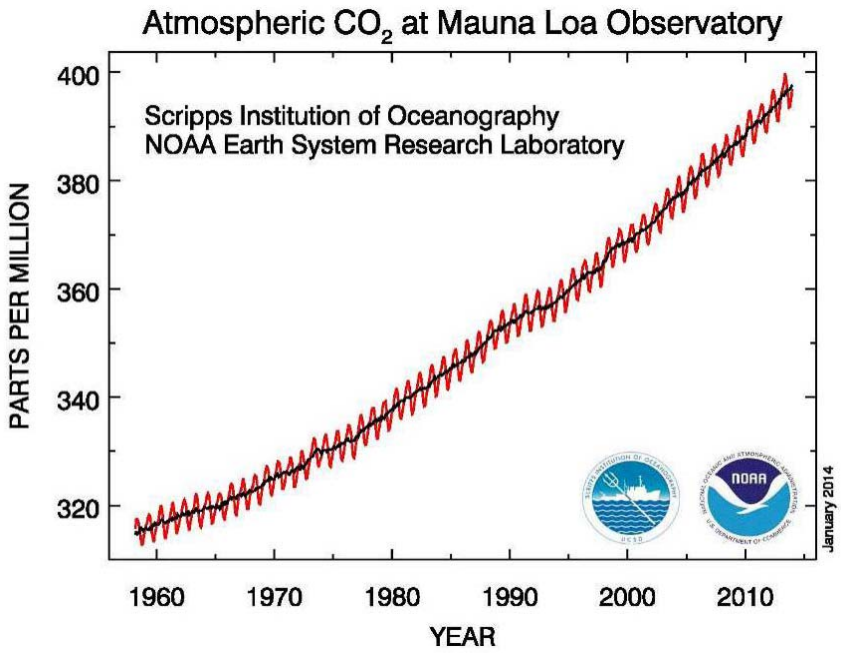
Figure 3: Global Atmospheric Concentration of CO_2



2.2.2 - Global Climate Change Trends

Figure 4 provides a more detailed look of concentrations since 1960 showing continuing steady increases even with international actions that have been taken to date. The National Oceanic and Atmospheric Administration reported that the global average CO_2 concentration was 396 parts per million (ppm) in 2013 and has exceeded 400 ppm at some monitoring stations (NOAA 2013).

Figure 4: Carbon Dioxide Concentrations 1960 to 2013



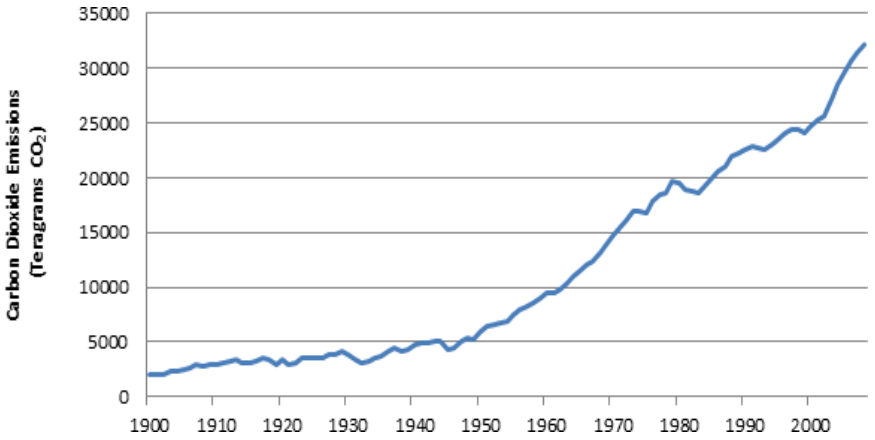
2.2.3 - Greenhouse Gas Emission Inventories

Emission inventories are database that list by source and pollutant the amount air pollutants discharged into the atmosphere during a given period of time. Inventories can range from individual businesses, cities, counties, states, nations, to global in scope. Emission inventories are used to help determine significant sources of air pollutants, establish emission trends over time, and target regulatory actions.

Emissions of greenhouse gases are a true cumulative impact. Emissions anywhere and everywhere in the world contribute to increased concentrations of greenhouse gases in the atmosphere and the potential for climate change. Viewing the emissions output at global, national, state, and local levels is important to understanding the scale of the problem and the relative contribution of each level of government organization.

Global emissions have increased rapidly since 1900 and continue to increase at an even faster pace since the year 2000. Figure 5 shows this trend with particularly dramatic increases after World War II and more recently with rapid increases in China and other rapidly industrializing nations in the last decade. Emissions have increase over 600 percent since 1950. Note that one teragram equals one million metric tons. The increases in emissions are consistent with the atmospheric concentrations shown in Figure 4 and Figure 5.

Figure 5: Increases in Global Carbon Dioxide Emissions 1900 to 2008



Source: EPA 2014.

The United States and California's greenhouse gas inventory in 2010 for all sources are shown in Table 4. The percentages of emissions for the United States are 12.2 percent of the global total yet accounts for only 4.4 percent of the world's population. This places extra responsibility for the United States to take a leadership role and to act as a model for other nations to follow. Although previous international efforts have not made substantial progress in slowing the growth in greenhouse gas emissions, the United States has many reasons to change to lower carbon economy. For example, reducing energy imports and increased energy security, cost savings from efficiency, employment in renewable energy, etc.

Table 4: United States, California, and World GHG Emission Inventory (CO_2e)

Inventory	$MMCO_2e$	Percent of Total
California	545	1.1
United States	5,921	12.2
World	48,629	100
Sources: ARB 2012 and EPA 2013.		

2.3 - Effects of Climate Change on Fresno

Scientific research indicates that an increase in global average temperature of 2 degrees Centigrade (°C) (3.6 ° Fahrenheit [F]) above pre-industrial levels poses risks to natural systems and human health and well-being. This is only 1.1°C (2.0°F) above present levels. In order to avoid temperatures above those levels, studies indicate that a concentration at or below 450 ppm CO_2e must be achieved. Other studies indicate a stable concentration of about 400 ppm CO_2e will be needed to prevent the 2.0°C (3.6°F) increase. As shown in Figure 4 above, readings at the Mauna Loa monitoring station have already exceeded 400 ppm CO_2e and the international average is likely to exceed 400 ppm in a

few years. The existing trend is likely to cause substantial harm to future generations and nature (ARB 2014).

Despite efforts to reduce greenhouse gas emissions, these gases can remain in the atmosphere for hundreds of years and emissions are expected to continue to increase globally for some time. Therefore, it is probable that climate change impacts will be observed. The impacts are predicted to vary by region. In California, climate change may result in a decreased water supply, sea level rise, and increased wildfires, to name a few. In order to manage these impacts, the City's vulnerability to these impacts is assessed and strategies have been developed to adapt to the projected changes.

Determining potential future impacts from climate change is an evolving process. The 2009 California Climate Adaptation Strategy provides a proactive foundation for an ongoing adaptation process within California for the sectors with the greatest risks. The document provides strategies for state and local governments to adapt to climate change (CNRA 2009). By incorporating applicable strategies as Implementation Strategies, the City is taking a proactive approach to ensure that impacts to the City are minimized.

The following discussion describes the main risks from climate change that could be experienced in the City of Fresno. The General Plan sections related to safety, public utilities, hydrology, and resource conservation contain policies that would decrease the risks to residents of the City. In general, City programs and policies to respond to existing levels of risk may need to be implemented more frequently or expanded to protect City residents and resources from potential impacts from climate change. Response to more or bigger events can be expected to demand more city resources.

2.3.1 - Wildfire

The City of Fresno is surrounded by irrigated agricultural lands, rural residential development, and the City of Clovis that are not subject to wildfire to any great extent. Fallow farmland and vacant land with weedy growth can become a fire hazard if not maintained. The San Joaquin River bluff area along the City's northern boundary could experience longer dry seasons and greater threats from wildfire.



San Joaquin River Bluffs

2.3.2 - Water

One of the potential impacts of climate change is a loss of natural snowpack, particularly the Sierra Nevada snowpack. Snowmelt provides an annual average of 15 million acre-feet of water, released between April and July each year (Department of Water Resources 2008). The California Department of Water Resources projects that the Sierra snowpack will experience at least a 25 percent reduction from its historic average by 2050 (DWR 2014). Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack.

Changes in precipitation patterns are expected to cause increased flooding. For the purposes of federal flood insurance, the Federal Emergency Management Agency (FEMA) has traditionally used the 100-year flood event, which refers to the level of flood flows that has a 1-percent chance of being exceeded in any single year. As California's hydrology changes, what is currently considered a 100-year flood may strike more often, leaving many communities at greater risk. Moreover, as peak flows and precipitation change over time, climate change calls into question assumptions of "stationarity" that are used in flood-related statistical analyses such as the 100-year flood. That is, the probable area of inundation does not change from year to year.



San Joaquin River

The California Department of Water Resources (2008) recommends that local governments implement land use policies that decrease flood risk. These following recommendations are included as GHG PLAN implementation policies where applicable and feasible.

- Local land use agencies should update General Plans to address increased flood risks posed by climate change. General Plans should consider an appropriate risk tolerance and planning horizon for each locality.
- Local governments should site new development outside of undeveloped floodplains unless the floodplain has at least a sustainable, 200-year level of flood protection.
- Local governments should use low-impact development techniques to infiltrate and store runoff.
- Local governments should include flood-resistant design requirements in local building codes. State, federal, and local agencies should develop conjunctive use management plans that integrate floodplain management, groundwater banking, and surface storage. Such plans could help facilitate system reoperation and provide a framework for the development of local projects that are beneficial across regions.
- Local land use agencies should adopt ordinances that protect the natural functioning of groundwater recharge areas.

Figure 6: 1997 San Joaquin River Flood



Source: DWR Final Report of the Flood Emergency Action Team, posted June 1997.

As precipitation falls in the form of rain rather than snow with greater storm intensity, high-frequency flood events are projected to increase. There is currently no known literature that suggests an increase in flooding from climate change in the Fresno area; however, it is possible that there could be changing weather patterns that would result in heavy downpours of rain in the area, which could cause street flooding. In addition, the potential for increased wildfires in foothill and mountain areas upstream from Fresno resulting from climate change could increase floods following fire if reservoirs had insufficient capacity to capture the runoff at that time.

2.4 - Federal, State, and Regional Actions to Address Climate Change

2.4.1 - United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is responsible for implementing federal policy to address global climate change. The federal government's early efforts have focused on public-private partnerships to reduce greenhouse gas intensity through energy efficiency, renewable energy, methane and other non-CO_2 gases, agricultural practices, and implementation of technologies to achieve greenhouse gas reductions.

The EPA is required to regulate carbon dioxide and other greenhouse gases as pollutants under Section 202(a)(1) of the federal Clean Air Act. The first step in implementing its authority was the Mandatory Reporting Rule that required inventory data collection commencing on January 1, 2010 with first reports due March 2011. Effective January 2, 2011, the EPA requires new and existing sources of greenhouse gas emissions of 75,000 tons per year to obtain a permit under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit Program. The EPA has developed federal light-duty vehicle standards that are harmonized with California standards

through 2016 and developed the first ever federal GHG standards for medium-duty and heavy-duty vehicles.

In June 2013, President Obama approved the nation's first Climate Action Plan that lays out a series of executive actions to reduce carbon pollution, prepare the nation for the impacts of climate change, and lead international efforts to address global climate change. The Plan reiterates the President's 2009 pledge to reduce United States greenhouse gas emissions by 17 percent below 2005 levels by 2020.

These federal efforts help support California's efforts by providing a more level playing field for regulated sources and by ensuring that out-of-state vehicles driving in California will contribute similar levels of emissions to those complying with California standards. However, legislative action at the federal level will be needed over the long term to ensure progress at the national level continues.

2.4.2 - State of California

California has adopted a variety of regulations aimed at reducing the State's greenhouse gas emissions. While state actions alone cannot stop climate change, the adoption and implementation of this legislation demonstrates California's leadership in addressing climate change. Key legislation and Executive Orders pertaining to the State's reduction targets are described below.

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

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

The State achieved the first goal of reducing emissions to 2000 levels by 2010. Total greenhouse gas emissions were reduced by 2.9 percent during that period even though population increased by 10.9 percent in the same period (ARB 2013). The State also appears to be on track for achieving the 2020 target.

AB 32. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. Greenhouse gases as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The California Air Resources Board (ARB) is the state agency charged with monitoring and regulating sources of greenhouse gases. The ARB approved the Climate Change Scoping Plan in December 2008 (California Air Resources Board 2008). The Scoping Plan contains measures designed to reduce the State's emissions to 1990 levels by the year 2020.

SB 375. SB 375 aligns regional transportation planning efforts, regional greenhouse gas reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy, which allocates land uses in the Metropolitan

Planning Organization's Regional Transportation Plan. Qualified projects consistent with an approved Sustainable Communities Strategy or Alternative Planning Strategy and categorized as "transit priority projects" would receive incentives under new provisions of CEQA. SB 375 requires regional reduction targets for light duty passenger vehicle CO_2 emissions for each MPO.

Other State Regulations

AB 1493 (Pavley). The Pavley Bill enacted in 2002 requires the maximum feasible and cost-effective reduction of greenhouse gases from automobiles and light-duty trucks. In 2004, ARB approved the "Pavley I" regulations that applied to new passenger vehicles beginning with model year 2009 through 2016. Pavley I is expected to reduce greenhouse gas emissions from regulated vehicles by 30 percent from 2002 levels by 2016. Pavley II was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III. The amendments, effective August 7, 2012, apply to vehicles for model years 2017 through 2025. The regulation will reduce greenhouse gases from new cars by 34 percent from 2016 levels by 2025 (ARB 2011).

Title 24 Energy Efficiency Standards. The State has adopted several other major regulations that will provide substantial reductions in greenhouse gases. Title 24, Part 6 California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 to reduce California's energy consumption. The California Energy Commission revises Title 24 about every three years to incorporate cost-effective energy efficiency technological advancements into the construction of new buildings. The latest version is the 2013 Title 24 update, which goes into effect July 1, 2014.

Green Building Code. California's Green Building Standard Code (CalGreen) was adopted in 2010 and went into effect January 2011. CalGreen is a mandatory green building code that sets minimum environmental standards for new buildings including standards for volatile organic compound (VOC) emitting materials, water conservation, and construction waste recycling.

Other Regulations. The ARB has adopted numerous regulations on sources of greenhouse gases since the approval of the Climate Change Scoping Plan. Some of the more notable regulations include the Low Carbon Fuel Standard and regulations affecting vehicle efficiency such as the Tire Pressure Program, Low Friction Oil, and Heavy Duty Vehicle Aerodynamic Efficiency Standards. Also important are ARB regulations that apply to high global warming potential consumer products and refrigerants.

2.4.3 - Fresno County Council of Governments

SB 375 Regional Targets and SCS

SB 375 aligns regional transportation planning efforts, regional greenhouse gas reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPO) are required to adopt a Sustainable Communities Strategy, which allocates land uses in the Metropolitan Planning Organization's Regional Transportation Plan. Qualified projects consistent with an approved Sustainable Communities Strategy or Alternative Planning Strategy and categorized as "transit priority projects" would receive incentives under new provisions of CEQA.

The initial results of the MPO scenario analysis for Fresno County indicated that achieving a percent reduction in passenger vehicle CO_2 per capita of 4.7 percent by 2020 and 7.6 percent by 2035 is feasible. These numbers are subject to changes due to model validation, calibration, and ongoing local coordination efforts. The MPO growth scenario focuses on existing core areas without expansion of the City of Fresno sphere of influence (ARB 2013). Under the General Plan Update, growth would be distributed along major corridors and activity centers supported by a new Bus Rapid Transit (BRT) system, and has a theme of complete neighborhoods to provide convenient access to different uses at the neighborhood level. The strategy relies on a combination of increasing density, mixed uses, and infill.

The Fresno Council of Governments (FCOG) has developed a Sustainable Community Strategy (SCS) to implement SB 375 requirements. The SCS, adopted by the FCOG on June 26, 2014 demonstrates that Fresno County will be able to achieve the GHG targets for light-duty vehicle travel adopted by the ARB for this area.

San Joaquin Valley Blueprint

The San Joaquin Valley Blueprint Planning Process was a 4-year effort by agencies, organizations, and individuals, including the Fresno Council of Governments, to identify visions, values, guiding principles, and alternative growth scenarios for development over a 20-year planning horizon.

The adopted 12 Blueprint Smart Growth Principles from this process are:

- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Encourage community and stakeholder collaboration.
- Foster distinctive, attractive communities with a strong sense of place.
- Make development decisions predictable, fair, and cost-effective.
- Mix land uses.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Provide a variety of transportation choices.
- Strengthen and direct development towards existing communities.
- Take advantage of compact building design.
- Enhance the economic vitality of the region.
- Support actions that encourage environmental resource management.

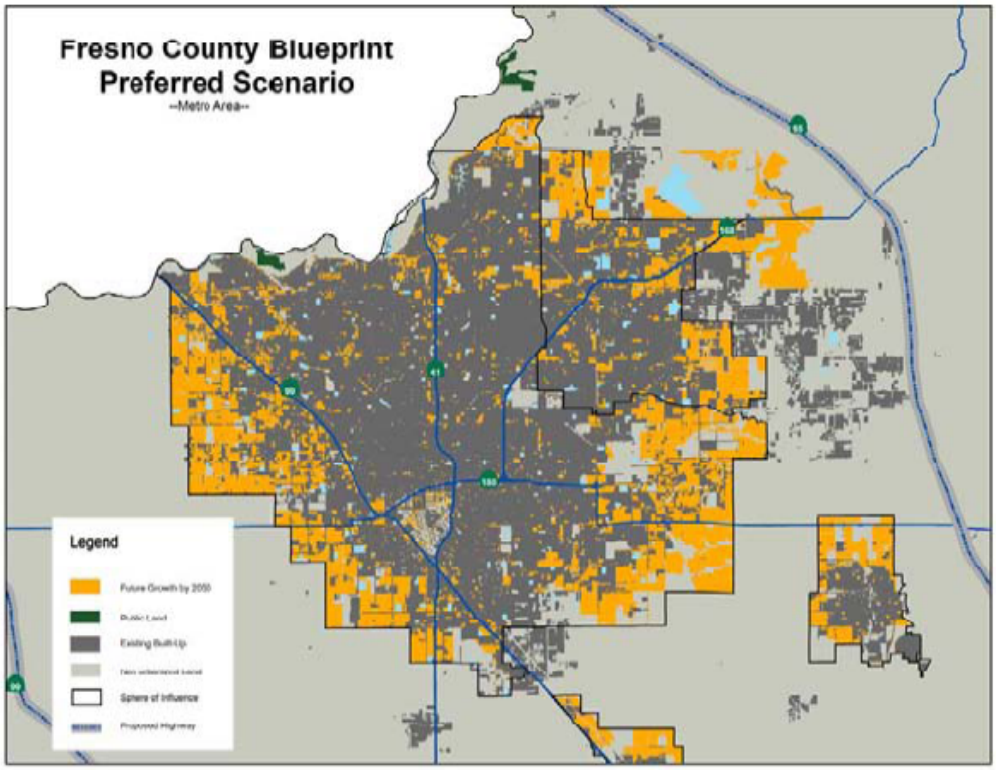
Fresno County's Blueprint Vision is as follows:

- Fresno County will be composed of unique cities, communities and a diverse population in a connected high quality environment that accommodates anticipated population growth and is supported by:
  - A vibrant economy built on competitive strength and world class education
  - A healthy and sustainable environment where air, aquifers, surface waters, forests, soil, agriculture, open space and wildlife resources are enhanced and protected

- A focus on cultural and community stewardship where all people enjoy fundamental rights as members of a free society, and where the community takes ownership of problems and their solutions.

The form of the Fresno region blueprint recognizes its economic, environmental, and cultural connectedness while maintaining a system of high-capacity multimodal transportation corridors that link the metro area to the rural areas and the State while preserving and maintaining the character of individual communities and the vital agricultural and natural resources between and around them (Fresno COG 2009).

Figure 7: Fresno County Blueprint Preferred Scenario



The Blueprint preferred scenario would result in countywide average residential density of new growth between now and 2050 averaging 8.0 dwelling units/acre. The density of new growth in the Fresno Clovis Metropolitan Areas (FCMA) will be 9.0 units/acre, while the average density of new development in the non-FCMA areas will be around 5.7 units/acre. This is comparable with the current trend density for Fresno County of 3.8 dwelling units/acre (Fresno COG 2009).

2.4.4 - San Joaquin Valley Air Pollution Control District

San Joaquin Valley AIR POLLUTION CONTROL DISTRICT

The City of Fresno is within the San Joaquin Valley Air Basin, which is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (District). The District has regulatory authority over certain stationary and industrial GHG emission sources and provides voluntary technical guidance on addressing greenhouse gases for other emission sources in a CEQA context. District initiatives related to greenhouse gases are described below.

Climate Change Action Plan

The District Governing Board approved the San Joaquin Valley Air Pollution Control District Climate Change Action Plan (CCAP) on August 21, 2008. The CCAP began a public process to bring together stakeholders, land use agencies, environmental groups, and business groups, and to conduct public workshops to develop comprehensive policies for CEQA guidelines, a carbon exchange bank, and voluntary greenhouse gas emissions mitigation agreements for the Governing Board's consideration. The CCAP contains the following goals and actions:

Goals

1. Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with greenhouse gas emissions increases.
2. Assist Valley businesses in complying with mandates of AB 32 (Global Warming Solutions Act of 2006).
3. Ensure that climate protection measures do not cause increases in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

Actions

1. Develop greenhouse gas significance threshold(s) or other mechanisms to address CEQA projects with greenhouse gas emissions increases.
2. Develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary greenhouse gas reductions created in the Valley.
3. Enhance the District's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB 32 emission reporting requirements to submit simultaneous streamlined reports to the District and the state of California with minimal duplication.
4. Develop and administer voluntary greenhouse gas emission reduction agreements to mitigate proposed greenhouse gas increases from new projects.

CEQA Greenhouse Gas Guidance

The District developed several resource documents that were used as guidance for developing the GHG Plan. The most important is the Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA, which is intended to assist local agencies in complying with CEQA and which contains a GHG threshold approach that has been widely accepted for use in the San Joaquin Valley and in other parts of the State. The District concluded that the existing science is inadequate to support quantification of the impacts that project-specific greenhouse gas emissions have on global climatic change. The District found that the effects of project-specific emissions to be cumulative, and without mitigation, their incremental contribution to global climatic change could be considered cumulatively considerable. The District found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas

emissions, whether through project design elements or mitigation. Many San Joaquin Valley local jurisdictions, including Fresno, have used the District guidance for CEQA compliance.

The primary features of the District's approach include:

- Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. The GHG Plan is intended to meet the criteria as an approved plan or mitigation program.
- Projects for which there is no applicable approved plan or program, or those projects not complying with an approved plan or program, the lead agency would evaluate the project against a performance-based standards and would require the adoption of design elements, known as a Best Performance Standard, to reduce greenhouse gas emissions.
- Projects incorporating Best Performance Standards would not require specific quantification of greenhouse gas emissions, and automatically would be determined to have a less than significant cumulative impact for greenhouse gas emissions.
- Best Performance Standards means, "Any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual." This equates to 21.65 percent accounting for revised 2020 growth projections that reflect the 2008 recession.

San Joaquin Valley Carbon Exchange and Rule 2301

The District initiated work on the San Joaquin Valley Carbon Exchange in November 2008. The Exchange was implemented with the adoption of Amendments to Rule 2301 Emission Reduction Credit Banking on January 19, 2012. The purpose of the carbon exchange is to quantify, verify, and track voluntary greenhouse gas emissions reductions generated within the San Joaquin Valley.

The District incorporated a method to register voluntary greenhouse gas emission reductions with amendments to Rule 2301. The purposes of the amendments to the rule include the following:

- Provide an administrative mechanism for sources to bank voluntary greenhouse gas emission reductions for later use.
- Provide an administrative mechanism for sources to transfer banked greenhouse gas emission reductions to others for any use.
- Define eligibility standards, quantitative procedures, and administrative practices to ensure that banked greenhouse gas emission reductions are real, permanent, quantifiable, surplus, and enforceable.

The District is participating in a new program developed by the California Air Pollution Control Officers to encourage banking and use of greenhouse gas reduction credits referred to as the CAPCOA Greenhouse Gas Reduction Exchange (GHGRx). The GHGRx provides information on GHG credit projects within participating air districts. The District is one of the first to have offsets available for trading on the Exchange.

SECTION 3: EMISSION INVENTORY

Emission inventories are compilations of emissions generated by sources in a geographic area at a given time. Greenhouse gas emission inventories are normally reported in units of metric tons of carbon dioxide equivalent (CO_2e) emissions per year. Emission inventories identify the contribution of each type or category of emissions to the total inventory of pollutants of interest. Emission inventories help to rank sources by size to determine those that are most important to control. Inventories are required to determine existing conditions and to forecast emissions in future years to account for the effects of growth.

3.1 - Inventory Methods and Assumptions

3.1.1 - Inventory Protocols

Emission inventory protocols have been developed for many emission sources by governmental and independent agencies, and professional associations. The U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, developed by ICLEI Local Governments for Sustainability, provides guidance for developing community inventories prepared in the United States. The U.S. Community Protocol is not entirely applicable to inventories in California communities. For some inventory categories, a more detailed inventory may be required to ensure its adequacy for use in a CEQA context. California specific emission factors and data are available for many sources that when used produce a more accurate inventory. The inventory prepared for the City of Fresno GHG Plan follows the U.S. Community Protocol as modified for use in California.

3.1.2 - Emission Inventory Source Categories

The inventory includes the following source sectors:

- Motor Vehicles
- Electricity Use
- Natural Gas Use
- Waste – Landfill Emissions
- Refrigerants

Another way to identify emission sources is recommended by the U.S. Community Protocol. Under that approach, emissions are categorized in Table 5.

Table 5: Inventory Emission Sources

Emission Sources	Activities
Built Environment	Fuel use in residential and commercial stationary combustion equipment (e.g., boilers and furnaces)
	Industrial stationary combustion sources not regulated by ARB or Air District
	Refrigerant leakage
Transportation and Other Mobile Sources	On-road passenger vehicles operating within the community boundary
	On-road freight and service vehicles operating within the community boundary
	On-road transit vehicles operating within the community boundary
	Off-road surface vehicles and other mobile equipment operating within the community boundary
Solid Waste	Operation of solid waste disposal facilities
	Generation and disposal of solid waste by the community
Wastewater and Water	Use of energy associated with use of potable water
	Use of energy associated with generation of wastewater
Upstream Impacts of Community-Wide Activities	Upstream and transmission and distribution (T&D) impacts of purchased electricity used by the community
Source: US Community Protocol V1, October 2012.	

The inventory does not include sources that comprise less than 3 percent of the inventory and sources that are not within the control or influence of the City of Fresno. One exception is off-road equipment, which is less than 1 percent but is commonly included in project level greenhouse gas analyses. Large industrial sources of emissions that are subject to ARB's reporting regulation and Cap and Trade regulation are not included in the inventory. Agricultural sources are not included in the inventory because the General Plan does not designate land for agricultural use. The inventory does not impacts of upstream emissions because those sources are not within the control or influence of the City. Although electricity transmission and distribution losses are not within the control of the City, strategies that promote local generation such as rooftop solar reduce T&D losses because the electricity is generated close to where it is used.

3.2 - Inventory Selection Criteria

The inventory year is important because it forms the starting point for setting emission reduction targets in future years. Several criteria were considered in selecting the best year for the baseline inventory, including:

- Availability of data
- Relationship with state inventories and targets
- Recommended practices from other agencies and organizations

Since the AB 32 target is based on returning emissions to 1990 levels by 2020, some jurisdictions include a 1990 inventory. The 1990 baseline represents statewide emissions and not the emissions of individual cities and counties. Growth rates vary widely from city to city since 1990. A 1990 inventory and target that do not account for variations in growth from community to community do not provide a valid comparison of the effectiveness or stringency of a greenhouse gas reduction program. In addition, the City cannot go back in time and change the amount and type of development that has occurred since 1990; it can only work from existing conditions. Therefore, the City has determined that a 2010 baseline provides the most recent year with complete data available suitable for describing existing conditions.

3.3 - Baseline Inventory

The City of Fresno baseline inventory year for the GHG Plan is 2010. The ARB has prepared an updated inventory for 2010 that accounts for regulations adopted to that point in time. Therefore, 2010 provides the best available baseline for the GHG Plan and can be compared directly with state progress to date and targets.

3.4 - Inventory Projections

The GHG Plan includes inventory projections for 2020, 2035, 2050, and 2056 (General Plan Buildout). These years correspond to state regulatory targets and goals and the General Plan buildout.

3.4.1 - BAU Inventory

BAU scenarios are commonly used in air quality planning to ensure that control measures are adequate to overcome the effects of cumulative growth in emissions by an attainment year. BAU is defined in ARB's AB 32 Scoping Plan as emissions occurring in 2020 if the average baseline emissions during the 2005 period grew to 2020 levels without additional control. The reduction required of the State's 2020 BAU inventory to achieve 1990 levels is 28.4 percent. BAU inventories allow for separate accounting of the benefits of regulations, strategies, and programs on future emissions. This concept is applied to the GHG Plan so that targets for the City can be compared directly with targets for the State. The BAU inventory for each milestone year is provided in Table 6 and Figure 8.

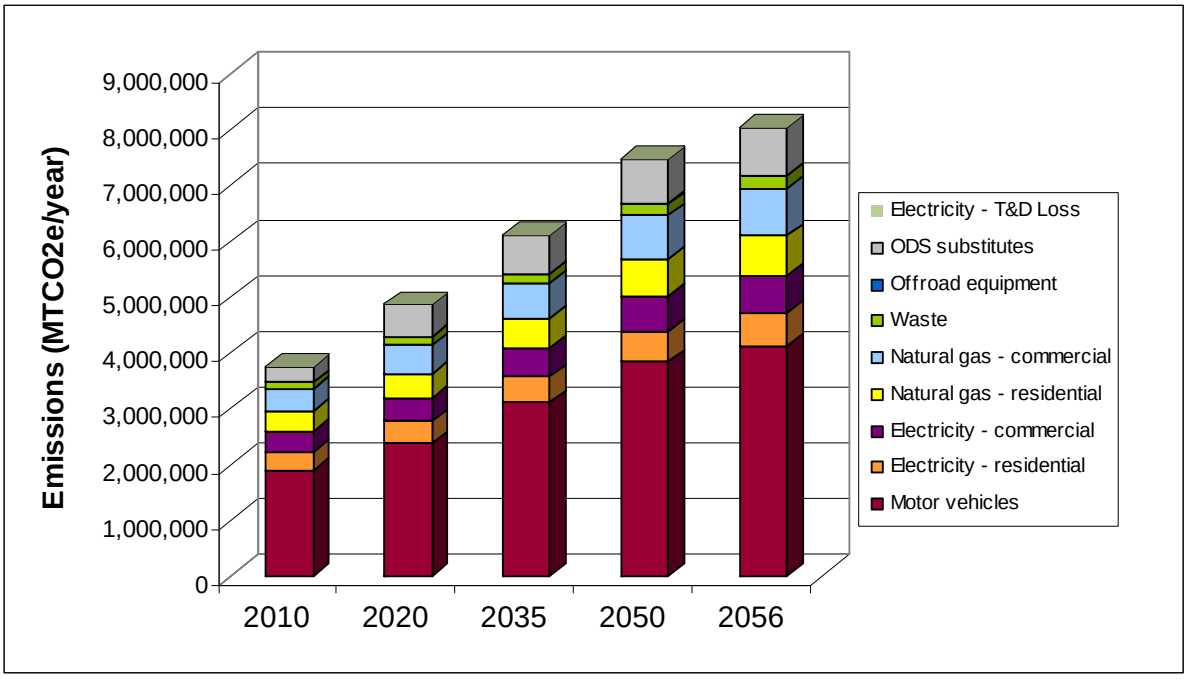
Table 6: City of Fresno Baseline and Business as Usual Emissions Projections

Sector	Emissions ($MTCO_2e$/year)				
	2010	2020	2035	2050	2056
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447

Table 6 (cont.): City of Fresno Baseline and Business as Usual Emissions Projections

Sector	Emissions ($MTCO_2e$/year)				
	2010	2020	2035	2050	2056
Electricity—commercial	361,836	415,012	509,781	626,137	679,888
Natural gas—residential	362,832	476,679	573,160	670,082	712,228
Natural gas—commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
Ozone depleting substance (ODS) substitutes	273,422	576,784	694,734	812,214	863,300
Total	**3,745,116**	**4,905,399**	**6,166,049**	**7,475,346**	**8,026,499**
Source: FCS 2013					

Figure 8: City of Fresno Baseline and Business s Usual Emissions Projections

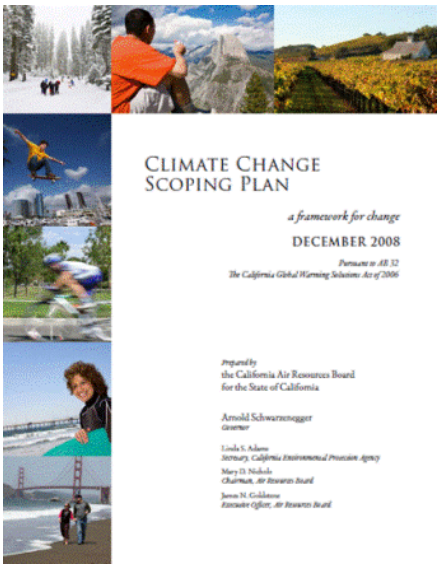


The BAU inventories presented above show that in the absence of regulations and other measures to reduce greenhouse gas emissions, buildout of the General Plan will more than double the City's emissions by 2056. The inventory breakdown by source categories show that Fresno's emissions are

dominated by mobile sources with over half the total emissions. Direct emissions from residential and commercial natural gas combustion are the second largest source. Indirect emissions from the consumption of electricity are the next largest source. So-called ozone depleting substances (ODS) substitutes, which are primarily used as refrigerants are expected to grow more rapidly than the other source categories. Ozone depleting substances are being phased out to comply with international treaties to protect the Earth's ozone layer; unfortunately, the substitutes tend to have higher global warming potentials than the gases they replace. Electricity transmission and distribution losses are estimated at 6.84 percent in the Western United States in 2010. No forecasts were found for other years. The 2010 emissions from T&D losses are estimated at 42,205 $MTCO_2e$.

SECTION 4: REDUCTIONS FROM STATE REGULATIONS

The State has enacted many regulations pursuant to the requirements in AB 32 that would reduce emissions within the City. The State's strategy is detailed in the Climate Change Scoping Plan adopted by the ARB in December 2008. Scoping Plan strategies are primarily implemented through the adoption of regulations (ARB 2008). The most important strategies are discussed below.



4.1 - Motor Vehicles

The ARB has adopted many of the Scoping Plan measures for mobile sources as regulations. Only the measures that have been adopted or put into practice are included in this assessment (California Air Resources Board 2012). The following regulations are included:

- **Pavley and Low Carbon Fuel Standard (LCFS)**: EMFAC2011 emission factors that include Pavley I and the LCFS were used to estimate the impact of those regulations. In this way, the reductions from those measures are more specific than simply applying the statewide reduction estimates because the reductions in EMFAC take into account the variations between vehicle classes and region. The Pavley I Vehicle Standards apply to passenger cars and light-duty trucks for model years 2009 to 2016.
- **Low Emission Vehicle (LEV) III Standards**: The LEV III standards amend the exhaust and evaporative emission standards for passenger cars and light- and medium-duty trucks. The standards provide requirements for model years 2017 to 2025. The regulation applies to both criteria pollutant and greenhouse gas emissions. The standard drops greenhouse gas emission to 166 grams per mile, a reduction of 34 percent compared with 2016 levels. LEV III implements the Pavley II standards described in the Scoping Plan.
- **Tire Pressure Program**: This regulation is categorized under vehicle efficiency measures in the Scoping Plan. This regulation applies to automotive service providers performing or offering to perform automotive maintenance or repair services in California. This applies to passenger cars, light-duty trucks, medium-duty vehicles, and light heavy-duty trucks with gross vehicle weight ratings of less than or equal to 10,000 pounds (California Air Resources Board 2009). This measure is anticipated to reduce emissions by 0.5 percent for those vehicle types.
- **Low Friction Oil**: ARB indicates that this measure has been achieved in practice. It is assumed that this measure would apply to the same vehicle types as in the tire pressure program. This measure is anticipated to reduce emissions by 2.2 percent.
- **Aerodynamic efficiency**: This regulation improves the fuel efficiency of heavy-duty tractors that pull 53-foot or longer box-type trailers. Fuel efficiency is improved through improvements in

tractor and trailer aerodynamics and the use of low rolling-resistance tires. This measure would reduce emissions by 2.1 percent from heavy-duty vehicles.

4.2 - Electricity

The State's strategy for reducing electricity-related greenhouse gases targets electric power utilities on the production side and energy efficiency on the consumer side. Two regulations are in place to reduce emissions from this source. The Renewable Portfolio Standard requires electric utilities to provide an increasing share of their energy from renewable sources with 33 percent required by 2020. Title 24 Energy Efficiency Standards for Residential and Non-Residential Buildings requires new structures to meet increasingly stringent energy efficiency standards. California's Green Building Code mandates increased water conservation that results in less electricity consumed to pump and transport water.

4.2.1 - Renewable Portfolio Standard.

The electricity emission factor was decreased to account for the renewable energy regulations, which require 33 percent renewable energy by the year 2020. The average renewable energy use for 2005–2009 for PG&E was calculated as 12.6 percent (California Public Utilities Commission 2012). Therefore, an additional 20.4 percent increase in renewables is needed for the utility to comply with the regulation.

4.2.2 - Title 24 Building Energy Efficiency Standards.

Building energy efficiency standards are designed to ensure that new and existing buildings achieve energy efficiency and preserve outdoor and indoor environmental quality. These standards are contained in the California Code of Regulations Title 24, Part 6. The California Energy Commission (CEC) is required by state law to update energy efficiency standards about every 3 years. The 2013 Standards will result in 25 percent less energy used for lighting, heating, cooling, ventilation, and water heating than the 2008 Standards that went into effect in 2010 (CEC 2012).

The reductions from Title 24 are applied to the energy consumption related emissions for new development and remodeling projects at existing buildings subject to the regulations. The benefits of the standards accrue as buildings subject to the standards are constructed to meet the standard applicable at the time. PG&E provided actual electricity and natural gas usage for 2008 through 2010, which reflect the benefits of all development subject to previous versions of the Title 24 standards. New development built after 2010 would provide additional reductions as buildings are constructed to comply with the standards.

4.2.3 - California's Green Building Code

On January 12, 2010, the State Building Standards Commission unanimously adopted updates to the California Green Building Standards Code, which went into effect on January 1, 2011. The Code is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings.

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

The California Green Building Standards Code includes the following requirements to reduce water and energy consumption:

- **Wastewater reduction**. Each building shall reduce the generation of wastewater by one of the following methods:
  1. The installation of water-conserving fixtures or
  2. Using non-potable water systems.
- **Water use savings**. 20 percent mandatory reduction in indoor water use with voluntary goal standards for 30, 35 and 40-percent reductions.
- **Water meters**. Separate water meters for buildings in excess of 50,000 sq ft or buildings projected to consume more than 1,000 gallons per day.
- **Irrigation efficiency**. Moisture-sensing irrigation systems for larger landscaped areas.
- **Building commissioning**. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 sq ft to ensure that all are working at their maximum capacity according to their design efficiencies.
- **Materials pollution control**. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard.
- **Short-term bicycle parking**. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1).
- **Long-term bicycle parking**. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.2).
- **Designated parking**. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.6.2 (5.106.5.2).
- **Recycling by Occupants**. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling.
- **Construction waste.** A minimum 50-percent diversion of construction and demolition waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects. All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled.

4.3 - Natural Gas

Title 24 will also provide reductions in natural gas usage required for water heating and space heating. The CEC estimates that the 2008 and 2013 standards will reduce emissions from residential and non-residential natural gas use by over 25 percent by 2020. Projects constructed between the 2010 base year and July 2014 comply with the 2008 Title 24 and projects after July 1, 2014 are assumed to comply with 2013 Title 24. Future revisions to Title 24 are normally scheduled about every 3 years. Therefore, emissions related to residential and commercial natural gas combustion will continue to decline in later years. However, no additional reductions for future regulations are currently claimed in the GHG Plan.

4.4 - Refrigerants

The State has adopted several refrigerant management regulations that are anticipated to achieve substantial reductions. For example, ARB predicts that the regulations that will apply to large commercial refrigeration units will reduce emissions by more than 50 percent.

4.5 - Reductions from State Regulations

The predicted reduction in emissions from state measures on City of Fresno emissions is shown in Table 7. The State's motor vehicle standards for new vehicles and low carbon fuel standard provide 74 percent of the reductions, although mobile sources comprise about 50 percent of the 2020 BAU inventory. Energy regulations provide 17 percent of the reductions.

Table 7: Reductions from Statewide Measures

Sector	State Measures	Emissions (MTCO2e/year)	
		2020	2035
Motor Vehicles	Pavley and Low Carbon Fuel Standard	554,774	902,450
	Low Emission Vehicle Program III	32,090	397,767
	Tire Tread Program	3,173	4,138
	Tire Pressure Program	5,817	7,587
	Low Friction Oil	23,270	30,347
	HD Aerodynamic/MHD Hybridization	15,125	19,726
	Subtotal	***634,250***	***1,362,016***
Electricity - Residential	Renewable Portfolio Standards	164,477	154,774
	Title 24 Energy Efficiency Standards	16,833	12,810

Table 7 (cont.): Reductions from Statewide Measures

Sector	State Measures	Emissions (MTCO2e/year)	
		2020	2035
Electricity - Commercial	Renewable Portfolio Standards	174,877	160,204
	Title 24 Energy Efficiency Standards	9,614	4,196
	Subtotal	***365,731***	***331,984***
Natural Gas –Residential	Title 24 Energy Efficiency Standards	7,983	12,496
Natural Gas - Commercial	Title 24 Energy Efficiency Standards	17,530	11,108
	Subtotal	**25,513**	*23,604*
Refrigerants (Ozone depleting substance substitutes)	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	288,392	347,367
	subtotal	**288,392**	**347,367**
	Total	**1,313,886**	**2,064,971**
Source: FCS 2013 (General Plan Update MEIR Appendix B)			

4.5.1 - Adjusted Business as Usual

The adjusted BAU inventory applies emission reductions achieved by regulations, programs, and measures that are implemented by other agencies for each source category. This inventory identifies the base from which reductions are needed from local strategies and measures to demonstrate consistency with the targets contained in AB 32. Table 8 shows the emission inventories for each year after the application of state regulatory measures.

Table 8: City of Fresno Adjusted Business as Usual Emissions

Sector	2010	2020	2035
Motor vehicles	1,795,666	1,748,773	1,745,843
Electricity - residential	289,745	209,178	258,766
Electricity—commercial	319,817	230,591	290,861
Natural gas—residential	400,169	468,696	506,670
Natural gas—commercial	448,706	497,117	553,452
Waste	123,945	147,628	177,508
Offroad equipment	1,051	1,138	1,314
Ozone depleting substance (ODS) substitutes	273,422	288,392	347,367
Total	**3,652,521**	**3,591,513**	**3,881,781**

4.5.2 - 2020 Target Analysis

Table 9 shows the percentage reduction from each inventory source category and from the total 2020 BAU inventory with the application of state regulations. The results demonstrate that the regulations alone are sufficient to reduce the BAU inventory by 27.0 percent, which exceeds the amount required to be consistent with AB 32 Scoping Plan targets (21.65 percent). Reductions from the GHG Plan will be 5.0 percent for a total reduction of 32.0 percent. Reductions from local measures are detailed in Section 5.2.4.

Table 9: City of Fresno 2020 BAU and Adjusted BAU Emissions Inventory

Inventory	2020 BAU Emissions ($MTCO_2e$/year)	2020 with Regulations ($MTCO_2e$/year)	Percent Reduction
Motor vehicles	2,383,023	1,748,773	26.62%
Electricity - residential	390,488	209,178	46.43%
Electricity - commercial	415,012	230,591	44.44%
Natural gas - residential	476,679	468,696	1.67%
Natural gas - commercial	514,647	497,117	3.41%
Waste	147,628	147,628	0.00%
Offroad equipment	1,138	1,138	0.00%
ODS substitutes (refrigerants)	576,784	288,392	50.00%
Total	**4,905,399**	**3,591,513**	**26.78%**
Emissions with Reductions from Local Measures	**—**	**3,443,261**	**29.81%**
Target based on Consistency with AB 32 Targets	—	—	21.65%
Meets Target in 2020?	—	—	Yes
Source: FirstCarbon Solutions, 2013 General Plan Update MEIR (Appendix B).			

4.5.3 - Post 2020 Targets

The City has committed to pursuing a target for 2050 based on the State's long-term goal of reducing California's emissions to 80 percent below 1990 levels by 2050. This is equivalent to 80 percent below the 2020 target. The City cannot achieve this target on its own because it lacks the authority to regulate most of the emissions generated within its boundaries. Therefore, the emissions presented in Table 10 below represent the amount of reductions required by all levels of government and individuals. An actual amount required as reductions from the City must be determined at a time when the State identifies its strategy for achieving the targets. The State estimates that a reduction trajectory of 5.8 percent per year is required to reach the 2050 target. Figure 9 shows that achieving this trajectory will require a substantial acceleration in reductions after 2035.

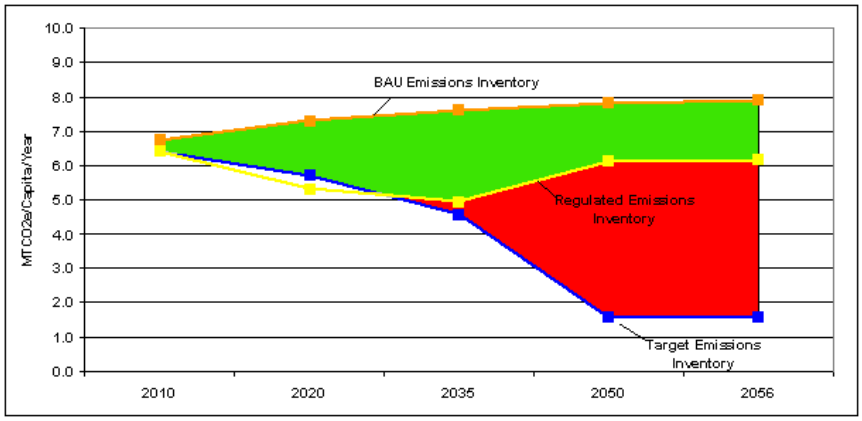
Table 10: City of Fresno 2035 and 2050 Interim Target Emissions Inventories

Inventory	Community Emissions ($MTCO_2e$)	Per Capita Emissions ($MTCO_2e$/Person)
2035 Interim Target	3,699,629	4.74
Percent Reduction from BAU in 2035		**40%**
2035 Inventory with Regulations	3,881,781	4.96
2035 Local Reductions	197,966	
2035 Inventory with Local Reductions	3,683,815	4.72
Additional Reductions to Reach Interim 2035 Target	None	
2050 Target	1,430,285	1.57
Reduction from 2035 to reach 2050 Target	2,253,533	
Percent Reduction from BAU in 2050		**80%**
Source: FCS 2013 (General Plan Update MEIR Appendix B)		

The emissions in 2035 with regulations currently in effect reflect substantial reductions from currently adopted regulations and local measures committed to by the City that would achieve a 40 percent reduction from the 2035 BAU inventory. Adoption of new motor vehicle emission standards for vehicles built in 2026 and later well before 2035 can reasonably be assumed. In addition, Title 24 energy efficiency standards for buildings will likely be updated several times prior to 2035, providing additional reductions from the energy sector. Finally, emission reductions from voluntary energy efficiency retrofits have not been quantified. Therefore, it is highly likely that City of Fresno would exceed a 40 percent reduction from BAU by 2035. It must be noted that the State has not adopted a target for 2035; therefore, the target presented here is provided for information only and does not represent a firm commitment by the City.

Achieving a 2050 target based on an 80 percent reduction from 1990 levels will require technologies yet to be identified and nearly complete transition from carbon-based fuels to renewable or zero emission energy sources. The City considers identifying a 2050 target and strategy to be speculative.

Figure 9: Reductions Required for 2035 and 2050 Target



SECTION 5: FRESNO'S GREENHOUSE GAS REDUCTION STRATEGY

The Greenhouse Gas Reduction Strategy is a comprehensive vision of the City's plan to reduce greenhouse gas emissions. The City is already on a path toward lower emissions through its prior actions. The City has adopted a large number of goals, policies, and programs that will reduce greenhouse gas emissions to implement the previous 2025 General Plan. The General Plan Update builds on the 2025 General Plan to provide a comprehensive strategy to reduce greenhouse gases from all sources within the City's ability to control or influence. The strategies enhance the effectiveness of State strategies by ensuring that the City is developed in ways that minimize emissions and by application to City-owned facilities. The relevant General Plan objectives and policies are listed throughout the following section. For convenience, a compilation of the General Plan objectives and policies is provided as Appendix A to this GHG Plan. Table 11 provides a listing of General Plan Elements/Chapters and the associated letter designations to enable the reader to identify the General Plan Element/Chapter associated with the objectives and policies listed in this section.

Table 11: General Plan Chapter Cross Reference

General Plan Element and Chapter	Policy Prefix
Urban Form (Chapter 3)	UF
Land Use (Chapter 3)	LU
Design (Chapter 3)	D
Mobility and Transportation (Chapter 4)	MT
Park and Open Space (Chapter 5)	POSS
Public Utilities and Services (Chapter 6)	PU
Resource Conservation and Resilience (Chapter 7)	RC
Health Communities (Chapter 10)	HC
Economic Development and Fiscal Sustainability (Chapter 2)	ED

5.1 - GHG Plan Reduction Strategy

The City can control or influence GHG emissions in several ways. The City has direct control over its own fleet vehicles and buildings where it can use its budgeting authority and purchasing decisions for high efficiency/low emission options. The City has influence over emissions from development and redevelopment projects through its land use authority and its responsibilities as a Lead Agency under CEQA. The City can also provide leadership and education to the community to encourage voluntary actions to reduce GHG emissions. The General Plan Update provides the comprehensive objectives and policies that direct development in the City. The GHG Plan relies upon the General Plan as the basis of the development related strategies to reduce GHG emissions.

Greenhouse gas emissions are generated by a multitude of sources and activities. There is no single technology or individual program that provides a silver bullet for addressing this problem. Comprehensive solutions on multiple fronts are required to make the progress needed to achieve reduction targets for 2020 and beyond.

The GHG Plan strategies are categorized as follows:

- Land Use and Transportation
- Transportation Facilities Strategies
- Transportation Demand Strategies
- Energy Conservation Strategies for New and Existing Buildings
- Waste Diversion and Recycling and Energy Recovery
- Strategies for Existing Development
- Municipal Strategies

As described in the previous section, motor vehicle emissions dominate the City's emission inventory. The City has control over the emissions from its government fleet vehicles through its purchasing decisions, but no control over the emissions from other vehicles that operate in and pass through the City. However, the City's authority over land use provides opportunities to influence the amount people drive and their choice of travel mode. In planning circles, this is called the land use, transportation, air quality connection.



Land use and transportation strategies are supported by the General Plan land use and circulation plans and policies that provide the City's vision of future development in the planning area to the extent that they reduce vehicle trips and miles traveled compared with alternative development plans and patterns. The City's General Plan Update includes many land use and transportation policies that when implemented result in lower greenhouse gas emissions through the promotion of smart growth; jobs/housing balance; transit-oriented development; and infill development through that application of land use designations, and zoning, and the use of public-private partnerships to encourage action.

The following are land use strategies utilizing goals and policies in the General Plan that with application to individual projects will achieve GHG emission reductions.

5.1.1 - Land Use Strategies

Development that is more dense and compact places people closer to destinations that can be accessed by walking or bicycling, and transit. Higher densities near transit routes and facilities also

increases the potential for more frequent high-quality transit service such as would be provided by BRT. The General Plan Update includes the following related policy.

Policy RC-2-a **Link Land Use to Transportation.** Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Compact and Infill Development

The General Plan provides for a substantial increase in development density in new growth areas compared to existing development. In addition, development trends show that more project developers can be expected to propose higher-density, single- and multi-family development than was constructed in the past. The General Plan land use designations provide density ranges that allow for higher average densities than experienced in the past for land already designated by the General Plan. The General Plan Updates provide an increase in density in new growth areas.



Higher-density development tends to produce fewer vehicle trips per dwelling unit and more intense commercial development increases opportunities for walking, bicycling, and transit use for some trips. Although higher density is a prerequisite for achieving compact development, the design of the new projects is critical for maximizing reductions from being more compact related to walking, bicycling, and transit use. Approved but undeveloped subdivisions would comply with existing General Plan designations; however, market forces could result in requests for revisions to these subdivisions that would increase development density. Another way to increase density is to allow second units on residential lots. This practice increases overall development density and promotes more compact development that brings more people closer to commercial development.

Related General Plan Policies

Policy UF-1-c **Legible City Structure**. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people, and pedestrian-oriented activity in Downtown; along a small number of prominent east west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lanes and streets.

Objective UF-12 Locate roughly one-half of future residential development in infill areas — defined as being within the City on December 21, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land..

Policy UF-12-b **Activity Centers**. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include Chapter 3: Urban Form, Land Use, and Design commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place..

Policy LU-2-a **Infill Development and Redevelopment**. Promote development of vacant, underdeveloped, and redevelopable land uses within the City Limits where urban services are available by establishing and implementing supportive regulations and programs.

Policy LU-2-b **Infill Development for Affordable Housing**. Consider a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City as a strategy to help to meet the affordable housing needs of the community.

Policy LU-3-b **Mixed-Use Urban Corridors that Connect the Downtown Planning Area**. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon corridors, as shown on Figure LU-1: General Plan Land Use Diagram.

Policy LU-3-c **Zoning for High Density on Major Transit Corridors**. Encourage adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish long-term growth and development potential for Downtown.

Policy LU-5-f **High Density Residential Uses**. Promote high-density residential uses to support Activity Centers and BRT corridors, affordable housing and walkable access to transit stops.

Policy RC-2-a **Link Land Use to Transportation**. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Key GHG Plan Indicators

- Compile ongoing development statistics for comparison with General Plan Policy objectives.
- Projects comply with General Plan policies.

Figure 10 illustrates the conceptual location for the City of Fresno growth areas and the proposed BRT corridor. Compact development and infill provide the supporting base that maximizes the potential reductions in GHG emissions from the Plan strategy. Increased density, strategically located near quality transit and activity centers, is critical to successful implementation.

Key GHG Plan Indicators

- Change in development density with time.
- Number of infill and redevelopment projects proposed
- Changes in transit service and ridership

Mixed-Use Development



Mixed-use projects provide opportunities for walking between uses for some trips. Trips are reduced when visitors can park once at the development and obtain services, shopping, or go to a restaurant during a single trip. There are a variety of mixed-use development types with different mixes of uses and designs. Infill projects that provide residential development close to existing commercial development or vice versa can produce many of the same mixed-use benefits if done in a walkable environment.

Relevant General Plan Policies

Policy RC-2-a **Link Land Use to Transportation**. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Policy RC-2-b **Provide Infrastructure for Mixed-Use and Infill**. Promote investment in the public infrastructure needed to allow mixed-use and denser infill development to occur in targeted locations, such as expanded water and wastewater conveyance systems, complete streetscapes, parks and open space amenities, and trails. Discourage investment in infrastructure that would not meet these criteria.

Policy UF-12-d **Appropriate Mixed-Use.** Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one or

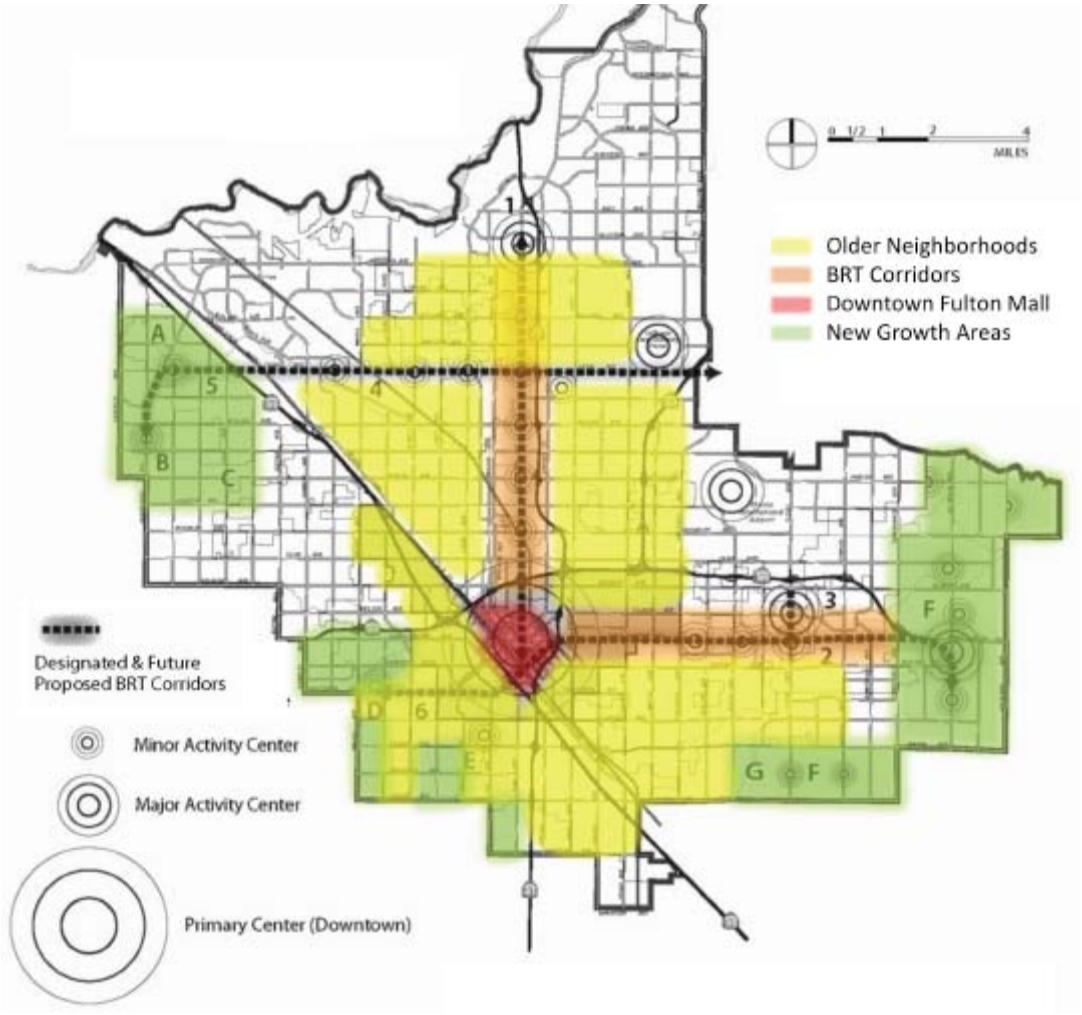
adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.

Policy UF-12-f **Mixed-Use in Activity Centers**. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.

Key GHG Plan Indicators

- The number of mixed use projects proposed
- The number of mixed use project constructed

Figure 10: City of Fresno Growth Areas and Proposed BRT Corridors



Pedestrian Oriented Development



Providing pedestrian-friendly infrastructure such as sidewalks, paths, and direct connections to neighboring uses such as shopping, schools, libraries, and parks increase the potential for people to make trips on foot instead of making a car trip. This strategy is consistent with the Complete Streets concept that aims to make streets safe for walking and bicycling.

Relevant General Plan Policies

Policy UF-12-e **Access to Activity Centers**. Promote adoption and implement standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.

Policy UF-12-f **Mixed-Use in Activity Centers**. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.

Objective UF-14 Create an urban form to facilitate multi-modal connectivity.

Policy UF-14-a **Design Guidelines for Walkability**. Use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.

Policy UF-14-b **Local Street Connectivity**. Design local roadways to connect throughout neighborhoods and large private developments with adjacent major streets and pathways of existing adjacent development. Create access for pedestrians and bicycles where a local street must dead end or be designed as a cul-de-sac to adjoining uses that provide services, shopping, and connecting pathways for access to the greater community area.

Policy UF-14-c **Block Length**. Create development standards that provide desired and maximum block lengths in residential, retail, and mixed-use districts order to enhanced walkability.

Policy D-3-c **Local Streets as Urban Parkways**. Develop local streets as "urban parkways", where appropriate, with landscaping and pedestrian spaces.

Policy D-4-b **Incentives for Pedestrian-Oriented Anchor Retail**. Consider adopting and implementing incentives for new pedestrian-friendly anchor retail at intersections within Activity Centers and along corridors to attract retail clientele and maximize foot traffic.

Policy MT-1-h **Update Standards for Complete Streets**. Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specifications reflect the Complete Streets concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.

Key GHG Plan Indicators

- Project compliance with General Plan Policies

Transit Oriented Development

Although limited transit service is now available in Fresno, long-term development trends for increasing density and mixes of uses can lead to improved transit service in those areas of the City over time. Higher densities when combined with pedestrian orientation encourage transit use. A key factor is that both ends of the transit trip must be walkable and have the potential to serve reasonably large numbers of transit riders. The City's proposed BRT system combined with plans to increase development densities at BRT stations and along the corridor are critical elements of the City's transit oriented development strategy.

Objective UF-12 Locate roughly one-half of future residential development in infill areas — defined as being within the City on December 21, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land..

Policy UF-12-a **BRT Corridors**. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.

Policy UF-12-b **Activity Centers**. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include Chapter 3: Urban Form, Land Use, and Design commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.

Key GHG Plan Indicators

- Comparison of development approved in infill areas versus non-infill areas
- Project designs consistent with General Plan policies

Transportation Facilities Strategies

The following are strategies related to transportation infrastructure and facilities that encourage the use of alternative modes of transportation such as walking, bicycling, and transit use. This strategy would be implemented through support for and funding of transit, bicycle, and pedestrian

connections, through transit and trail planning, and with regional cooperation among relevant agencies.

Transit Facilities



Transit facilities include bus stops, bus turnouts, multimodal transfer centers, and information kiosks. These facilities increase the comfort and convenience of using transit and minimize impacts on traffic flow from buses stopping for riders and re-entering traffic. Overall increases in transit service through the addition of new buses, new routes, and more frequent stops can also provide increased transit mode share. Transit facility improvements are often provided by development projects in new growth areas as conditions of approval and mitigation measures. The improvements can also be provided as retrofits on existing streets and upgrades to existing transit stops using transportation funding.

Relevant General Plan Policies

Objective MT-8 Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize environmental impacts.

Policy MT-8-a **Street Design Coordinated with Transit**. Coordinate the planning, design, and construction of the major street network with transit operators to facilitate efficient direct transit routing throughout the Planning Area.

Policy MT-8-b **Transit Serving Residential and Employment Nodes**. Identify the location of current and future residential and employment concentrations and Activity Centers throughout the transit service area in order to facilitate planning and implementation of optimal transit services for these uses. Work with California State University, Fresno to determine locations within the campus core for bus stops.

Policy MT-8-g **High Speed Train.** If the State moves forward with HST, ensure it is constructed through Fresno in a manner that minimizes impacts to surrounding property owners and creates the most opportunity for redevelopment around the HST station.

Objective MT-9 Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, frequent, reliable, and financially feasible.

Key GHG Plan Indicators

- Transit route expansions
- Transit ridership trends

Bicycle and Pedestrian Infrastructure



Adequate pedestrian infrastructure connecting frequently accessed destinations is critical to an increase in walking trips. Pedestrian infrastructure should be incorporated into project designs for new development, but also can be retrofitted in existing neighborhoods with barriers to walking such as lack of sidewalks or dangerous crossings.

Bicycle infrastructure including separate bicycle paths and bicycle lanes on roadways can increase the safety of cyclists and encourage the use of this travel mode. Bicycle paths designed to provide more direct connections shorten travel distances and maximize safety. Bicycle lanes are less costly and can more easily connect multiple destinations for cyclists. The City of Fresno has an aggressive program in place to construct bike lanes and paths throughout the city. All new development is required to comply with the Bicycle, Pedestrian, and Trails Master Plan. Most arterials are now equipped with striped bike lanes. The City has also been installing sensors in the bike lanes that will trigger traffic lights to change when no motor vehicles are present.



Relevant General Plan Policies

Objective MT-4 Establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.

Policy MT-4-a **Bicycle, Pedestrian and Trails Master Plan**. To the extent consistent with this General Plan, continue to implement and periodically update the Bicycle, Pedestrian, and Trails Master Plan to meet State standards and requirements for recommended improvements and funding proposals as determined appropriate and feasible..

Policy MT-4-b **Bikeway Improvements**. Establish and implement property development standards to assure that projects adjacent to designated bikeways provide adequate right-of-way and that necessary improvements are constructed to implement the planned bikeway system shown on Figure MT-2 to provide for bikeways, to the extent feasible, when existing roadways are reconstructed; and alternative bikeway alignments or routes where inadequate right-of-way is available.

Policy MT-4-c **Bikeway Linkages**. Provide linkages between bikeways, trails and paths, and other regional networks such as the San Joaquin River Trail and adjacent jurisdiction bicycle systems wherever possible.

Objective MT-5 Establish a well-integrated network of pedestrian facilities to accommodate safe, convenient, practical, and inviting travel by walking, including for those with physical mobility and vision impairments.

Policy MT-5-a **Sidewalk Development**. Pursue funding and implement standards for development of sidewalks on public streets, with priority given to meeting the needs of persons with physical and vision limitations; providing safe routes to school; completing pedestrian improvements in existing neighborhoods with lower vehicle ownership rates; or providing pedestrian access to public transportation routes.

Objective MT-6 Establish a network of multi-purpose pedestrian and bicycle paths, as well as limited access trails, to link residential areas to local and regional open space and urban Activity Centers in order to enhance Fresno's recreational amenities and alternative transportation options.

Policy MT-6-a **Link Residences to Destinations**. Design a pedestrian and bicycle path network that links residential areas with Activity Centers, such as parks and recreational facilities, educational institutions, employment centers, cultural sites, and other focal points of the city environment.

Policy MT-6-g **Path and Trail Development in Subdivisions**. Require all subdivision maps to incorporate planned multi-purpose path and trail development standards and corridor linkages consistent with the General Plan, applicable law and case-by-case determinations as a condition of tentative map approval.

Policy POSS-7-h **Interlink City and San Joaquin River Parkway Trail Networks**. Strive to connect the parkway trail network to other trails in the vicinity, in order to create a community and regional trail system that offers a variety of different route combinations and enhances public access to the parkway.

Key GHG Plan Indicators

- Bicycle, Pedestrian, and Trails Master Plan implementation progress (projects funded and constructed)
- Developer funded and constructed bicycle and pedestrian projects
- Compliance with General Plan policies and Development Code.

Traffic Calming Features

Design features and strategies to reduce vehicle speeds and reduce conflicts with pedestrians encourage more walking. Slower speeds encouraged by traffic calming can also improve safety and increase bicycling. Providing on-street parking, or street trees and landscaping to separate vehicles from pedestrians improve walkability.



Transportation Demand Strategies

These strategies provide programs and facilities that encourage employees to use alternative modes for commute trips.

Transportation Demand Management

Transportation Demand Management (TDM) refers to measures designed to reduce the demand for transportation facilities that are usually implemented at employment sites and event centers. These include programs targeting employee commute trips at the worksite such as vanpools, and incentives for alternative transportation and government-operated programs such as rideshare matching and outreach and incentives. Event center TDM measures involve the use of shuttles, encouraging carpooling, and staggering arrival and departure times to reduce congestion.

Large existing and new employers are required by existing regulations to implement TDM programs. The San Joaquin Valley Air Pollution Control District has adopted Rule 9410 Employer Based Trip Reduction, which requires employers with over 100 employees to implement trip reduction programs. The rule targets employee commute trips and requires large employers to implement measures that reduce VMT by increasing transit use, carpooling, vanpooling, bicycling, or other measures to reduce trips. The SJVAPCD estimates that the rule will reduce light-duty mobile source criteria pollutants by approximately 6.8 percent by 2023 (SJVAPCD 2009). Similar reductions in greenhouse gas emissions would also be achieved with the reduction in trips and vehicle miles traveled from the rule.

End-of-trip facilities include items such as showers and lockers for people who bicycle to work, secure bike parking, onsite services such as dry cleaning pick-up and cafeterias, and break rooms to reduce trips for errands and lunch. These are measures intended to increase the convenience and reduce potential negatives associated with bicycling to work and to eliminate the need for some trips during the workday. End-of-trip facilities are often included as design features in large projects to attract employees and may be selected by businesses as compliance options for Rule 9410.

Relevant General Plan Policies

Policy MT-10-c **Transportation Demand Management Guidelines**. Establish transportation demand management guidelines to allow for reduced off-street parking requirements.

Parking Measures

Providing limited parking is one of the most effective transportation measures. Use of parking structures and paid parking provide strong incentive to use alternative modes and to take advantage of carpools and vanpools. This measure would only apply in higher-density development areas, downtown, and mixed-use projects specifically designed for this strategy.



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Relevant General Plan Policies

Policy MT-10-a **Updating Parking Standards**. Update off-street parking standards to reflect the context and location within activity areas of multiple uses and reductions appropriate for mixed residential and non-residential uses and proximity to existing or planned transit service.

Policy MT-10-b **Shared Parking**. Establish a strategy to promote the sharing of excess parking between uses within Activity Centers and BRT corridors, including specific provisions for this in the Development Code.

Policy MT-10-d **Parking Maximums**. Explore maximum off-street parking limits within Activity Centers proximate to BRT corridors, if such an Activity Center is determined compatible with promotion of a healthy and vigorous business environment.

Policy MT-10-f **Parking Benefit Districts**. Establish parking benefit districts to fund consolidated public parking where supported by local businesses.

Key GHG Plan Indicators

- Completion of parking standards update incorporating the policies.
- Projects with shared parking approved.

Electric Vehicle Charging Stations

Infrastructure to charge electric vehicles while at work or other destinations would allow longer distance commuters and other drivers to use electric vehicles without concern for running out of charge on the return trip. Quick-charge technologies are in development that can partially charge a car battery in 15 minutes. Once quick-charging stations are widely available, the range impediment of electric vehicles will be much less important.

The interim solution to battery range is hybrid vehicles that can run on electricity or conventional fuels. Plug-in hybrids have larger battery packs that allow vehicles to travel greater distances under battery power prior to use of the gasoline engine.

Relevant General Plan Policies

Policy RC-8-j **Alternative Fuel Network**. Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

Key GHG Plan Indicators

- Completion of EV charging stations and alternative fuel stations

Energy Conservation Strategies for New and Existing Buildings

Improving energy efficiency in new and existing buildings and facilities provides one of the most cost-effective strategies for reducing greenhouse gases. The energy savings from improved energy efficiency can often pay for the cost of the upgrades and retrofits over time. These strategies are implemented through the promotion of energy- and water-efficient buildings (e.g., LEED buildings and/or exceeding Title 24 standards) through green building ordinances, project timing, prioritization, and other implementing tools.

Energy Efficiency in New Buildings

New projects can exceed Title 24 Energy Efficiency Standards for new residential and non-residential buildings. The amount of reductions in energy use can be related to voluntary tier levels contained in Title 24 or through use of outside certifying programs such as LEED, EnergyStar or Greenpoint Rating systems. It should be noted that meeting LEED standards does not necessarily mean that a project would comply with Title 24, so additional measures may still be required for some projects to meet regulatory requirements. The state's ultimate goal is for new buildings to achieve "net zero" energy consumption. Net zero requires a combination of high efficiency buildings and energy self-generation through solar power or other means. Once net zero buildings become the norm, opportunities for reductions from new building energy efficiency become limited. Locations and building designs that are not suitable for onsite generation will not be able to achieve net zero energy consumption with currently available technologies. For those sites, offsite generation in common areas or through purchase of energy generated by zero emission facilities may be used.

Key General Plan Policies

Objective RC-8 Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

Policy RC-8-a **Existing Standards and Programs**. Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.

Policy RC-8-b **Energy Reduction Targets**. Strive to reduce per capita residential electricity use to 1,800 kWh per year and nonresidential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings.

Policy RC-8-c **Energy Conservation in New Development**. Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.:

Policy RC-8-d **Incentives**. Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Policy RC-8-e **Energy Use Disclosure**. Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

Key GHG Plan Indicators

- Title 24 compliance reports demonstrating projects meet or exceed regulatory requirements
- Project CEQA documents include discussion of energy conservation design features
- Periodic compilation of building energy efficiency reports for comparison with Plan goals

Energy Efficiency in Existing Buildings

Older buildings that were constructed prior to the adoption of Title 24 or that were constructed when early versions of Title 24 were in place provide significant opportunities for cost-effective energy retrofits. Most current energy retrofit programs are voluntary incentive based programs. The State of California and the federal government have from time to time offered tax credits and deductions for energy retrofits. Public utilities also offer energy efficiency rebates for projects such as whole-house fans, insulation, weatherization, and other actions that reduce energy consumption in residential and commercial buildings. Some jurisdictions have proposed mandatory energy efficiency retrofits at time of sale; however, those programs are currently considered by many to be infeasible because of the loss of equity experienced by many homeowners at the time of sale, especially when housing values are low.

In January 2011, the City Council unanimously approved the adoption of the California Property Assessed Clean Energy (PACE) program administered by figtreecompany.com for the City of Fresno. PACE is helping property owners improve their energy efficiency and save money. PACE utilizes bond financing to provide property owners fixed-rate, property-based, no-money-down financing for energy and water efficiency retrofits to their properties, significantly reducing energy bills and expenses with instant cost savings.

Key General Plan Policies

Policy RC-7-i **PACE Financing**. Develop a residential Property Assessed Clean Energy (PACE) program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.

Key GHG Plan Indicators

- Progress in implementing the PACE program
- Report on types and numbers of projects funded



Self Generation using Solar Panels and Solar Hot Water Systems

The City of Fresno's location and climate is excellent for solar electric generation and hot water systems with an average of 262 sunny days per year. Residential and commercial projects can include solar-ready roofs to allow future installation of solar panels or provide solar panels at the time of construction. Solar panel technology is becoming increasingly efficient in terms of power production and costs have declined substantially in recent years. Not all locations and project settings are conducive to solar power production, and cost-effectiveness is currently dependent on the receipt of incentives in most cases. Sites with the potential for other structures or trees shading the panel location greatly reduce feasibility. The projects also often require net metering where surplus power generated by the panels is sold to the utility and power is purchased from the grid during periods of low production or high usage. The utilities are only required to accept a limited amount of solar photovoltaic (PV) distributed generation into their systems each year. If limits are exceeded and net metering is not allowed, the systems become less feasible.

Solar hot water systems have been used for residential water heating for many years and are especially popular for residences with swimming pools to extend the days per year when the pool can be used. Another option for hot water is to use tankless, electric water heaters. These are increasingly used in new development. Tankless heating saves water and energy because it is not necessary to run the water for long periods for the water to arrive from the hot water tank to the faucet as is the case with the conventional water heaters.

Key General Plan Policies

Policy RC-8-h **Solar Assistance**. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Key GHG Plan Indicators

- Projects permitted

Water Conservation Strategies



Northeast Fresno Surface Water Treatment Plant

Water pumping and transport consumes approximately 20 percent of all energy used in California. Measures to reduce water consumption through improved efficiency in plumbing fixtures and landscaping can result in substantial savings compared to past practices. In some cases, it may be feasible to go beyond the water efficiency standards in the California Green Building Code and the Model Water Landscape Efficiency Ordinance with new construction. Water reuse and recycling through non-potable "purple pipe" systems may reduce energy consumption for water transport; however, the City has determined that construction of such a system from the Fresno/Clovis Regional Water Reclamation Facility (RWRF) back to the urban area is currently infeasible because of cost and practicality. The use of recycled water should focus on new and existing large green spaces, industrial uses, and new development. However, the development of a gray water policy for the residential reuse of wastewater for household gardening and landscape irrigation on site may be feasible. Water users that implement these measures or purchase buildings and homes that include these features will benefit from savings in their water bills.

Key General Plan Policies

Policy RC-6-d **Recycled Water**. Prepare, adopt, and implement a City of Fresno Recycled Water Master Plan.

Objective RC-7 Promote water conservation through standards, incentives and capital investments.

Policy RC-7-a **Water Conservation Program and 2035 Target**. Maintain a comprehensive conservation program that reduces per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees.

- Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving

programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.
- Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements.
- Adopt and implement policies in the event an artificial lake is proposed for development.
- Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area.
- Expand efforts to educate the public about water supply issues and water conservation techniques.

Policy RC-7-d **Update Standards for New Development**. Continue to refine water saving and conservation standards for new development.

Policy RC-7-f **Implementation and Update Conservation Program**. Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City's Water Conservation Program.

Policy RC-7-h **Landscape Water Conservation Standards**. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other State regulations.

- Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance.
- Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.

Key GHG Plan Indicators

- Track per capita water use with collected meter data and normal reporting
- Progress in updating the Water Conservation Program

Waste Diversion and Recycling and Energy Recovery

Programs and actions that promote recycling and diversion of waste from landfills can reduce energy consumed in the transport and handling of the waste material and can reduce the greenhouse gases that are emitted during the decomposition of organic waste.

The State of California has adopted increasingly stringent mandates for the percentage of solid waste that can be disposed in landfills. Programs that require or encourage further reductions in waste beyond mandates will result in greenhouse gas reductions from this source. Certain landfills are mandated to install methane capture systems. Methane is a powerful greenhouse gas that is 21

times more effective than carbon dioxide in retaining heat in the atmosphere. The methane can be flared, producing mainly carbon dioxide or used in combustion devices to generate heat or power that can be used for productive purposes displacing the use of fossil fuels.

Relevant General Plan Policies

Policy PU-9-a **New Techniques**. Continue to collaborate affected stakeholders and partners to identify and support programs and new techniques of solid waste disposal, such as recycling, composting, waste to energy technology, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.

Policy PU-9-b **Compliance with State Law**. Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.

Policy RC-11-a **Waste Reduction Strategies**. Maintain current targets for recycling and re-use of all types of waste material in the city and enhance waste and wastewater management practices to reduce natural resource consumption, including the following measures:

- Continue to require recyclable material collection and storage areas in all residential development.
- Establish recycling collection and storage area standards for commercial and industrial facilities to size the recycling areas according to the anticipated types and amounts of recyclable material generated.
- Provide educational materials to residents on how and what to recycle and how to dispose of hazardous waste.
- Provide recycling canisters and collection in public areas where trash cans are also provided.
- Institute a program to evaluate major waste generators and identify recycling opportunities for their facilities and operations.
- Continue to partner with the California Integrated Waste Management Board on waste diversion and recycling programs and the CalMax (California Materials Exchange) program.
- Evaluate the feasibility of a residential, restaurant and institutional food waste segregation and recycling program, to reduce the amount of organic material sent to landfill and minimize the emissions generated by decomposing organic material.
- Evaluate the feasibility of "carbon footprinting" for the City's wastewater treatment facilities, biomass and composting operations, solid waste collection and recycling programs.
- Expand yard waste collection to divert compostable waste from landfills.
- Study the feasibility and cost-benefit analysis of a municipal composting program to collect and compost food and yard waste, using the resulting compost matter for City park and median maintenance.

Policy RC-4-i **Methane Capture**. Continue to pursue opportunities to reduce air pollution by using methane gas from the old City landfill and the City's wastewater treatment process.

Policy RC-11-b **Zero Waste Strategy**. Create a strategic and operations plan for fulfilling the City Council resolution committing the City to a Zero Waste goal.

Key GHG Plan Indicators

- Progress reports on achieving State mandated waste reduction and diversion goals
- Adoption of commercial and industrial recycling area and storage standards
- Adoption of the Zero Waste Strategy

Wastewater



Fresno/Clovis RWRF

Wastewater treatment can produce methane emissions that are a powerful greenhouse gas, but it also provides a valuable renewable energy source when scrubbed of harmful components. Fresno currently operates a major regional secondary treatment plant and reuses water primarily for agricultural purposes. The City has one tertiary treatment facility at the Copper River development in north Fresno that provides water for a golf course and shared landscaped areas. Tertiary treatment of wastewater can allow its use for safely watering landscaped areas such as highway medians, parks, and golf courses using so-called "purple pipe" systems. Tertiary treatment systems can use substantial amounts of energy, so energy savings from less water pumping must be balanced with the energy costs of treating the water and pumping to where it is used. Wastewater treatment plants such as the Fresno/Clovis RWRF with anaerobic digesters capture the methane produced during the treatment process for productive use such as generation of electricity or process heat to offset some of the plant's power consumption.

Relevant General Plan Policies

Objective PU-7 Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

Policy PU-7-a **Reduce Wastewater**. Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.

Policy PU-7-d **Wastewater Recycling**. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely

technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.

Key GHG Plan Indicators

- Progress in adopting wastewater reduction programs
- Feasibility studies regarding future tertiary treatment/recycling options

Community Involvement and Outreach

Many of the strategies listed above will be more effective if there is community involvement and outreach to engage the citizens. This strategy requires public awareness of the measures available for them to take effective action at reducing their energy use and carbon footprint.

Measures and programs that reduce greenhouse gas emissions are often operated at the regional level. Many modes of transportation operate at the regional level, because people travel throughout the region. Regional cooperation provides a venue for sharing knowledge and resources to help address a variety of issues, including climate change and greenhouse gas emissions.

Relevant General Plan Policies

Policy RC-7-g **Educate on State Requirements**. Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.

Policy RC-8-h **Solar Assistance**. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Policy RC-8-k **Energy Efficiency Education**. Provide long-term and ongoing education of homeowners and businesses as to the value of energy efficiency and the need to upgrade existing structures on the regular basis as technology improves and structures age.

Key GHG Plan Indicators

- Progress reports on education and outreach programs.
- Number of solar panel installation permits issued

Municipal Strategies

The City of Fresno has a comprehensive set of strategies specifically targeted at greenhouse gas emissions generated at city-owned facilities and from city operations. The strategies identified by the City include the following measures intended to improve energy efficiency in buildings and equipment owned by the City, alternative fuels for city vehicles and equipment, and water conservation:

- Improve energy efficiency in city operations.
- New city buildings exceed Title 24 energy efficiency standards.
- Install renewable energy systems on city facilities.

- City operated transportation demand management for city employees.
- Purchase green vehicles for city fleets.
- Enhance reduction, recycling, and reuse efforts at city facilities.
- Implement water efficient landscaping in city parks and facilities.

Relevant General Plan Policies

Policy RC-7-c **Best Practices for Conservation**. Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate.

Policy RC-7-e **Retrofit City Facilities, and Consider Incentives Programs for to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites.** Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.

Policy RC-8-f **City Heating and Cooling**. Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.

Policy RC-8-g **Revolving Energy Fund**. Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Key GHG Plan Indicators

- Progress reports from responsible departments on conservation efforts
- Progress on creating a City Energy Fund
- Identification and recognition of major individual conservation projects

Regional Urban Forestry Program

Trees provide shade that can reduce the urban heat island effect caused when pavement and other open surfaces absorb solar radiation and re-radiate heat to the surrounding environment. The shade can reduce energy required for cooling. Trees also store carbon as they grow, in a process referred to as sequestration. Emission reductions from urban forestry projects must consider the life cycle emissions such as tree maintenance and the ultimate disposition of trees at the end of their lives to ensure that they produce a net decrease in greenhouse gas emissions.

The City maintains trees in parks and other publicly owned landscaped areas. These areas may provide an opportunity for new tree planting or replacement of tree species that possess a low potential to store carbon, with tree species that possess higher carbon storage potential. Guidance for managing urban forests is available from a number of sources. The Climate Action Reserve, Urban Forest Project Reporting Protocol (CAR 2008) provides criteria for generating greenhouse gas

emission offsets with tree planting along with procedures for project monitoring. ICLEI's Urban Forestry Toolkit for Local Governments provides a series of fact sheets and case studies that communities can use to design an effective urban forestry program (ICLEI 2006).

Relevant General Plan Policies

Policy POSS-1-g **Regional Urban Forest**. Maintain and implement incrementally, through new development projects, additions to Fresno's regional urban forest to delineate corridors and the boundaries of urban areas, and to provide tree canopy for bike lanes, sidewalks, parking lots, and trails.

Key GHG Plan Indicators

- Track change in urban tree cover over time.

Other Municipal Strategies

Energy Savings from Traffic and Street Lighting

The City plans to replace lighting fixtures with more efficient LED or other technology whenever possible. According to a report prepared by PG&E, Phase II LED luminaires provided power savings of 36 percent compared with high-pressure sodium luminaires, and the newer Phase III LED luminaires provided 52 percent savings (PG&E 2008).

Low-Emission City Fleet Vehicles



The City operates vehicles used by the FAX bus fleet, the Solid Waste Division, the Police Department and for maintenance and other purposes. The City has already converted a significant number of buses and refuse hauling trucks to compressed natural gas (CNG) and liquefied natural gas (LNG). FAX operated 81 alternatively fueled CNG buses in 2013. The City's entire fleet of garbage trucks is run by LNG. Most other vehicles in the City fleet are powered by gasoline and diesel fuels. The City will replace vehicles with the lowest-emission technology that fulfills the work requirements and that is cost-effective as the current fleet reaches the end of its useful life. The full life cycle reductions in greenhouse gases are 23 to 24 percent for CNG buses and 11 to 16 percent for LNG trucks compared with diesel (CEC 2007).

Green Purchasing

The City makes purchases typical for city government operations such as vehicles, computers, paper, and materials required to maintain the City's infrastructure. The City's natural gas fleet vehicles provide good examples of its past green purchasing practices.

Municipal Water Conservation

The City has implemented water saving measures at most public parks, and other landscaped areas maintained by the City. The General Plan Policies listed in the Water Conservation Strategies section apply to municipally operated facilities.

Strategies for Existing Development

The GHG Plan strategies described above are implemented in two ways. New development projects are proposed and constructed consistent with the General Plan and GHG Plan. Existing residents and businesses comply with regulations that apply to everyone and participate in new and existing programs and measures. People living in existing residential development also share the benefits of the land use strategies applied at work places and commercial areas that are walkable and transit oriented. The strategies that apply directly and indirectly to existing development are shown in Table 12.

Table 12: Strategies for Existing Development

Strategy	How it Applies
Transportation Demand Management (TDM)	TDM is implemented at existing and new businesses and can also reduce trips from new and existing housing where employees live.
Expanded Transit Service	Improved transit service will encourage increased ridership from new and existing development.
Improved Transit Stations	Transit stations service a wider community area that includes new and existing development.
Traffic Calming Retrofits	Traffic calming designs can be retrofitted on existing roads or built in new development.
Complete Streets Program	Complete streets connect existing and new areas.
Parking Management	Parking management at new and existing employment centers encourages trip reductions from all residential development

Table 12 (cont.): Strategies for Existing Development

Strategy	How it Applies
Energy Retrofits	Educational and incentive programs encourage existing residents and business owners to install energy retrofits providing large benefits in older structures.
Bicycle and Pedestrian Improvements on Existing Roads	Bicycle paths and lanes can be retrofitted on existing roads and sidewalks and pedestrian paths can connect existing neighborhoods with appropriate destinations.
Bicycle Parking Facilities	Bicycle parking can be added to existing businesses if needed to satisfy demand by employees and customers.
Water Conservation Programs	Educational and incentive programs encourage existing residents and businesses to conserve water.
Recycled Water Use in Existing Parks	Recycled water can be piped to any area retrofitted or initially developed with a "purple pipe" system to distribute recycled water.

Recycling Programs	Operational programs such as recycling apply to all residents and businesses in the City.
Electric Vehicle Charging	Charging stations can be installed in existing development as a retrofit or in new development.
Measures That Apply to New Development but Indirectly Benefit Existing Development	
Transit and Pedestrian Oriented Development	Transit and pedestrian oriented development provides destinations that encourage transit use from existing development and walking once people arrive.
Mixed Use Development	Mixed-use development creates a more walkable environment conducive to transit use for trips from existing development.
Compact Development	Making the City more compact shortens average trip lengths for residents and creates more opportunities for transit.
Traffic Flow Improvements	Transportation improvements that reduce congestion and improve flow can reduce emissions from both existing and new development.

5.2 - Reduction Potential from Local Measures

Reductions beyond state regulations will be achieved through the development of the land use pattern and transportation system envisioned by the General Plan, enforcement of city ordinances and design standards, and direct reductions from energy conservation projects, and alternative fuels use.

The effectiveness of the GHG land use strategy is dependent on several factors. The first factor is the rate of population growth. Rapid population growth has two contradictory effects. First, the overall growth in emissions will increase substantially in high growth areas; however, the per capita emissions in high growth areas will be lower. This is because a larger percentage of the population will live in areas of the city with energy efficient homes and businesses, and better transportation options than the slow growing or built out counterparts. On a citywide basis, faster-growing cities will build out neighborhoods and shopping centers more rapidly, providing more work and shopping opportunities close to home and shorter travel distances.

The second factor is economic. The type and scale of development projects will vary depending on market forces and the state of the economy in future years. Market forces affect the amount of single-family development compared to multifamily development. A vibrant economy will tend to create more jobs and increase in migration.

The amount of trips and miles traveled varies substantially between highly urban areas and suburban and rural areas. Frequent bus, light rail, or commuter train service requires high development densities to provide adequate ridership to support the service. The reductions that can be achieved by pedestrian orientated development and transit oriented development vary widely based the density and design at both ends of the trip.

5.2.1 - Mobile Source Reductions

Land Use Strategy. SB 375 required the ARB to set regional targets for reductions from light duty passenger vehicle emission. After a lengthy review process and input from the regional transportation planning agencies, the ARB adopted a Fresno County target reduction in passenger vehicle CO_2 per capita of 4.7 percent by 2020 and 7.6 percent by 2035. The key strategies envisioned include:

- Combination of density increase, mixed uses, and infill
- Growth along major corridors and activity centers

The land use strategies are expected to reduce trip generation and vehicle miles traveled to achieve the percentage reductions based on modeling results from the regional transportation model for the General Plan Update land use scenario. The City of Fresno is participating in the SB 375 SCS process to more closely define the growth areas that would be part of the SCS and qualify for CEQA streamlining provisions.

A 4.7 percent reduction in light duty passenger cars and truck emissions by 2020 would provide approximately 55,400 $MTCO_2e$/year. A 7.6 percent reduction in 2035 would provide reductions of approximately 81,700 $MTCO_2e$/year.

Emission reductions at the individual project level would be substantially larger than the amounts estimated for as the overall reduction for SB 375 compliance. CAPCOA estimates that land use and transportation measures in a suburban setting can reduce emissions by a global maximum of 15 percent and 20 percent in a suburban center. Projects approaching the maximum reductions would be in locations served by frequent transit with complete pedestrian and bicycle infrastructure and multiple destinations such as retail and commercial service within walking distance.

Transportation Demand Management. The General Plan encourages transportation demand management (TDM) at projects that are large employers. The SJVAPCD Rule 9410 – Employer Trip Reduction would provide at 1.6 percent emission reduction in 2020 and 2035 through reduced trips and vehicle miles traveled.

A 1.6 percent reduction in 2020 would provide a 28,800 $MTCO_2e$/year emission reduction. The 1.6 percent reduction for 2035 would result in a 27,200 $MTCO_2e$/year emission reduction.

5.2.2 - Energy Efficiency Reductions

Building Energy Efficiency. The City supports the State's efforts to achieve net zero energy consumption in new residential and non-residential buildings. Achieving net zero is currently possible in some buildings with the use of onsite solar to offset the electricity consumption from the grid. The 2013 Title 24 standards that go into effect on July 1, 2014 are substantially more stringent than the 2008. With no experience implementing the new standards, it would be speculative to assume that all projects would be capable of exceeding the standard by a certain percentage.

General Plan Policy RC-8-b includes a city target to strive to reduce per capita residential electricity use to 1,800 kWh per year and nonresidential electricity use to 2,700 kWh per year per capita. This

would result in a 28 percent and a 30 percent reduction, respectively, from 2010 rates of consumption. Since the target includes both existing and new development, a direct comparison to Title 24 mandates is not possible.

The City encourages developers to achieve the voluntary tier levels from the California Public Utilities Commission (CPUC) Energy Efficiency Strategic Plan, which ultimately lead to net zero energy consumption for residential development by 2020 and non-residential development by 2030. However, use of solar to offset energy consumption to achieve the voluntary tier reduction levels is feasible for projects with suitable solar orientation and roof design. Once Title 24 mandates net zero energy consumption, no further reductions beyond regulation can be achieved by projects.

Water Conservation. The California Water Conservation Act mandates a 20 percent reduction in water usage by 2020. The City has a reduction target of per capita water usage in the City's water service area to 230 gpd per capita (25 percent below the current consumption rate) in 2035. The City will meet the reduction target with measures applicable to new and existing development. Reductions beyond the state mandated 20 percent are possible with the use of building and landscaping water conservation features. The reductions from buildings can be achieved with high-efficiency toilets, low-flow showers and faucets, and water-efficient appliances such as clothes washers and dishwashers. Water savings from landscaping would be achieved primarily through the use of synthetic ('turf') lawns, drought-tolerant landscaping or xeriscaping. The City is also proposing General Plan Policy RC-7-b that requires a tiered water cost structure to cover the true cost of the water supply. Example measures and water savings estimates are provided below.

5.2.3 - Indoor Water Conservation Measures

Hot water pipe insulation: Insulate hot-water pipes, and separation of hot and cold piping to avoid heat exchange. Water savings: 2,400 gallons per residential unit per year. Cost: $50/unit.

Pressure reducing valves: Pressure reducing valves maintain pressure below 60 psi reducing volume of any leakage present and preventing excessive flow from all appliances and fixtures. Water savings: 1,800 gallons per residential unit per year. Cost: $100 per unit.

Water-Efficient Dishwashers: Install Energy Star-certified units. Water savings: 650 gallons per residential unit per year.

Dual Flush Toilets. Provides option to flush with partial (0.8 gallon) flow of water or with a full (1.6 gallons) flow depending on need. Water savings: 4,000 gallons per year per toilet. Cost: $200 per toilet; however, retrofit kits are available for under $20.

High-efficiency Washing Machines: Use front loading and top loading Energy Star-qualified clothes washers that use 35 to 50 percent less water than conventional washing machines. Water savings: 7,000 gallons per year. Cost: $800 for a high-efficiency washing machine.

Point-of-Use or Tankless Water Heaters: Install small water heaters close to the point of use, such as bathrooms, kitchen, and laundry area. Water savings: 5,300 gallons per residential unit per year.

Cost: $700 for point of use water heaters. However, the cost is approximately the same for one large unit or three smaller ones.

Outdoor Water Conservation Measures:

Evapotranspiration (ET) Controllers: Irrigation scheduled by actual plant ET rates. Water savings: 20,000 gallons per single-family unit per year. Cost: $175 per controller and $48 per year in maintenance.

Water-Efficient Landscaping: Use drought tolerant plants and compliant irrigation systems and controllers. Water Savings: Up to 50 percent of outdoor use (12,000 gallons/year from a 2,100-square foot landscaped area. Cost: similar to conventional landscaping.

Xeriscape. Xeriscaping is a combination of seven principles, planning and design, practical turf areas, efficient irrigation, soil analysis and improvement, mulching, low-water-use plants, and appropriate maintenance. Water savings: 30 percent reduction in irrigation demand or about 16,000 gallons per year on a typical single-family lot. Cost: similar to conventional landscaping.

Estimates of water savings and costs are from the City of Chula Vista Water Conservation Plan Guidelines adopted in 2003.

5.2.4 - Energy Savings from Water Conservation

The combined benefits of indoor and outdoor water conservation program are estimated at 20 percent in 2020 to achieve compliance with state-mandated reductions and 25 percent by 2035 to meet the General Plan Update target. Reductions in water use reduce electricity consumed for pumping, treatment, and transport of water by proportional amounts. Reductions in water use by these amounts would provide emission reductions of 5,975 $MTCO_2e$/year by 2020 and 8,891 $MTCO_2e$/year by 2035.

5.2.5 - Waste Diversion and Recycling Reductions

The City of Fresno will meet or exceed the state-mandated 75 percent diversion target by 2020. The ARB estimates that statewide reductions of 20 to 30 $MMTCO_2e$ will be achieved through this strategy. The City of Fresno has achieved substantial progress to date. The City per capita baseline based on the 2002 to 2004 average is 6.6 pounds per day per person. The 2010 per capita rate was 3.7 pounds per day per person. The 75 percent diversion target would require a per capita rate of 1.65 pounds per person per day by 2020. Achieving net zero waste would provide additional reductions from this sector; however, no reductions are estimated pending adoption of a state mandate. Estimated emission reductions from achieving the 75 percent mandated diversion target are 74,886 $MTCO_2e$ per year in 2020 and 90,043 $MTCO_2e$ in 2035.

5.2.6 - Summary of Reductions from Local Measures

Table 13 summarizes the local reductions from the measures described above.

Table 13: Reductions from Local Measures

Sector	Local Measures	Emissions (MTCO2e/year)	
		2020	2035
Motor Vehicles	General Plan Land Use Plan (transportation and land use strategies)	50,275	81,734
	Transportation Demand Management (Rule 9410)	17,115	17,207
	Subtotal	*67,390*	*98,941*
Water - Electricity	Achieve mandated water reductions and General Plan policy objectives (20%/2020 and 25%/2035)	5,975	8,981
	Subtotal	*5,975*	*8,981*
Waste	Achieve 75 percent diversion/recycling mandate	74,886	90,043
	Subtotal	*74,886*	*90,043*
	Total	**164,079**	**197,966**
Source: FCS, 2014 (MEIR Appendix B).			

SECTION 6: DEVELOPMENT PROJECT REQUIREMENTS

This section describes the actions that individual development projects are required to implement in order to qualify for CEQA streamlining and to demonstrate that the project would not result in significant greenhouse gas impacts. Projects that have completed all environmental review prior to adoption of the GHG Plan must comply with regulations in effect at the time of construction and with conditions of approval that were required during review of the tract map, site plan, or conditional use permit approved by the City. This means that all development will help meet the City's greenhouse gas reduction targets.

6.1 - Projects Exempt from CEQA

Projects that have already completed the CEQA process and only require building permits have no requirements beyond applicable regulations such as the Uniform Building Code, Title 24 Energy Efficiency Standards, the City Development Code, and other City Ordinances.

City Development Code. (Consult the Development Code for requirements for each type of project.) Examples include:

- Street Design (complete streets) (applies if project involves street improvements)
- Pedestrian Improvements (sidewalks, paths, connections, etc.)
- Bicycle Lanes and Paths (consistent with Bike Master Plan)
- Bicycle Parking (Commercial)
- Enforce Building Code Requirements (Green Building Code)

State Regulations. (Project buildings must meet Title 24 energy performance standards and Green Building Code standards in effect at the time of construction.)

6.2 - Projects Requiring a Discretionary Approval

Projects requiring a discretionary approval from the City must comply with CEQA provisions related to greenhouse gas emissions. Projects that are consistent with a greenhouse gas (GHG)reduction plan meeting certain criteria are considered CEQA-compliant for greenhouse gas impacts. The following review process is proposed:

6.2.1 - New Discretionary Development Approval Process to Determine Consistency with GHG Reduction Plan

1. Review General Plan Policies listed in the GHG Plan to determine applicability to the project.
2. Incorporate design features or mitigation measures into the project as needed to demonstrate consistency.
   a. Street and pedestrian design complies with complete streets concepts.
   b. Review project against Development Code for mandatory design features required for the project.

c. Consider alternative energy generation (solar) if appropriate for the project and site. (The State is working towards zero net energy development that will require increasing efficiency and self generation over time).
d. Review water conservation building and landscape design features for compliance with City water conservation standards.

3. Implement project design features suitable for the development type and location.
   e. Projects within core/center areas and BRT corridors should meet minimum density and design requirements to ensure pedestrian and transit orientation is met.
   f. Maintain and enhance connections to regional bikeways and trail system.

4. Complete the latest version of the Fresno Green Residential or Non-Residential Checklist
   g. Meet the Fresno Green checklist point requirements.
   h. Alternatively, meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Programs, or qualify for Build It Green's GreenPoint rating system for residential building.

6.2.2 - New Discretionary Development requiring a General Plan Amendment

1. Comply with all of the measures listed above for ministerial and discretionary projects.
2. Ensure that change in land use designation would not result in a significant increase in GHG emissions compared to the existing designation (would require a GHG technical study to quantify GHG emissions and benefits of project design features).
3. Projects currently designated for residential or commercial development that increase development densities and intensities and comply with all other relevant General Plan policies and City design standards are considered to have less than significant GHG impacts.
4. Emissions from stationary sources for new industrial projects are not considered in the significance determination; however, emissions from motor vehicles trips generated by the project and energy efficiency of the building are considered.
5. Projects that propose decreases in development densities or intensities requiring a General Plan will require analysis to determine the impacts on the General Plan land use strategy and must identify mitigation measures to reduce greenhouse gas emissions beyond those required by regulation if needed.

6.2.3 - Projects within Downtown Plan, BRT Station Area, SCS Plan Area

Projects that are consistent with the land use and development densities specified by the applicable plan and that comply with design standards for those areas would be considered to have less than significant impacts on climate change.

SECTION 7: GHG PLAN IMPLEMENTATION MONITORING

The GHG Plan is designed so that it can be monitored, updated, and its effectiveness measured on an annual basis towards meeting a target for reduction of greenhouse gas emissions in 2020 and to measure further progress through buildout of the General Plan in 2056. More detailed analysis of benchmarks and performance indicators should be accomplished on a 3 to 5-year basis to fully diagnose and correct issues arising during implementation. The reporting required for the General Plan provides a good venue for monitoring the GHG Plan. California Government Code Section 65400 requires the City to prepare and submit an annual report on the status of the General Plan and progress in its implementation to the City Council, the Governor's Office of Planning and Research, and the Department of Housing and Community Development.

7.1 - Key Indicators

Changing the development pattern of a city is a long incremental process. Individual development projects often take years to complete. Large new development areas build out gradually and can take many years to provide the full range of residential, commercial, and institutional projects needed to achieve the ultimate vision for the neighborhood or plan area. Diligence is required to maintain the vision over time and patience is required for the vision to come to fruition. Tracking and assessing progress implementing the GHG Plan helps the community to determine if the cumulative actions over the previous reporting period are consistent with the vision. Identifying key indicators of success can help the City focus on the most important trends and milestones and document the progress.

Three Indicator Categories. The key indicators proposed for the GHG Plan fall into three categories. The indicators in the first category are those that are measureable on an individual project or building basis. These are usually physical improvements with energy savings, solar panels, or alternative fuel projects. The second category includes incremental land use changes such as project density and compliance with design standards that affect motor vehicle travel. The second category indicators typically require the passage of time and consideration of projects in context of neighborhoods, or growth areas to assess their effectiveness. The third indicator category includes the development of programmatic measures such as public education and outreach programs, energy and water conservation programs, recycling and composting programs, etc. For programmatic measures, the indicators initially track program development, and once operational, change to measuring program effectiveness in encouraging the desired behavior changes or actions.

Land Use Measures are Location Sensitive. The effectiveness of land use measures is highly context-sensitive. Projects must implement design features that best fit with the location and the use. For example, many design features that are appropriate for a high-density, mixed-use neighborhood are not appropriate for a low-density, single-family neighborhood. The City is planning for the entire community, so the reductions are averaged across the entire area to achieve an overall goal. Some areas will provide reductions below the goal and others will achieve over the goal, but on average, the City will achieve the needed reductions.

7.1.1 - Tracking and Monitoring of Performance Indicators

As part of the annual report to the City Council on progress in implementing the General Plan, staff will report on benchmarks achieved that implement goals, objectives, and policies having air quality, climate change, and sustainability benefits. The City will use its Geographic Information System to provide up-to-date land use and development data and tracking for other metrics or quantitative measures of success. Data should be reported annually. Results from past years should be summarized to show trends. Table 14 proposes performance indicators and benchmarks.

Table 14: GHG Plan Performance Indicators

Measure	Performance Indicator	Timeframe
Energy-Related		
Building Energy Efficiency	Title 24 Compliance Reports (percent over requirement)	Compile annually
Solar Installations (PV and Water Heaters)	Systems installed and kW/therms per system (building permits)	
Energy Retrofits (voluntary)	Type of retrofit (insulation, windows, whole house fans, etc.) (building permit data)	
Water Conservation		
Building Water Efficiency	Plan check results (buildings complying with standards for toilets, faucets, etc)	Compile annually
Outdoor Water Efficiency	Landscaping plan reviews (number of projects/area of coverage	
Solid Waste		
Recycling and diversion	Tons of waste to landfill compared to regulatory per capita baseline	Annual reports
Alternative Fuel Vehicles		
Municipal Fleet Vehicles	Number and type of alternative fueled vehicles purchased	Compile annually
Fueling/Charging Infrastructure	Infrastructure projects completed and fuel type	
Land Use Measures		
Compact development/ Infill	Building permit statistics (No. of units, units/acre, FAR)	Compile annually
	Plans/Maps approved (average density, location – infill, growth area	
	Change in inventory of approved vacant parcels by land use designation	

Table 14 (cont.): GHG Plan Performance Indicators

Measure	Performance Indicator	Timeframe
Transit and Pedestrian Oriented Development	Plans/Maps approved in growth areas designated for transit and pedestrian oriented development (name, acres, units, density)	Compile annually
Transportation and Circulation Measures		
Transit Improvements	Ridership statistics (boardings, passenger miles)	Compile annually
	Transit route expansions and changes to service frequency and type (enhanced, BRT, other)	
Road Improvements	New lane miles of roads built by functional classification	Compile annually
	Complete street projects	
	Congestion relief projects completed	
Bicycle Measure	Bicycle lanes and path by classification	Compile annually
SB 375 Sustainable Communities Strategies	SB 375 Sustainable Communities Strategies implementation status report	Compile annually
TDM Program	Number of employers participating in the program (SJVAPCD data)	Compile annually
VMT Reductions	Updates in vehicle miles traveled used by Fresno COG in making Transportation Conformity findings for transportation plans	Every three years
Programmatic Measures		
Public Education and Outreach	Qualitative assessment of implementation and list of events work products	Annual report
PACE Program	Program participation statistics with project summary data	Compile annually
Regulatory Program Development	Progress on adopting and implementing mandatory programs related to design and conservation	Compile annually
Voluntary Program Development/Support	Progress on developing and implementing voluntary programs. Once adopted, report on projects or events arising from the programs.	Compile annually

SECTION 8: GLOSSARY OF TERMS AND ACRONYMS

AB	Assembly Bill
ARB	California Air Resources Board: a part of the California Environmental Protection Agency, an organization that reports directly to the Governor's Office in the Executive Branch of California State government. The mission of the ARB is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the State.
CEQA	California Environmental Quality Act: a California statute passed in 1970 to institute a statewide policy of environmental protection.
BAU	Business as usual: emissions that are expected to occur in a future year in the absence of emission reduction regulations and controls.
CO_2	Carbon dioxide: A naturally occurring gas and a by-product of burning fossil fuels and biomass other industrial processes. It is the reference gas against which other greenhouse gases are measured and therefore has a global warming potential of 1.
Climate Change	The statistically significant variation either in the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer).
EPA	United States Environmental Protection Agency. The mission of the EPA is to protect human health and to safeguard the natural environment—air, water and land—upon which life depends.
Greenhouse gas	A gas that absorbs infrared radiation in the atmosphere. Greenhouse gases as defined by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
$MTCO_2e$	Metric tons of carbon dioxide equivalents: a measure of greenhouse gas emissions
$MMTCO_2e$	Million metric tons of carbon dioxide equivalents: a measure of greenhouse gas emissions
ODS	Ozone depleting substances: compounds that contributes to stratospheric ozone depletion. ODS include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, methyl bromide, carbon tetrachloride, hydrobromofluorocarbons, chlorobromomethane, and methyl chloroform. ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete ozone.
SB	Senate Bill

SECTION 9: REFERENCES

Boden, T.A., G. Marland, and R.J. Andres (2010). Global, Regional, and National Fossil-Fuel CO2 Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2010.

California Air Resources Board (ARB). 2011. LEV III Staff Report and Initial Statement of Reasons. December 7.

California Air Resources Board. 2008. Scoping Plan. Website: www.arb.ca.gov/cc/scopingplan /document/adopted_scoping_plan.pdf. Accessed June 21, 2012.

California Air Resources Board. 2013. Staff Report, Update on Senate Bill 375 Implementation in the San Joaquin Valley. Date of Release January 15, 2013. Website: http://www.arb.ca.gov/cc/sb375/finalstaffreport_011513.pdf. Accessed May 22, 2013.

California Air Resources Board. 2014. Proposed First Update to the Climate Changes Scoping Plan: Building on the Framework. February 2014

California Department of Water Resources. 2014. Climate Change. Website: http://www.water.ca.gov/climatechange/. Accessed March 27, 2014.

California Department of Water Resources. 2014. Final Report of the Flood Emergency Action Team. Website: http://www.water.ca.gov/historicaldocs/irwm/feat-1997/janc1.html Flood of 97. Accessed March 27, 2014.

California Energy Commission. 2012. Building Energy Efficiency Website: http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2013_Building Energy_Efficiency_Standards_FAQ.pdf, Frequently Asked Questions. Accessed December 4, 2012.

California Energy Commission. 2013. Impact Analysis California's 2013 Building Energy Efficiency Standards. CEC-400-2013-008. July.

California Public Utilities Commission. 2012. Large IOU RPS Procurement Data 2003-2010. Website: http://www.cpuc.ca.gov/PUC/energy/Renewables. Accessed June 28, 2012.

Intergovernmental Panel on Climate Change. 2007a. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor, and H.L. Miller [eds.]). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Website: www.ipcc.ch /publications_and_data/ar4/wg1/en/contents.html, Accessed June 23, 2012.

San Joaquin Valley Air Pollution Control District. 2009. Final Staff Report, Rule 9410 (Employer Based Trip Reduction) Appendix B. December 17, 2009.

United States Environmental Protection Agency. 2014. Global Greenhouse Gas Emissions Data. Website: http://www.epa.gov/climatechange/ghgemissions/global.html#four. Accessed March 27, 2014.

Appendix A:
General Plan Policy List

The General Plan Update is the foundation of the City of Fresno's strategy to reduce development related greenhouse gas emissions. The City's land use authority provides its most effective means of limiting the impact of growth predicted for the City. The Greenhouse Gas Reduction Plan (GHG Plan) relates the benefits of the General Plan and the City's strategy for achieving GHG reduction targets. The following Table is a list of General Plan Policies that provide greenhouse gas reductions or support GHG Plan strategies.

Table 155: General Plan Policies

Policy Numbers	Urban Form Element Policies
Policy UF-1-c	**Legible City Structure**. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people, and pedestrian-oriented activity in Downtown; along a small number of prominent east west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lanes and streets.
Objective UF-12	Locate roughly one-half of future residential development in infill areas — defined as being within the City on December 21, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land.
Policy UF-3-a	**BRT Corridors**. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.
Policy UF-12-b	**Activity Centers**. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include Chapter 3: Urban Form, Land Use, and Design commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.
Policy UF-12-d	**Appropriate Mixed-Use.** Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one or adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.
Policy UF-3-e	**Access to Activity Centers.** Promote adoption and implement standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.
Policy UF-12-f	**Mixed-Use in Activity Centers**. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.
Objective UF-14	Create an urban form to facilitate multi-modal connectivity.

Policy UF-5-a	**Design Guidelines for Walkability**. Develop and use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.
Policy UF-14-b	**Local Street Connectivity**. Design local roadways to connect throughout neighborhoods and large private developments with adjacent major streets and pathways of existing adjacent development. Create access for pedestrians and bicycles where a local street must dead end or be designed as a cul-de-sac to adjoining uses that provide services, shopping, and connecting pathways for access to the greater community area.
Policy UF-14-c	**Block Length**. Create development standards that provide desired and maximum block lengths in residential, retail, and mixed-use districts order to enhanced walkability.
Policy Number	**Land Use Element Policies**
Objective LU-2	Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residents.
Policy LU-2-a	**Infill Development and Redevelopment**. Promote development of vacant, underdeveloped, and redevelopable land uses within the City Limits where urban services are available by establishing and implementing supportive regulations and programs.
Policy LU-2-b	**Infill Development for Affordable Housing**. Consider a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City as a strategy to help to meet the affordable housing needs of the community.
Policy LU-3-b	**Mixed-Use Urban Corridors that Connect the Downtown Planning Area**. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon corridors, as shown on Figure LU-1: General Plan Land Use Diagram.
Policy LU-3-c	**Zoning for High Density on Major Transit Corridors**. Encourage adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish long-term growth and development potential for Downtown.
Policy LU-5-f	**High Density Residential Uses.** Promote high-density residential uses to support Activity Centers and BRT corridors, affordable housing and walkable access to transit stops.
Policy Number	**Design Element Policies**
Policy D-3-c	**Local Streets as Urban Parkways.** Develop local streets as "urban parkways", where appropriate, with landscaping and pedestrian spaces.
Policy D-4-b	**Incentives for Pedestrian-Oriented Anchor Retail.** Consider adopting and implementing incentives for new pedestrian-friendly anchor retail at intersections within Activity Centers and along corridors to attract retail clientele and maximize foot traffic.

Policy	Transportation Element Policies
Policy MT-1-i	**Update Standards for Complete Streets.** Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specifications reflect the Complete Streets concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.
Objective MT-4	Establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.
Policy MT-4-a	**Bicycle, Pedestrian and Trails Master Plan.** To the extent consistent with this General Plan, continue to implement and periodically update the Bicycle, Pedestrian, and Trails Master Plan to meet State standards and requirements for recommended improvements and funding proposals as determined appropriate and feasible
Policy MT-4-b	**Bikeway Improvements.** Establish and implement property development standards to assure that projects adjacent to designated bikeways provide adequate right-of-way and that necessary improvements are constructed to implement the planned bikeway system shown on Figure MT-2 to provide for bikeways, to the extent feasible, when existing roadways are reconstructed; and alternative bikeway alignments or routes where inadequate right-of-way is available
Policy MT-4-c	**Bikeway Linkages.** Provide linkages between bikeways, trails and paths, and other regional networks such as the San Joaquin River Trail and adjacent jurisdiction bicycle systems wherever possible.
Objective MT-5	Establish a well-integrated network of pedestrian facilities to accommodate safe, convenient, practical, and inviting travel by walking, including for those with physical mobility and vision impairments.
Policy MT-5-a	**Sidewalk Development.** Pursue funding and implement standards for development of sidewalks on public streets, with priority given to meeting the needs of persons with physical and vision limitations; providing safe routes to school; completing pedestrian improvements in existing neighborhoods with lower vehicle ownership rates; or providing pedestrian access to public transportation routes.
Objective MT-6	Establish a network of multi-purpose pedestrian and bicycle paths, as well as limited access trails, to link residential areas to local and regional open space and urban Activity Centers in order to enhance Fresno's recreational amenities and alternative transportation options.
Policy MT-6-a	**Link Residences to Destinations.** Design a pedestrian and bicycle path network that links residential areas with Activity Centers, such as parks and recreational facilities, educational institutions, employment centers, cultural sites, and other focal points of the city environment.
Policy MT-6-g	**Path and Trail Development in Subdivisions.** Require all subdivision maps to incorporate planned multi-purpose path and trail development standards and corridor linkages consistent with the General Plan, applicable law and case-by-case determinations as a condition of tentative map approval.
Objective MT-8	Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize environmental impacts.

Policy MT-8-a	**Street Design Coordinated with Transit.** Coordinate the planning, design, and construction of the major street network with transit operators to facilitate efficient direct transit routing throughout the Planning Area.
Policy MT-8-b	**Transit Serving Residential and Employment Nodes.** Identify the location of current and future residential and employment concentrations and Activity Centers throughout the transit service area in order to facilitate planning and implementation of optimal transit services for these uses. Work with California State University, Fresno to determine locations within the campus core for bus stops.
Policy MT-8-g	**High Speed Train.** If the State moves forward with HST, ensure it is constructed through Fresno in a manner that minimizes impacts to surrounding property owners and creates the most opportunity for redevelopment around the HST station.
Objective MT-9	Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, frequent, reliable, and financially feasible.
Policy MT-10-a	**Updating Parking Standards.** Update off-street parking standards to reflect the context and location within activity areas of multiple uses and reductions appropriate for mixed residential and non-residential uses and proximity to existing or planned transit service.
Policy MT-10-b	**Shared Parking.** Establish a strategy to promote the sharing of excess parking between uses within Activity Centers and BRT corridors, including specific provisions for this in the Development Code.
Policy MT-10-c	**Transportation Demand Management Guidelines.** Establish transportation demand management guidelines to allow for reduced off-street parking requirements.
Policy MT-10-d	**Parking Maximums.** Explore maximum off-street parking limits within Activity Centers proximate to BRT corridors, if such an Activity Center is determined compatible with promotion of a healthy and vigorous business environment.
Policy MT-10-f	**Parking Benefit Districts.** Establish parking benefit districts to fund consolidated public parking where supported by local businesses.
Policy Number	**Park and Open Space Policies**
Policy POSS-1-g	**Regional Urban Forest.** Maintain and implement incrementally, through new development projects, additions to Fresno's regional urban forest to delineate corridors and the boundaries of urban areas, and to provide tree canopy for bike lanes, sidewalks, parking lots, and trails.
Policy POSS-7-h	**Interlink City and San Joaquin River Parkway Trail Networks.** Strive to connect the parkway trail network to other trails in the vicinity, in order to create a community and regional trail system that offers a variety of different route combinations and enhances public access to the parkway.
Policy Number	**Public Utilities Policies**
Objective PU-7	Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.
Policy PU-7-a	**Reduce Wastewater.** Reduce Wastewater. Identify and consider implementing water conservation standards and other programs and policies, as determined

	appropriate, to reduce wastewater flows.
Policy PU-7-d	**Wastewater Recycling.** Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.
Policy PU-9-a	**New Techniques.** Continue to collaborate affected stakeholders and partners to identify and support programs and new techniques of solid waste disposal, such as recycling, composting, waste to energy technology, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.
Policy PU-9-b	**Compliance with State Law.** Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.
Policy Numbers	**Resource Conservation Element Policies**
Objective RC-2	Promote land uses that conserve resources
Policy RC-2-a	**Link Land Use to Transportation**. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.
Policy RC-2-b	**Provide Infrastructure for Mixed-Use and Infill.** Promote investment in the public infrastructure needed to allow mixed-use and denser infill development to occur in targeted locations, such as expanded water and wastewater conveyance systems, complete streetscapes, parks and open space amenities, and trails. Discourage investment in infrastructure that would not meet these criteria.
Policy RC-4-i	**Methane Capture.** Continue to pursue opportunities to reduce air pollution by using methane gas from the old City landfill and the City's wastewater treatment process.
Policy RC-6-d	**Recycled Water.** Prepare, adopt, and implement a City of Fresno Recycled Water Master Plan.
Objective RC-7	Promote water conservation through standards, incentives and capital investments.
Policy RC-7-a	**Water Conservation Program and 2035 Target.** Maintain a comprehensive conservation program that reduces per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees. • Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.

	• Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements. • Adopt and implement policies in the event an artificial lake is proposed for development. • Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area. • Expand efforts to educate the public about water supply issues and water conservation techniques.
Policy RC-7-c	**Best Practices for Conservation.** Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate
Policy RC-7-d	**Update Standards for New Development.** Continue to refine water saving and conservation standards for new development
Policy RC-7-e	**Retrofit City Facilities, and Consider Incentives Programs for to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites.** Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.
Policy RC-7-f	**Enforce and Update Conservation Program.** Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City's Water Conservation Program.
Policy RC-7-g	**Educate on State Requirements.** Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.
Policy RC-7-h	**Landscape Water Conservation Standards**. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other State regulations. • Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance. • Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.
Policy RC-7-i	**PACE Financing.** Develop a residential Property Assessed Clean Energy (PACE)

	program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.
Objective RC-8	Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.
Policy RC-8-b	**Energy Reduction Targets.** Strive to reduce per capita residential electricity use to 1,800 kWh per year and nonresidential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings..
Policy RC-8-c	• **Energy Conservation in New Development.** Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.
Policy RC-8-d	**Incentives.** Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.
Policy RC-8-e	**Energy Use Disclosure.** Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.
Policy RC-8-f	**City Heating and Cooling.** Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.
Policy RC-8-g	**Revolving Energy Fund.** Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.
Policy RC-8-h	**Solar Assistance.** Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.
Policy RC-8-j	**Alternative Fuel Network.** Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.
Policy RC-8-k	**Energy Efficiency Education.** Provide long-term and ongoing education of homeowners and businesses as to the value of energy efficiency and the need to upgrade existing structures on the regular basis as technology improves and structures age.
Policy RC-11-a	**Waste Reduction Strategies.** Maintain current targets for recycling and re-use of all types of waste material in the city and enhance waste and wastewater management practices to reduce natural resource consumption, including the following measures: • Continue to require recyclable material collection and storage areas in all residential development. • Establish recycling collection and storage area standards for commercial and industrial facilities to size the recycling areas

	according to the anticipated types and amounts of recyclable material generated. • Provide educational materials to residents on how and what to recycle and how to dispose of hazardous waste. • Provide recycling canisters and collection in public areas where trash cans are also provided. • Institute a program to evaluate major waste generators and identify recycling opportunities for their facilities and operations. • Continue to partner with the California Integrated Waste Management Board on waste diversion and recycling programs and the CalMax (California Materials Exchange) program. • Evaluate the feasibility of a residential, restaurant and institutional food waste segregation and recycling program, to reduce the amount of organic material sent to landfill and minimize the emissions generated by decomposing organic material. • Evaluate the feasibility of "carbon footprinting" for the City's wastewater treatment facilities, biomass and composting operations, solid waste collection and recycling programs. • Expand yard waste collection to divert compostable waste from landfills. • Study the feasibility and cost-benefit analysis of a municipal composting program to collect and compost food and yard waste, using the resulting compost matter for City park and median maintenance.
Policy RC-11-b	**Zero Waste Strategy.** Create a strategic and operations plan for fulfilling the City Council resolution committing the City to a Zero Waste goal.

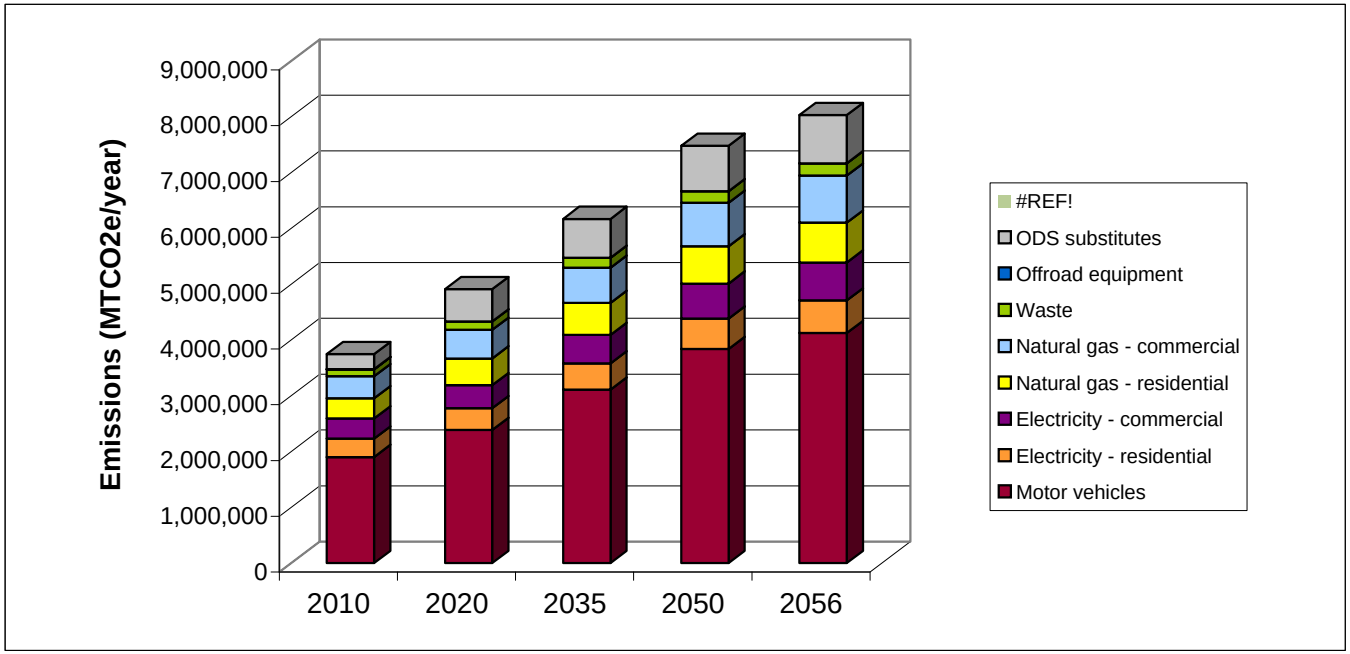
Appendix B: Greenhouse Gas Emission Reductions and Modeling Results

Community Greenhouse Gas Business as Usual Inventory

Summary

Prepared by Michael Brandman Associates

Source	2010	2020	2035	2050	2056
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447
Electricity - commercial	361,836	415,012	509,781	626,137	679,888
Natural gas - residential	362,832	476,679	573,160	670,082	712,228
Natural gas - commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	3,745,115	4,905,399	6,166,049	7,475,346	8,026,499



Emission Reduction from Local Measures

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	2,383,023.0	1,828,249.0	1,745,490.1	**637,532.9**
Reduction		554,774.0		26.75%

Reductions from Land Use Strategy 2020

	Reduction Percentage	Emissions MTCO2e
2020 Lt Duty Vehicle Emissions without Local Measures		1,069,681.4
SB 375 Land Use Strategy	4.70%	**50,275**
Emissions after reduction		1,019,406

Source: ARB Staff Report Update on Senate Bill 375 Implementation in the San Joaquin Valley, January 15, 2013

Reductions from TDM

	Percentage Reduction	Emissions MTCO2e
2020 Lt Duty Emissions with SB 375		1,069,681.4
Rule 9410 TDM Emission Reductior	1.60%	**17,115**
Emissions after reduction		1,052,567

Source: SJVAPCD 2012 Rule 9410 Staff Report
Reductions include increases in travel by carpool, vanpool, transit, bicycling, and walking for commute trips

2035 Emission Emissions without Local Measures

Mobile Source Emissions	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Motor Vehicles	3,107,859.0	2,205,408.7	1,782,755.6	**1,325,103.4**
Reduction		902,450.3		42.64%

Reductions from Land Use Strategy 2035		
	Reduction Percentage	**Emissions MTCO2e**
2035 Light Duty Emissions without Local Measures		1,075,445.3
SB 375 Land Use Strategy	7.60%	**81,734**
Lt Duty Emissions after reduction		993,711

Source: ARB Staff Report Update on Senate Bill 375 Implementation in the San Joaquin Valley, January 15, 2013

Reductions from TDM 2035		
	Percentage Reduction	**Emissions MTCO2e**
2035 Emissions with SB 375		1,075,445.3
Rule 9410 TDM Emission Reductior	1.60%	**17,207**
Lt Duty Emissions after reduction		1,058,238

Source: SJVAPCD 2012 Rule 9410 Staff Report
Reductions include increases in travel by carpool, vanpool, transit, bicycling, and walking for commute trips

Water Use	Population	Water Use (gal/day)	Mgal/Day	Mgal/year	20% Reduction	25% Reduction
Per capita water use 2009 (gal)		275				
Population 2010	545,000	149,875,000	149.88	54,704.4		
Population 2020	649,200	178,530,000	178.53	65,163.5	13,032.7	
Population 2035	780,600	214,665,000	214.67	78,352.7		19,588.2
Population 2050	912,600	250,965,000	250.97	91,602.2		22,900.6
Population 2056	970,000	266,750,000	266.75	97,363.8		24,340.9

Electric Intensity Factors	kWh/mgal	2020 Energy Savings (kWh)	2035 Energy Savings (kWh)
Supply	2,117	27,590,205	41,468,180
Treatment	111	1,446,629	2,174,288
Distribution	1,272	16,577,582	24,916,167
Total		45,614,415	68,558,634

Emission Reductions from Water Use	PG&E Emissions Rate (MTCO2/MWh	Emission Reductions (MTCO2e)
2020 Reductions	0.131	5,975.5
2035 Reductions	0.131	8,981.2

Project Reduction Potential From Land Use and Transportation Measures

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

Source: Reductions from CAPCOA 2010

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

Source: CAPCOA 2010 Table 6.2

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

Solid Waste		
Reductions from Diversion and Recycling		Per Capita (lbs/day)
2005 Waste Generation (tons)	505,910	6.6
2010 Waste Generation (tons)	333,098	3.7
Emissions MTCO2e	123,945	
Emission Rate (MTCO2e/ton)	0.37	
2020 Target (75% Diversion) tons		1.65
2020 Emission at 75% Diversion		1.65

	Population	Target	Waste Gen (lbs/day)	Waste Gen (tons/year)	Waste Emissions MTCO2e	BAU Emissions MTCO2e	Emission Reduction MTCO2e
Population 2020	649,200	1.65	1,071,180	195,490	72,742	147,628	74,886
Population 2035	780,600	1.65	1,287,990	235,058	87,465	177,508	90,043
BAU Emissions							

Local Reduction Summary			
Sector		**2020 (MTCO2e)**	**2035 MTCO2e**
Motor Vehicles	Land Use and Transportation Str	50,275	81,734
	TDM (Rule 9410)	17,115	17,207
	Subtotal	**67,390**	**98,941**
Electricity	Water Conservation	5,975	8,981
	Subtotal	**5,975**	**8,981**
Waste	75% Waste Diversion Target	74,886	90,043
	Subtotal	**74,886**	**90,043**
Total all Sectors		**148,252**	**197,966**

		Per Capita Emission
2020 BAU	4,905,399	
2020 Adj BAU	3,591,513	
2020 Local Reductions	148,252	
2020 w/all Reductions	3,443,261	5.30
Percent Reduction from BAU	29.81%	

		Per Capita Emissions
2035 BAU	6,166,049	
2035 Adj BAU	3,881,781	
2035 Local Reductions	197,966	
2035 w/all Reductions	3,683,815	4.72
Percent Reduction from BAU	40.26%	
2035 Interim Target	3,699,629	4.74
Additional Reductions Needed	-15,814	-0.02

Reductions from State Measures

Targets based on State Reductions for AB 32

State Inventory 2010 MTCO2e	451.6
New State Inventory 2020 BAU MTCO2e	**545.0**
State Inventory 2020 Reduced MTCO2e	507.0
AB 32 target - 1990 EI MTCO2e	427.0
Reductions Required from BAU MTCO2e	118.0
Percent Reduction Rqd BAU	**21.7**
Reduction from 2010	24.6
Percent Reduction from 2010	5.4

2020 Emission Reduction Calculations				
	Emissions	**Population**	**Per Capita**	**Reduction**
Fresno 2010 Inventory	3,745,116	545,000	6.87	
Fresno 2020 BAU Inventory	4,905,399	649,200	7.56	
Fresno 2020 Target	**3,843,313**	649,200	**5.92**	**21.65%**
Reduction Required from BAU	1,062,086			
Reductions Achieved	1,313,886			
Emissions with Reductions	3,591,513		5.53	**26.78%**

Offroad Emissions Alternative Estimate using State Inventory for 2010	
California 2010 MTCO2e	2,030,000
California Population	37,309,404
Per Capita Emissions MT/Person/Year	0.054
Fresno Population 2010	545,000
Fresno Offroad Emissions	29,653.4

	2020 BAU	**2020 w/Pavley I**	**2020 w/LEV III and Other Regs**	**Reduction from BAU**
Mobile Source Emissions				
Motor Vehicles	2,383,023.0	1,828,249.0	1,748,773.1	**634,250**
Reduction		554,774.0	79,475.9	26.62%

Fleet VMT Fractions in 2020		**CO2 tons/year**	**MTCO2e/year**
Gasoline Vehicles			
LDA	0.436	701,792.9	
LDT1	0.064	118,436.2	
LDT2	0.163	356,767.2	
Total	0.663	1,176,996.3	
LEV III 2020 Reduction 3%		35,309.9	
Diesel Vehicles			
LDA	0.0012	1,856.6	
LDT1	0.0001	131.0	
LDT2	0.0001	118.2	
Total	0.0014	2,105.8	
LEV III 2020 Reduction 3%		63.2	
Total Inventory 2020		**1,179,102.1**	1,069,681.4
LEV III 2020 Reduction 3%			**32,090.4**
ARB estimate of LEV Reductions from 2016 to 2020			

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	1,179,102.1	1,069,681.4	1,069,681.4

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2020 Reductions	
California Reductions in MMT CO2e	0.93	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0041	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction in HD emissions MTCO2e	**9,836.7**	

Med/HDT Hybridization	2020 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction in HD emissions MTCO2e	**5,288.6**	**15,125.3**

Light Duty Vehicle Efficiency Measures	2020 Reductions	Fresno Reduction MTCO2e
Tire Pressure Regulation	0.55	5,817.4
Tire Tread Standard	0.3	3,173.1
Low Friction Oil	2.2	23,269.6
Total	3.05	**32,260.2**
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.013537506	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	**32,260.2**	
Total Reductions all Measures	**47,385.5**	

Mobile Reductions Summary	MTCO2e/ year
LEV III	32,090.4
Vehicle Efficiency	47,385.5
	79,475.9

Energy Emissions	2020 EI MTCO2e	2020 w/RPS	RPS Reduction
2020 Electricity Residential	390,488	226,011	164,477
2020 Electricity Commercial	415,012	240,205	174,807
Total	805,500	466,216	339,284

	2020 MTCO2e	T24 Reductions	2020 w/T24
2020 Natural Gas Residential	476,679	7,983	468,696
2020 Natural Gas Commercia	514,647	17,530	497,117
	991,326	**25,513**	965,813

PG&E Portfolio	Percent
2010 Pecentage	17.7
2020 Mandate Percentage	33
Reduction	15.3

Included in Emission Factor from PG&E in spreadsheets

Title 24 Reductions 2008 and 2013 Updates

	2020 BAU MTCO2e	2010 BAU MTCO2e	Increase 2010 to 2020	Emission Reduction
Electricity Residential	390,488	327,813	62,675	16,833
Electricity Commercial	415,012	361,836	53,176	9,614
Total	805,500	689,649	115,851	**26,447**
Natural Gas Residential	476,679	362,832	113,847	7,983
Natural Gas Commercial	514,647	394,417	120,230	17,530
	991,326	757,250	234,076	**25,513**
Title 24 Totals				**51,960**

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

2008 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	8,659	0.227	1,966
Multi-Family	0.539	10,143	0.197	1,998
Total 2020 Residential Electricity Reductions				**3,964**

2008 Title 24 Fresno Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	15,729	0.1	1,573
Multi-Family	0.539	18,425	0.07	1,290
Total 2020 Residential Natural Gas Reductions				**2,863**

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

2013 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	20,204	0.364	7,354
Multi-Family	0.539	23,668	0.233	5,515
Total 2020 Residential Electricity Reductions				**12,869**

2013 Title 24 Fresno Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	36,701	0.065	2,386
Multi-Family	0.539	42,992	0.038	1,634
Total 2020 Residential Natural Gas Reductions				**4,019**

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

	2020 Adj EI MTCO2e	Title 24 Reductions	2020 EI W/T24	2020 BAU	Reduction from BAU
2020 Electricity Residential	226,011	16,833	209,178	390,488	181,310
2020 Electricity Commercial	240,205	9,614	230,591	415,012	184,421
Total	466,216	**26,447**	439,769		
2020 Nat Gas Residential	476,679	**7,983**	468,696	476,679	7,983
2020 Nat Gas Commercial	514,647	**17,530**	497,117	514,647	17,530
Total	991,326	25,513	965,813		

Ozone Depleting Substances	
	MTCO2e
2020 BAU Emissions	576,784
ARB Refrigerant Management Program Reduction 50%	0.5
2020 Reduction	**288,392**

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

Emissions (MTCO2e/year)		2020 BAU	Reductions in 2020	Adj BAU 2020	Percent Reduction
	Motor vehicles	2,383,023	634,250	1,748,773	26.62%
	Electricity - residential	390,488	181,310	209,178	46.43%
	Electricity - commercial	415,012	184,421	230,591	44.44%
	Natural gas - residential	476,679	7,983	468,696	1.67%
	Natural gas - commercial	514,647	17,530	497,117	3.41%
	Waste	147,628	0	147,628	0.00%
	Offroad equipment	1,138	0	1,138	0.00%
	ODS substitutes	576,784	288,392	288,392	50.00%
	Total	4,905,399	1,313,886	3,591,513	26.78%

BAU assumes 2005 emission rates to eliminate the effect of controls

Source Group	State Measures	Emissions (MTCO2e/year) 2020	
Motor vehicles	Pavley and Low Carbon Fuel Standard	554,774	
	Low Emission Vehicle Program III	32,090	
	Tire Tread Program	3,173	
	Tire Pressure Program	5,817	
	Low Friction Oil	23,270	
	Aerodynamic Efficiency/Hybridization	15,125	
	Subtotal	**634,250**	
Electricity - residential	Renewable Portfolio Standards	164,477	
	Title 24 Energy Efficiency Standards	16,833	
Electricity – commercial	Renewable Portfolio Standards	174,807	
	Title 24 Energy Efficiency Standards	9,614	
	Subtotal	**365,731**	
Natural Gas-Residential	Title 24 Energy Efficiency Standards	7,983	
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	17,530	
	Subtotal	**25,513**	
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	288,392	
	Total	**1,313,886**	

Source: Michael Brandman Associates

Emission Summary BAU and Regulations All Years

Business as Usual Modeling Results

	2010 BAU	2020 BAU	2035 BAU	2050 BAU	2056 BAU
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447
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Natural gas - commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	***3,745,116***	***4,905,399***	***6,166,049***	***7,475,346***	***8,026,498***
Per Capita Emissions		7.556067612	7.89911452		

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Motor vehicles	1,795,666	1,828,249	2,205,409	2,711,894	2,914,488
Electricity - residential	289,745	226,011	271,756	317,710	337,694
Electricity - commercial	319,817	240,205	295,057	362,433	393,513
Natural gas - residential	400,169	476,679	519,166	670,082	712,228
Natural gas - commercial	448,706	514,647	564,560	776,525	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	***3,652,521***	***4,011,341***	***4,729,504***	***5,859,698***	***6,286,229***

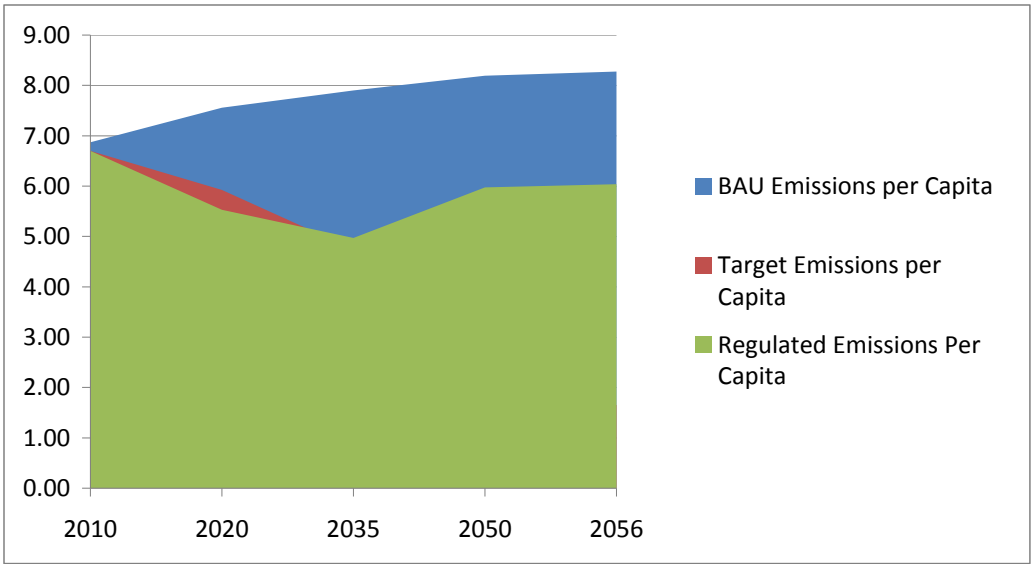
Adjusted BAU with Off Model Reductions from Title 24 and LEV III

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Motor vehicles	1,795,666	1,748,773	1,745,843	2,711,894	2,914,488
Electricity - residential	289,745	209,178	258,766	317,710	337,694
Electricity - commercial	319,817	230,591	290,861	362,433	393,513
Natural gas - residential	400,169	468,696	506,670	670,082	712,228
Natural gas - commercial	448,706	497,117	553,452	776,525	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	288,392	347,367	406,107	431,650
Total	***3,652,521***	***3,591,513***	***3,881,781***	***5,453,591***	***5,854,579***
Per Capita Emissions	6.70	5.53	4.97	5.98	6.04

Target Inventories

	2010	2020	2035	2050	2056
BAU Inventory	3,745,116	4,905,399	6,166,049	7,475,346	8,026,498
Target Inventories	3,495,422	3,843,380	3,699,629	1,495,069	1,605,300
Inventories with Regulations	3,652,521	3,591,513	3,881,781	5,453,591	5,854,579
Planning Area Population	545,000	649,200	780,600	912,600	970,000

	2010	2020	2035	2050	2056
BAU Emissions per Capita	6.87	7.56	7.90	8.19	8.27
Target Emissions per Capita	6.70	5.92	4.74	1.64	1.65
Regulated Emissions Per Capi	6.70	5.53	4.97	5.98	6.04



2020 Target	21.6 percent below 2020 BAU
2035 Target	40 percent below 2020 Target (1990 levels)
2050 Target	80 percent below 2020 Target (1990 levels)

2035 Emission Reduction Estimates

	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Mobile Source Emissions				
Motor Vehicles	3,107,859.0	2,205,408.7	1,745,842.7	**1,362,016.3**
Reduction		902,450.3		43.82%

LEV III Reduction Estimates

Gasoline Vehicles	Fleet VMT Fractions in 2035	MTCO2e tons/year
LDA	0.439	968,384.4
LDT1	0.065	143,734.1
LDT2	0.162	358,158.0
Total	0.667	1,470,276.5
LEV III 2035 Gas Reduction 27%		**396,974.7**

2035 Emfac Fleet Fractions

	GAS	DSL
LDA	0.439	0.001
LDT1	0.065	0.000
LDT2	0.162	0.000

Diesel Vehicles		
LDA	0.001	2,584.1
LDT1	0.000	190.7
LDT2	0.000	161.4
Total	0.0013	2,936.2
LEV III 2035 Diesel Reduction 27%		**792.8**
Total Light Duty Cars and Trucks with LEV III		**1,075,445.3**
LEV Reductions in 2035		**397,767.4**

	MTCO2e/ year
LEV III Reduction	397,767.4

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2035 Reductions
California Reductions in MMT CO2e	0.93
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0041
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0
Reduction in HD emissions MTCO2e	**12,828.7**

Med/HDT Hybridization	2035 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0	
Reduction in HD emissions MTCO2e	**6,897.2**	**19,725.9**

Light Duty Vehicle Efficiency Measures	2035 Reductions	Fresno Reduction MTCO2e
Tire Pressure Regulation MMTCO2e	0.55	7,586.9
Tire Tread Standard MMTCO2e	0.3	4,138.3
Low Friction Oil MMTCO2e	2.2	30,347.5
Total (MMTCO2e)	3.05	**42,072.7**
California 2020 BAU EI Transportation MMTCO2e	225.3	
Percent Reduction in Transportation	0.013537506	
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	**42,072.7**	
Total Reductions all Measures	**61,798.5**	

Reduction based on ARB Scoping Plan reductions from Efficiency Measures

Total Reductions for Motor Vehicles	**1,362,016.3**

Energy Emissions

Electricity	2035 EI MTCO2e	2035 w/RPS	RPS Reduction	T24 Reduction	Total Reduction
2035 Electricity Residential	426,350	271,576	154,774	12,810	167,584
2035 Electricity Commercia	455,261	295,057	160,204	4,196	164,400
Total	881,611	566,633	314,978		331,985

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

Natural Gas

	2035 MTCO2e	T24 Reductions	2035 w/T24
2035 Natural Gas Resident	519,166	12,496	506,670
2035 Natural Gas Commer	564,560	11,108	553,452
	1,083,726	**23,603**	1,060,123

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

Title 24 Reductions

	2010 MTCO2e	2035 MTCO2e	Increase 2010 to 2035	Emission Reduction	Residential	Commercial
Electricity Residential	205,228	271,576	66,348	12,810	12,810	
Electricity Commercial	219,145	295,057	75,912	4,196		4,196
Total	424,373	566,633	142,260	**17,007**		
Natural Gas Residential	431,774	519,166	87,392	12,496	12,496	
Natural Gas Commercial	469,526	564,560	95,034	11,108		11,108
	901,300	1,083,726	182,426	**23,603**		
Title 24 Totals				**40,610**	25,306	15,304

2008 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	3,667	0.227	832
Multi-Family	0.539	4,295	0.197	846
Total 2020 Residential Electricity Reductions				**1,678**

2008 Title 24 Fresno Residential Development Projections Natural Gas				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	4,830	0.1	483
Multi-Family	0.539	5,657	0.07	396
Total 2020 Residential Natural Gas Reductions				**879**

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

2013 Title 24 Fresno Residential Development Projections Electricity				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	26,888	0.25	6,722
Multi-Family	0.539	31,498	0.14	4,410
Total 2035 Residential Electricity Reductions				**11,132**

2013 Title 24 Fresno Residential Development Projections Natural Gas				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	35,417	0.2	7,083
Multi-Family	0.539	41,488	0.09	3,734
Total 2035 Residential Natural Gas Reductions				**10,817**

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

	2035 EI MTCO2e w/RPS	Title 24 Reductions	2035 EI W/T24
2035 Electricity Residential	271,576	12,810	258,766
2035 Electricity Commercia	295,057	4,196	290,861
Total	566,633	**17,007**	549,626

Ozone Depleting Substances

	MTCO2e
2035 BAU Emissions	694,734
ARB Refrigerant Management Program Reduction 50%	0.5
2035 Reduction	**347,367**

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

Emission Reduction Summary

	Emissions (MTCO2e/year)			
	2035 BAU	**Reductions in 2035**	**Adj BAU 2035**	**Percent Reduction**
Motor vehicles	3,107,859	1,362,016	1,745,843	43.82%
Electricity - residential	469,524	167,584	301,940	35.69%
Electricity - commercial	509,781	164,400	345,381	32.25%
Natural gas - residential	573,160	12,496	560,664	2.18%
Natural gas - commercial	632,169	11,108	621,061	1.76%
Waste	177,508	0	177,508	0.00%
Offroad equipment	1,314	0	1,314	0.00%
ODS substitutes	694,734	347,367	347,367	50.00%
Total	6,166,049	2,064,971	4,101,078	33.49%

Transportation and Distribution Losses
Business as Usual Modeling Results

	2010 BAU	2020 BAU	2035 BAU	2050 BAU	2056 BAU
Electricity - residential	297,705	354,581	426,350	498,446	529,796
Electricity - commercial	317,868	378,626	455,261	532,246	565,723
Total E	615,573	733,207	881,611	1,030,692	1,095,519
T&D Loss	42,105	50,151	60,302	70,499	74,934

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Electricity - residential	263,134	205,228	246,767	288,496	306,641
Electricity - commercial	280,954	219,145	263,501	308,059	327,435
Total E	544,088	424,374	510,268	596,555	634,076
T&D Loss	37,216	29,027	34,902	40,804	43,371

T&D Loss for Western Region in 2010 is 6.84%
No rates were found for future years, so assumed constant rate.
T&D losses are expected to decline with increases in local production from solar or other distributed generation.

Community Greenhouse Gas Inventory

Summary

Year: 2010

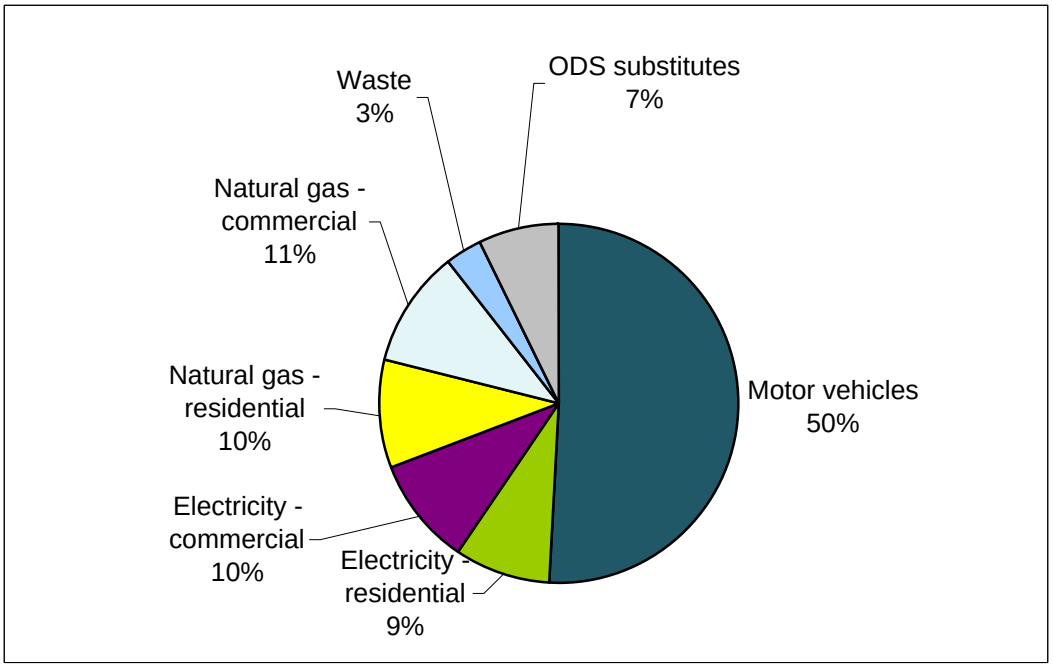
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	545,000	Fresno COG
Employment	209,261	Census 2011
County Information		
Population	930,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

- U.S. Census Bureau. 2011. 2009-2001 American Community Survey 3-Year Estimates Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%

Sources	**MTCO2e**
Motor vehicles	1,899,799
Electricity - residential	327,813
Electricity - commercial	361,836
Natural gas - residential	362,832
Natural gas - commercial	394,417
Waste	123,945
Offroad equipment	1,051
ODS substitutes	273,422
Total	***3,745,116***



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated		
Tons / year (instate)	333,099	
Percent Waste		
Mixed MSW	48.2	
Newspaper	1.3	
Office paper	10.1	
Corrugated cardboard	4.8	
Magazines/third class mail	1.2	
Food scraps	15.5	
Grass	1.9	
Leaves	1.9	
Branches	0.6	
Dimensional lumber	14.5	
Waste Emissions		
Emissions (MTCO2e)	123,945	SEEC 2013
Emissions (MTCO2e/person)	0.2274	Divide emissions by population

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

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

Waste Emissions: Statewide Energy Efficiency Collaborative (SEEC). July 2013. Climate and Energy Management Suite. Version 2. Website: cems.californiaseec.org. Model run by Michael Brandman Associates/FirstCarbon Solutions, output contained in Appendix. Note: it was assumed that the landfills have methane capture. According to the County of Fresno Agenda Item 21, March 11, 2008 regarding the Feasibility Study on Gas to Energy Conversion at Southeast Regional Disposal Site and Amercian Avenue Disposal Site, Amercian Avenue Disposal site had methane capture at that time; that site collects 83 percent of the waste for the City (http://www2.co.fresno.ca.us/0110a/Questys_Agenda/MG151925/AS151956/AS151970/AI151985/DO152036/DO_152036.PDF).

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 9,162,734 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 3,344,397,910 Source: VMT per day * 365 days/year
Annual VMT Growth Rate 2.48%

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	733	213297	5785	34575	133039	129247	819333	365979	393776	199720	762678	697704	48	0	0
LDT1	102	29789	808	4829	18580	18051	114428	51113	54995	27893	106516	97442	7	0	0
LDT2	291	84691	2297	13728	52824	51318	325321	145315	156351	79300	302827	277028	19	0	0
LHD1	49	14123	383	2289	8809	8558	54252	24233	26074	13224	50501	46198	3	0	0
LHD2	5	1566	42	254	977	949	6014	2686	2890	1466	5598	5121	0	0	0
MCY	10	2891	78	469	1803	1752	11105	4960	5337	2707	10337	9456	1	0	0
MDV	353	102724	2786	16652	64072	62245	394592	176256	189643	96185	367307	336015	23	0	0
MH	3	804	22	130	502	487	3090	1380	1485	753	2877	2632	0	0	0
OBUS	2	537	15	87	335	325	2063	921	991	503	1920	1756	0	0	0
SBUS	0	114	3	19	71	69	439	196	211	107	409	374	0	0	0
T6	3	939	25	152	586	569	3608	1611	1734	879	3358	3072	0	0	0
T7	0	133	4	22	83	81	512	229	246	125	477	436	0	0	0
UBUS	1	293	8	48	183	178	1127	503	542	275	1049	959	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	578	16	94	360	350	2220	992	1067	541	2067	1891	0	0	0
LDT1	0	45	1	7	28	27	174	78	84	42	162	148	0	0	0
LDT2	0	40	1	6	25	24	153	68	73	37	142	130	0	0	0
LHD1	35	10132	275	1642	6320	6140	38921	17385	18705	9487	36229	33143	2	0	0
LHD2	8	2418	66	392	1508	1465	9289	4149	4464	2264	8646	7910	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	47	1	8	29	28	179	80	86	44	167	152	0	0	0
MH	0	144	4	23	90	87	553	247	266	135	515	471	0	0	0
OBUS	3	739	20	120	461	448	2837	1267	1363	692	2641	2416	0	0	0
SBUS	2	466	13	75	290	282	1789	799	860	436	1665	1523	0	0	0
T6	33	9535	259	1546	5947	5778	36627	16360	17603	8928	34094	31190	2	0	0
T7	150	43624	1183	7072	27210	26434	167573	74851	80536	40847	155986	142697	10	0	0
UBUS	2	678	18	110	423	411	2605	1163	1252	635	2424	2218	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	329	71,500	1,498	7,091	22,639	18,929	107,280	44,364	45,944	23,278	92,165	90,658	7	0	0	**525,353**
LDT1	52	11,398	239	1,131	3,612	3,020	17,113	7,078	7,330	3,714	14,704	14,466	1	0	0	**83,806**
LDT2	180	39,128	820	3,881	12,391	10,361	58,717	24,283	25,148	12,741	50,447	49,623	4	0	0	**287,545**
LHD1	49	11,546	214	925	2,716	2,128	11,498	4,624	4,732	2,412	9,781	0	0	0	0	**50,577**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	5	1,280	24	103	301	236	1,275	513	525	267	1,084	0	0	0	0	**5,607**
MCY	1	237	6	29	99	87	508	212	217	107	401	368	0	0	0	**2,271**
MDV	271	59,008	1,236	5,852	18,683	15,622	88,533	36,611	37,915	19,210	76,059	74,815	6	0	0	**433,550**
MH	3	658	12	53	155	121	655	263	270	137	557	572	0	0	0	**3,453**
OBUS	2	439	8	35	103	81	437	176	180	92	372	382	0	0	0	**2,305**
SBUS	0	93	2	7	22	17	93	37	38	20	79	81	0	0	0	**490**
T6	3	768	14	61	181	142	765	307	315	160	650	668	0	0	0	**4,031**
T7	0	109	2	9	26	20	109	44	45	23	92	95	0	0	0	**572**
UBUS	1	240	4	19	56	44	239	96	98	50	203	208	0	0	0	**1,259**
Total	**898**	**196,404**	**4,079**	**19,197**	**60,983**	**50,809**	**287,220**	**118,609**	**122,757**	**62,212**	**246,596**	**231,935**	**18**	**0**	**0**	**1,401,716**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	84	2	14	53	51	323	144	155	79	301	275	0	0	0	**1,483**
LDT1	0	7	0	1	4	4	26	12	13	6	24	22	0	0	0	**120**
LDT2	0	6	0	1	4	4	23	10	11	6	21	19	0	0	0	**104**
LHD1	7	2,167	59	351	1,351	1,313	8,322	3,717	4,000	2,029	7,747	0	0	0	0	**31,056**
LHD2	2	519	14	84	324	315	1,995	891	959	486	1,857	0	0	0	0	**7,443**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	7	0	1	4	4	27	12	13	6	25	23	0	0	0	**122**
MH	0	125	3	14	47	43	258	110	114	56	213	195	0	0	0	**1,177**
OBUS	3	737	16	82	295	279	1,743	723	790	389	1,442	1,152	0	0	0	**7,648**
SBUS	2	409	9	43	154	141	844	360	373	185	697	639	0	0	0	**3,854**
T6	34	8,290	185	870	3,125	2,850	17,086	7,284	7,559	3,742	14,126	12,943	1	0	0	**78,060**
T7	242	58,248	1,297	6,121	21,957	20,023	120,045	51,177	53,112	26,292	99,248	90,939	6	0	0	**548,464**
UBUS	2	715	19	116	446	433	2,748	1,227	1,321	670	2,558	2,340	0	0	0	**12,593**
Total	**294**	**71,315**	**1,605**	**7,699**	**27,765**	**25,459**	**153,438**	**65,667**	**68,419**	**33,945**	**128,258**	**108,548**	**7**	**0**	**0**	**692,418**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,094,134	1,899,799	1,899,799

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,422,450,000	2,610	358457	22.0	7.8	327,813
Commercial	1,570,085,283	7,503	395661	24.3	8.6	361,836
Industrial	*					0
Total	**2,992,535,283**		**754,119**	**46.4**	**16.5**	**689,649**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	68,192,726	125	398,927	37.5	0.8	362,832
Commercial	74,128,922	354	433,654	40.8	0.8	394,417
Industrial	*					0
Total	**142,321,648**		**832,582**	**78.3**	**1.6**	**757,250**

Notes and Sources:

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

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

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

- Emission Factor: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

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

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	1,019	0.1600	0.0100	930
Fresno	545,000	597	0	0	545
Percent Fresno/Fresno County	58.6%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	920	0.360	0.08000	864
Fresno	545,000	539	0	0	506
Percent Fresno/Fresno County	58.6%				

Total Fresno **1,051**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California

Emissions (MMTCO2e)	18.69
Population	37,253,956
Emissions (MTCO2e per person)	0.50

Fresno

Population	545,000
Emissions (MTCO2e per person)	273,422

(estimated by using California per person emissions)

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

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

Community Greenhouse Gas Inventory

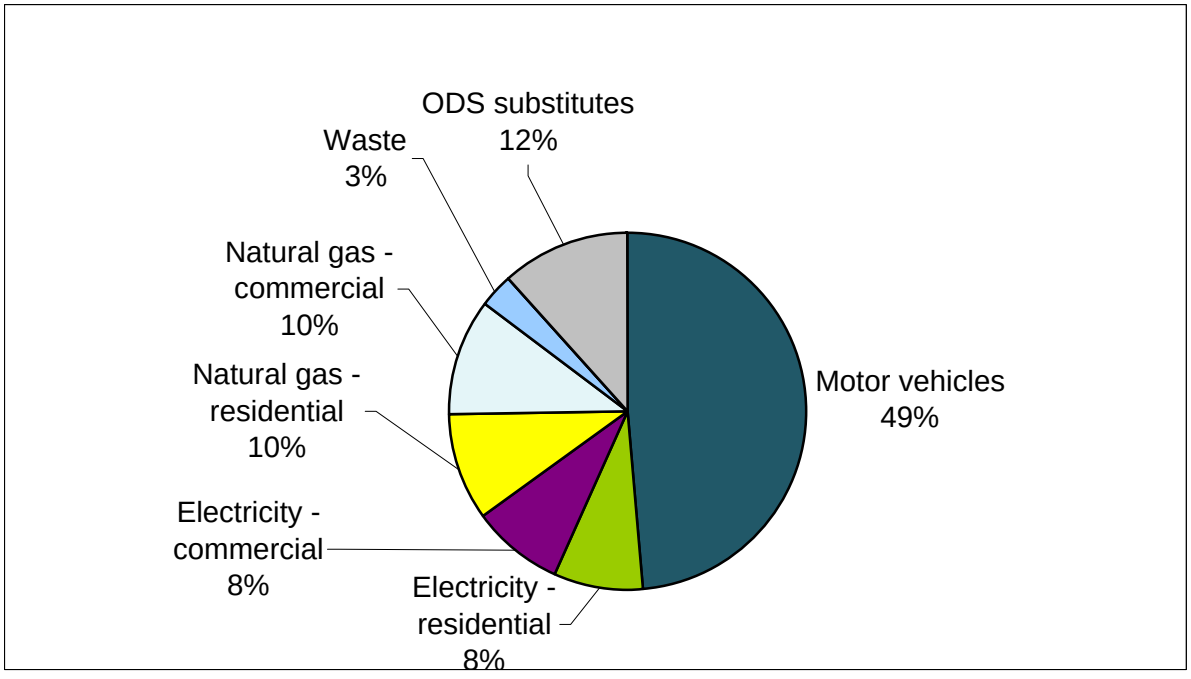
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,383,023	2,383,023
Electricity - residential	390,488	
Electricity - commercial	415,012	
Natural gas - residential	476,679	
Natural gas - commercial	514,647	
Waste	147,628	
Offroad equipment	1,138	
ODS substitutes	576,784	
Total	***4,905,399***	



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,195,062,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	919	267550	7257	43370	166878	162121	1027734	459069	493935	250520	956669	875168	60	0	0
LDT1	128	37366	1014	6057	23306	22642	143534	64114	68983	34988	133609	122226	8	0	0
LDT2	365	106233	2881	17220	66260	64371	408069	182276	196120	99470	379852	347491	24	0	0
LHD1	61	17716	481	2872	11050	10735	68051	30397	32706	16588	63346	57949	4	0	0
LHD2	7	1964	53	318	1225	1190	7544	3370	3626	1839	7022	6424	0	0	0
MCY	12	3626	98	588	2262	2197	13929	6222	6695	3395	12966	11862	1	0	0
MDV	443	128852	3495	20887	80369	78078	494958	221088	237880	120651	460733	421482	29	0	0
MH	3	1009	27	164	629	611	3876	1731	1863	945	3608	3301	0	0	0
OBUS	2	674	18	109	420	408	2587	1156	1243	631	2408	2203	0	0	0
SBUS	0	143	4	23	89	87	550	246	265	134	512	469	0	0	0
T6	4	1178	32	191	735	714	4525	2021	2175	1103	4212	3853	0	0	0
T7	1	167	5	27	104	101	642	287	309	157	598	547	0	0	0
UBUS	1	368	10	60	229	223	1413	631	679	345	1316	1204	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	725	20	118	452	439	2785	1244	1338	679	2592	2371	0	0	0
LDT1	0	57	2	9	35	34	219	98	105	53	203	186	0	0	0
LDT2	0	50	1	8	31	30	192	86	92	47	178	163	0	0	0
LHD1	44	12709	345	2060	7927	7701	48820	21807	23463	11900	45444	41573	3	0	0
LHD2	10	3033	82	492	1892	1838	11651	5204	5600	2840	10846	9922	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	58	2	9	36	35	224	100	108	55	209	191	0	0	0
MH	1	181	5	29	113	109	694	310	333	169	646	591	0	0	0
OBUS	3	926	25	150	578	561	3558	1590	1710	867	3312	3030	0	0	0
SBUS	2	584	16	95	364	354	2244	1002	1078	547	2089	1911	0	0	0
T6	41	11960	324	1939	7460	7247	45943	20522	22080	11199	42766	39123	3	0	0
T7	188	54720	1484	8870	34131	33158	210196	93890	101021	51237	195661	178993	12	0	0
UBUS	3	851	23	138	530	515	3267	1459	1570	796	3041	2782	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	413	89,687	1,879	8,895	28,397	23,744	134,567	55,648	57,630	29,199	115,608	113,717	9	0	0	**658,979**
LDT1	66	14,297	299	1,419	4,530	3,788	21,465	8,879	9,195	4,659	18,445	18,145	1	0	0	**105,122**
LDT2	226	49,080	1,028	4,868	15,543	12,996	73,652	30,460	31,544	15,982	63,278	62,245	5	0	0	**360,683**
LHD1	61	14,483	269	1,160	3,407	2,670	14,422	5,800	5,936	3,026	12,269	0	0	0	0	**63,442**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,606	30	129	378	296	1,599	643	658	335	1,360	0	0	0	0	**7,033**
MCY	1	298	7	36	124	109	638	266	272	134	503	461	0	0	0	**2,849**
MDV	341	74,017	1,551	7,340	23,435	19,595	111,052	45,923	47,559	24,096	95,405	93,844	7	0	0	**543,825**
MH	3	825	15	66	194	152	821	330	338	172	699	717	0	0	0	**4,331**
OBUS	2	551	10	44	130	102	548	221	226	115	466	479	0	0	0	**2,891**
SBUS	0	117	2	9	28	22	117	47	48	24	99	102	0	0	0	**615**
T6	4	963	18	77	227	178	959	386	395	201	816	837	0	0	0	**5,056**
T7	1	137	3	11	32	25	136	55	56	29	116	119	0	0	0	**718**
UBUS	1	301	6	24	71	55	300	120	123	63	255	262	0	0	0	**1,579**
Total	**1,127**	**246,360**	**5,116**	**24,079**	**76,495**	**63,732**	**360,276**	**148,778**	**153,982**	**78,036**	**309,319**	**290,928**	**22**	**0**	**0**	**1,758,250**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	106	3	17	66	64	406	181	195	99	378	346	0	0	0	**1,860**
LDT1	0	9	0	1	5	5	33	15	16	8	30	28	0	0	0	**150**
LDT2	0	7	0	1	5	5	29	13	14	7	27	24	0	0	0	**131**
LHD1	9	2,718	74	441	1,695	1,647	10,439	4,663	5,017	2,545	9,717	0	0	0	0	**38,955**
LHD2	2	651	18	106	406	395	2,502	1,118	1,202	610	2,329	0	0	0	0	**9,336**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	9	0	1	5	5	33	15	16	8	31	28	0	0	0	**152**
MH	1	157	3	17	59	54	323	138	143	71	267	245	0	0	0	**1,477**
OBUS	4	925	20	103	370	350	2,186	907	991	487	1,808	1,445	0	0	0	**9,594**
SBUS	2	513	11	54	194	176	1,058	451	468	232	875	802	0	0	0	**4,835**
T6	43	10,399	232	1,092	3,920	3,575	21,431	9,137	9,482	4,694	17,718	16,235	1	0	0	**97,915**
T7	304	73,063	1,627	7,678	27,542	25,116	150,579	64,194	66,621	32,979	124,492	114,070	8	0	0	**687,969**
UBUS	3	897	24	145	560	544	3,446	1,539	1,656	840	3,208	2,935	0	0	0	**15,796**
Total	**369**	**89,454**	**2,013**	**9,657**	**34,827**	**31,934**	**192,466**	**82,370**	**85,821**	**42,579**	**160,881**	**136,158**	**9**	**0**	**0**	**868,539**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,626,789	2,383,023	2,383,023

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

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Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
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Annual Growth Rate in VMT: 2.54% Source: Fresno COG

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Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
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LHD1	2.71%	1.95%
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MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
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LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

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UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	919	267550	7257	43370	166878	162121	1027734	459069	493935	250520	956669	875168	60	0	0
LDT1	128	37366	1014	6057	23306	22642	143534	64114	68983	34988	133609	122226	8	0	0
LDT2	365	106233	2881	17220	66260	64371	408069	182276	196120	99470	379852	347491	24	0	0
LHD1	61	17716	481	2872	11050	10735	68051	30397	32706	16588	63346	57949	4	0	0
LHD2	7	1964	53	318	1225	1190	7544	3370	3626	1839	7022	6424	0	0	0
MCY	12	3626	98	588	2262	2197	13929	6222	6695	3395	12966	11862	1	0	0
MDV	443	128852	3495	20887	80369	78078	494958	221088	237880	120651	460733	421482	29	0	0
MH	3	1009	27	164	629	611	3876	1731	1863	945	3608	3301	0	0	0
OBUS	2	674	18	109	420	408	2587	1156	1243	631	2408	2203	0	0	0
SBUS	0	143	4	23	89	87	550	246	265	134	512	469	0	0	0
T6	4	1178	32	191	735	714	4525	2021	2175	1103	4212	3853	0	0	0
T7	1	167	5	27	104	101	642	287	309	157	598	547	0	0	0
UBUS	1	368	10	60	229	223	1413	631	679	345	1316	1204	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	725	20	118	452	439	2785	1244	1338	679	2592	2371	0	0	0
LDT1	0	57	2	9	35	34	219	98	105	53	203	186	0	0	0
LDT2	0	50	1	8	31	30	192	86	92	47	178	163	0	0	0
LHD1	44	12709	345	2060	7927	7701	48820	21807	23463	11900	45444	41573	3	0	0
LHD2	10	3033	82	492	1892	1838	11651	5204	5600	2840	10846	9922	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	58	2	9	36	35	224	100	108	55	209	191	0	0	0
MH	1	181	5	29	113	109	694	310	333	169	646	591	0	0	0
OBUS	3	926	25	150	578	561	3558	1590	1710	867	3312	3030	0	0	0
SBUS	2	584	16	95	364	354	2244	1002	1078	547	2089	1911	0	0	0
T6	41	11960	324	1939	7460	7247	45943	20522	22080	11199	42766	39123	3	0	0
T7	188	54720	1484	8870	34131	33158	210196	93890	101021	51237	195661	178993	12	0	0
UBUS	3	851	23	138	530	515	3267	1459	1570	796	3041	2782	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	413	89,687	1,879	8,895	28,397	23,744	134,567	55,648	57,630	29,199	115,608	113,717	9	0	0	**658,979**
LDT1	66	14,297	299	1,419	4,530	3,788	21,465	8,879	9,195	4,659	18,445	18,145	1	0	0	**105,122**
LDT2	226	49,080	1,028	4,868	15,543	12,996	73,652	30,460	31,544	15,982	63,278	62,245	5	0	0	**360,683**
LHD1	61	14,483	269	1,160	3,407	2,670	14,422	5,800	5,936	3,026	12,269	0	0	0	0	**63,442**

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LHD2	7	1,606	30	129	378	296	1,599	643	658	335	1,360	0	0	0	0	**7,033**
MCY	1	298	7	36	124	109	638	266	272	134	503	461	0	0	0	**2,849**
MDV	341	74,017	1,551	7,340	23,435	19,595	111,052	45,923	47,559	24,096	95,405	93,844	7	0	0	**543,825**
MH	3	825	15	66	194	152	821	330	338	172	699	717	0	0	0	**4,331**
OBUS	2	551	10	44	130	102	548	221	226	115	466	479	0	0	0	**2,891**
SBUS	0	117	2	9	28	22	117	47	48	24	99	102	0	0	0	**615**
T6	4	963	18	77	227	178	959	386	395	201	816	837	0	0	0	**5,056**
T7	1	137	3	11	32	25	136	55	56	29	116	119	0	0	0	**718**
UBUS	1	301	6	24	71	55	300	120	123	63	255	262	0	0	0	**1,579**
Total	**1,127**	**246,360**	**5,116**	**24,079**	**76,495**	**63,732**	**360,276**	**148,778**	**153,982**	**78,036**	**309,319**	**290,928**	**22**	**0**	**0**	**1,758,250**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	106	3	17	66	64	406	181	195	99	378	346	0	0	0	**1,860**
LDT1	0	9	0	1	5	5	33	15	16	8	30	28	0	0	0	**150**
LDT2	0	7	0	1	5	5	29	13	14	7	27	24	0	0	0	**131**
LHD1	9	2,718	74	441	1,695	1,647	10,439	4,663	5,017	2,545	9,717	0	0	0	0	**38,955**
LHD2	2	651	18	106	406	395	2,502	1,118	1,202	610	2,329	0	0	0	0	**9,336**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	9	0	1	5	5	33	15	16	8	31	28	0	0	0	**152**
MH	1	157	3	17	59	54	323	138	143	71	267	245	0	0	0	**1,477**
OBUS	4	925	20	103	370	350	2,186	907	991	487	1,808	1,445	0	0	0	**9,594**
SBUS	2	513	11	54	194	176	1,058	451	468	232	875	802	0	0	0	**4,835**
T6	43	10,399	232	1,092	3,920	3,575	21,431	9,137	9,482	4,694	17,718	16,235	1	0	0	**97,915**
T7	304	73,063	1,627	7,678	27,542	25,116	150,579	64,194	66,621	32,979	124,492	114,070	8	0	0	**687,969**
UBUS	3	897	24	145	560	544	3,446	1,539	1,656	840	3,208	2,935	0	0	0	**15,796**
Total	**369**	**89,454**	**2,013**	**9,657**	**34,827**	**31,934**	**192,466**	**82,370**	**85,821**	**42,579**	**160,881**	**136,158**	**9**	**0**	**0**	**868,539**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,626,789	2,383,023	2,383,023

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	426992	26.3	9.3	390,488
Commercial	1,800,825,042	7,503	453808	27.9	9.9	415,012
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**880,800**	**54.2**	**19.2**	**805,500**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

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

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

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

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

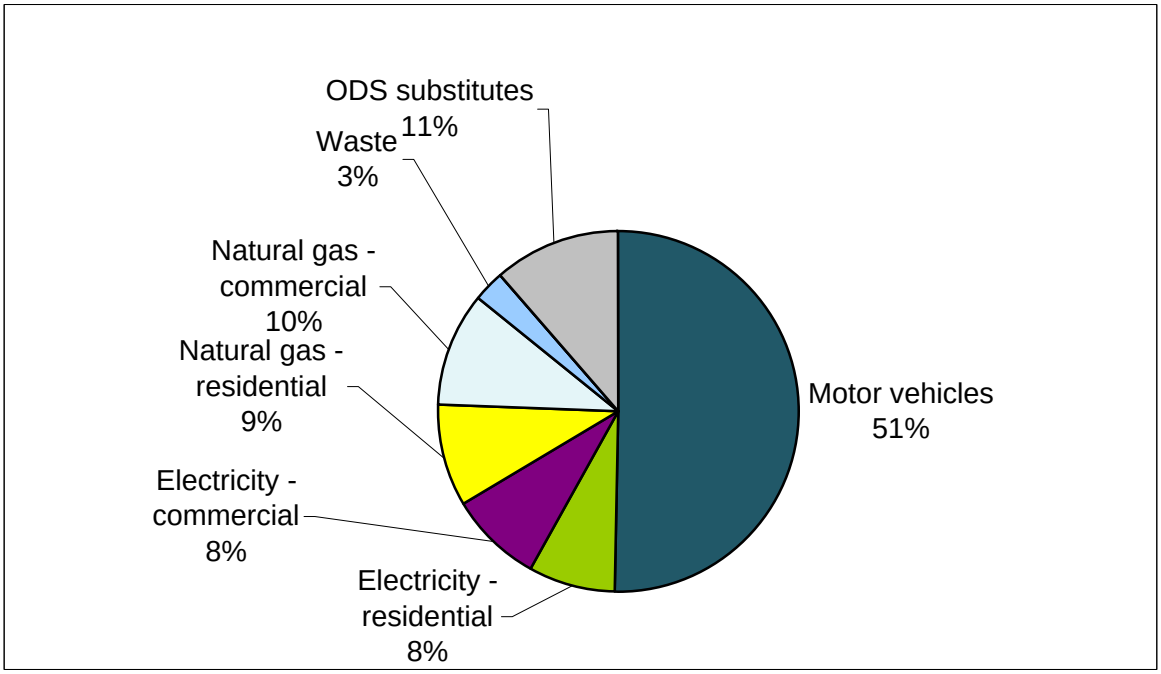
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,107,859	3,107,859
Electricity - residential	469,524	
Electricity - commercial	509,781	
Natural gas - residential	573,160	
Natural gas - commercial	632,169	
Waste	177,508	
Offroad equipment	1,314	
ODS substitutes	694,734	
Total	***6,166,049***	



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1199	348930	9464	56561	217637	211433	1340336	598702	644174	326719	1247656	1141366	78	0	0
LDT1	167	48732	1322	7899	30395	29529	187192	83615	89966	45630	174248	159404	11	0	0
LDT2	476	138545	3758	22458	86414	83951	532189	237719	255773	129726	495390	453187	31	0	0
LHD1	79	23104	627	3745	14411	14000	88750	39643	42654	21634	82613	75575	5	0	0
LHD2	9	2561	69	415	1598	1552	9839	4395	4729	2398	9158	8378	1	0	0
MCY	16	4729	128	767	2950	2866	18166	8114	8731	4428	16910	15469	1	0	0
MDV	577	168045	4558	27240	104814	101826	645508	288336	310235	157348	600873	549683	38	0	0
MH	5	1316	36	213	821	797	5055	2258	2430	1232	4706	4305	0	0	0
OBUS	3	878	24	142	548	532	3374	1507	1622	822	3141	2873	0	0	0
SBUS	1	187	5	30	117	113	718	321	345	175	668	611	0	0	0
T6	5	1536	42	249	958	931	5902	2636	2836	1439	5494	5026	0	0	0
T7	1	218	6	35	136	132	838	374	403	204	780	713	0	0	0
UBUS	2	480	13	78	299	291	1843	823	886	449	1716	1570	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	945	26	153	590	573	3632	1622	1746	885	3381	3093	0	0	0
LDT1	0	74	2	12	46	45	285	127	137	69	265	243	0	0	0
LDT2	0	65	2	11	41	39	250	112	120	61	233	213	0	0	0
LHD1	57	16575	450	2687	10338	10044	63670	28440	30600	15520	59267	54218	4	0	0
LHD2	14	3956	107	641	2467	2397	15195	6787	7303	3704	14145	12940	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	76	2	12	48	46	293	131	141	71	273	249	0	0	0
MH	1	236	6	38	147	143	905	404	435	221	842	770	0	0	0
OBUS	4	1208	33	196	754	732	4641	2073	2230	1131	4320	3952	0	0	0
SBUS	3	762	21	123	475	462	2926	1307	1406	713	2724	2492	0	0	0
T6	54	15598	423	2528	9729	9452	59917	26764	28797	14605	55774	51023	4	0	0
T7	245	71364	1936	11568	44512	43243	274130	122449	131749	66822	255175	233436	16	0	0
UBUS	4	1109	30	180	692	672	4261	1903	2048	1039	3966	3628	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	538	116,967	2,451	11,600	37,034	30,966	175,497	72,575	75,160	38,080	150,772	148,306	11	0	0	**859,419**
LDT1	86	18,645	390	1,851	5,908	4,940	27,995	11,580	11,992	6,076	24,055	23,664	2	0	0	**137,097**
LDT2	295	64,009	1,341	6,349	20,270	16,949	96,055	39,724	41,139	20,843	82,525	81,178	6	0	0	**470,391**
LHD1	80	18,888	350	1,513	4,444	3,482	18,809	7,564	7,742	3,946	16,001	0	0	0	0	**82,739**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,094	39	168	493	386	2,085	839	858	437	1,774	0	0	0	0	**9,172**
MCY	1	388	9	47	162	143	832	347	355	174	656	602	0	0	0	**3,715**
MDV	444	96,530	2,022	9,573	30,563	25,555	144,830	59,892	62,025	31,426	124,424	122,389	9	0	0	**709,239**
MH	5	1,076	20	86	253	198	1,071	431	441	225	911	935	0	0	0	**5,648**
OBUS	3	718	13	58	169	132	715	288	294	150	608	624	0	0	0	**3,770**
SBUS	1	153	3	12	36	28	152	61	63	32	129	133	0	0	0	**802**
T6	5	1,256	23	101	295	232	1,251	503	515	262	1,064	1,092	0	0	0	**6,594**
T7	1	178	3	14	42	33	178	71	73	37	151	155	0	0	0	**936**
UBUS	2	392	7	31	92	72	391	157	161	82	332	341	0	0	0	**2,059**
Total	**1,469**	**321,295**	**6,673**	**31,403**	**99,762**	**83,117**	**469,860**	**194,032**	**200,818**	**101,772**	**403,403**	**379,419**	**29**	**0**	**0**	**2,293,051**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	138	4	22	86	83	529	236	254	129	493	451	0	0	0	**2,425**
LDT1	0	11	0	2	7	7	43	19	21	10	40	36	0	0	0	**196**
LDT2	0	10	0	2	6	6	37	17	18	9	35	32	0	0	0	**171**
LHD1	12	3,544	96	575	2,211	2,148	13,615	6,081	6,543	3,319	12,673	0	0	0	0	**50,804**
LHD2	3	849	23	138	530	515	3,263	1,457	1,568	795	3,037	0	0	0	0	**12,176**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	11	0	2	7	7	43	19	21	11	40	37	0	0	0	**199**
MH	1	204	5	22	77	70	421	180	186	92	348	319	0	0	0	**1,926**
OBUS	5	1,206	27	135	483	456	2,851	1,183	1,293	636	2,359	1,885	0	0	0	**12,512**
SBUS	3	670	15	70	252	230	1,380	588	611	302	1,141	1,045	0	0	0	**6,305**
T6	56	13,562	302	1,424	5,112	4,662	27,950	11,916	12,366	6,121	23,108	21,173	1	0	0	**127,698**
T7	396	95,287	2,122	10,014	35,920	32,755	196,380	83,720	86,885	43,010	162,358	148,766	10	0	0	**897,226**
UBUS	4	1,170	32	190	730	709	4,495	2,008	2,160	1,096	4,184	3,828	0	0	0	**20,600**
Total	**481**	**116,663**	**2,626**	**12,595**	**45,420**	**41,647**	**251,008**	**107,424**	**111,926**	**55,531**	**209,815**	**177,572**	**12**	**0**	**0**	**1,132,719**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,425,770	3,107,859	3,107,859

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Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

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UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1199	348930	9464	56561	217637	211433	1340336	598702	644174	326719	1247656	1141366	78	0	0
LDT1	167	48732	1322	7899	30395	29529	187192	83615	89966	45630	174248	159404	11	0	0
LDT2	476	138545	3758	22458	86414	83951	532189	237719	255773	129726	495390	453187	31	0	0
LHD1	79	23104	627	3745	14411	14000	88750	39643	42654	21634	82613	75575	5	0	0
LHD2	9	2561	69	415	1598	1552	9839	4395	4729	2398	9158	8378	1	0	0
MCY	16	4729	128	767	2950	2866	18166	8114	8731	4428	16910	15469	1	0	0
MDV	577	168045	4558	27240	104814	101826	645508	288336	310235	157348	600873	549683	38	0	0
MH	5	1316	36	213	821	797	5055	2258	2430	1232	4706	4305	0	0	0
OBUS	3	878	24	142	548	532	3374	1507	1622	822	3141	2873	0	0	0
SBUS	1	187	5	30	117	113	718	321	345	175	668	611	0	0	0
T6	5	1536	42	249	958	931	5902	2636	2836	1439	5494	5026	0	0	0
T7	1	218	6	35	136	132	838	374	403	204	780	713	0	0	0
UBUS	2	480	13	78	299	291	1843	823	886	449	1716	1570	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	945	26	153	590	573	3632	1622	1746	885	3381	3093	0	0	0
LDT1	0	74	2	12	46	45	285	127	137	69	265	243	0	0	0
LDT2	0	65	2	11	41	39	250	112	120	61	233	213	0	0	0
LHD1	57	16575	450	2687	10338	10044	63670	28440	30600	15520	59267	54218	4	0	0
LHD2	14	3956	107	641	2467	2397	15195	6787	7303	3704	14145	12940	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	76	2	12	48	46	293	131	141	71	273	249	0	0	0
MH	1	236	6	38	147	143	905	404	435	221	842	770	0	0	0
OBUS	4	1208	33	196	754	732	4641	2073	2230	1131	4320	3952	0	0	0
SBUS	3	762	21	123	475	462	2926	1307	1406	713	2724	2492	0	0	0
T6	54	15598	423	2528	9729	9452	59917	26764	28797	14605	55774	51023	4	0	0
T7	245	71364	1936	11568	44512	43243	274130	122449	131749	66822	255175	233436	16	0	0
UBUS	4	1109	30	180	692	672	4261	1903	2048	1039	3966	3628	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	538	116,967	2,451	11,600	37,034	30,966	175,497	72,575	75,160	38,080	150,772	148,306	11	0	0	**859,419**
LDT1	86	18,645	390	1,851	5,908	4,940	27,995	11,580	11,992	6,076	24,055	23,664	2	0	0	**137,097**
LDT2	295	64,009	1,341	6,349	20,270	16,949	96,055	39,724	41,139	20,843	82,525	81,178	6	0	0	**470,391**
LHD1	80	18,888	350	1,513	4,444	3,482	18,809	7,564	7,742	3,946	16,001	0	0	0	0	**82,739**

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LHD2	9	2,094	39	168	493	386	2,085	839	858	437	1,774	0	0	0	0	**9,172**
MCY	1	388	9	47	162	143	832	347	355	174	656	602	0	0	0	**3,715**
MDV	444	96,530	2,022	9,573	30,563	25,555	144,830	59,892	62,025	31,426	124,424	122,389	9	0	0	**709,239**
MH	5	1,076	20	86	253	198	1,071	431	441	225	911	935	0	0	0	**5,648**
OBUS	3	718	13	58	169	132	715	288	294	150	608	624	0	0	0	**3,770**
SBUS	1	153	3	12	36	28	152	61	63	32	129	133	0	0	0	**802**
T6	5	1,256	23	101	295	232	1,251	503	515	262	1,064	1,092	0	0	0	**6,594**
T7	1	178	3	14	42	33	178	71	73	37	151	155	0	0	0	**936**
UBUS	2	392	7	31	92	72	391	157	161	82	332	341	0	0	0	**2,059**
Total	**1,469**	**321,295**	**6,673**	**31,403**	**99,762**	**83,117**	**469,860**	**194,032**	**200,818**	**101,772**	**403,403**	**379,419**	**29**	**0**	**0**	**2,293,051**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	138	4	22	86	83	529	236	254	129	493	451	0	0	0	**2,425**
LDT1	0	11	0	2	7	7	43	19	21	10	40	36	0	0	0	**196**
LDT2	0	10	0	2	6	6	37	17	18	9	35	32	0	0	0	**171**
LHD1	12	3,544	96	575	2,211	2,148	13,615	6,081	6,543	3,319	12,673	0	0	0	0	**50,804**
LHD2	3	849	23	138	530	515	3,263	1,457	1,568	795	3,037	0	0	0	0	**12,176**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	11	0	2	7	7	43	19	21	11	40	37	0	0	0	**199**
MH	1	204	5	22	77	70	421	180	186	92	348	319	0	0	0	**1,926**
OBUS	5	1,206	27	135	483	456	2,851	1,183	1,293	636	2,359	1,885	0	0	0	**12,512**
SBUS	3	670	15	70	252	230	1,380	588	611	302	1,141	1,045	0	0	0	**6,305**
T6	56	13,562	302	1,424	5,112	4,662	27,950	11,916	12,366	6,121	23,108	21,173	1	0	0	**127,698**
T7	396	95,287	2,122	10,014	35,920	32,755	196,380	83,720	86,885	43,010	162,358	148,766	10	0	0	**897,226**
UBUS	4	1,170	32	190	730	709	4,495	2,008	2,160	1,096	4,184	3,828	0	0	0	**20,600**
Total	**481**	**116,663**	**2,626**	**12,595**	**45,420**	**41,647**	**251,008**	**107,424**	**111,926**	**55,531**	**209,815**	**177,572**	**12**	**0**	**0**	**1,132,719**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,425,770	3,107,859	3,107,859

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

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Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

		Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
	(kWh/year)		CO2	CH4	N2O	MTCO2e
Residential	2,037,366,000	2,610	513416	31.6	11.2	469,524
Commercial	2,212,049,466	7,503	557436	34.3	12.2	509,781
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**1,070,853**	**65.9**	**23.4**	**979,305**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

		Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
	(therms/year)		CO2	CH4	N2O	MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

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

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

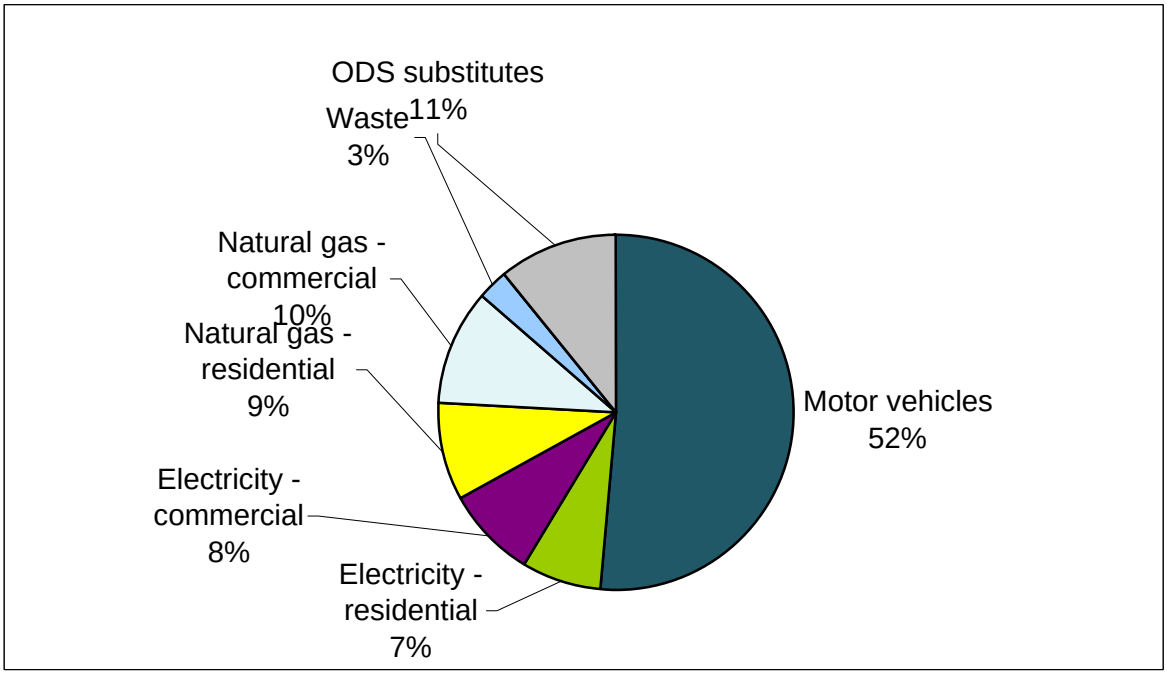
Summary
Year: 2050
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	912,600	Fresno COG
Employment	362,114	
County Information		
Population	1,521,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,832,694	3,832,694
Electricity - residential	548,921	
Electricity - commercial	626,137	
Natural gas - residential	670,082	
Natural gas - commercial	776,459	
Waste	207,525	
Offroad equipment	1,314	
ODS substitutes	812,214	
Total	***7,475,346***	



Community Greenhouse Gas Inventory

Waste

Year: **2050**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	207,525	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1479	430310	11672	69753	268396	260745	1652939	738335	794413	402919	1538643	1407563	97	0	0
LDT1	207	60097	1630	9742	37484	36416	230850	103116	110948	56272	214888	196581	14	0	0
LDT2	587	170857	4634	27696	106568	103530	656310	293161	315427	159982	610928	558882	38	0	0
LHD1	98	28493	773	4619	17772	17265	109449	48889	52602	26679	101881	93202	6	0	0
LHD2	11	3159	86	512	1970	1914	12133	5420	5831	2958	11294	10332	1	0	0
MCY	20	5832	158	945	3638	3534	22403	10007	10767	5461	20854	19077	1	0	0
MDV	712	207238	5621	33593	129260	125575	796057	355583	382590	194046	741013	677884	47	0	0
MH	6	1623	44	263	1012	983	6234	2785	2996	1520	5803	5309	0	0	0
OBUS	4	1083	29	176	676	656	4161	1859	2000	1014	3873	3543	0	0	0
SBUS	1	230	6	37	144	140	885	395	426	216	824	754	0	0	0
T6	7	1895	51	307	1182	1148	7278	3251	3498	1774	6775	6198	0	0	0
T7	1	269	7	44	168	163	1033	461	496	252	961	880	0	0	0
UBUS	2	592	16	96	369	359	2273	1015	1092	554	2116	1936	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1166	32	189	727	707	4479	2001	2153	1092	4169	3814	0	0	0
LDT1	0	92	2	15	57	55	352	157	169	86	327	299	0	0	0
LDT2	0	80	2	13	50	49	308	138	148	75	287	262	0	0	0
LHD1	70	20441	554	3313	12750	12386	78519	35073	37737	19140	73090	66863	5	0	0
LHD2	17	4878	132	791	3043	2956	18739	8370	9006	4568	17443	15957	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	94	3	15	59	57	361	161	174	88	336	307	0	0	0
MH	1	290	8	47	181	176	1116	498	536	272	1039	950	0	0	0
OBUS	5	1490	40	242	929	903	5723	2556	2751	1395	5327	4874	0	0	0
SBUS	3	940	25	152	586	569	3609	1612	1734	880	3359	3073	0	0	0
T6	66	19236	522	3118	11998	11656	73892	33006	35513	18012	68782	62922	4	0	0
T7	302	88008	2387	14266	54893	53328	338065	151007	162476	82406	314689	287880	20	0	0
UBUS	5	1368	37	222	853	829	5254	2347	2525	1281	4891	4474	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	664	144,247	3,022	14,305	45,672	38,189	216,428	89,501	92,689	46,962	185,936	182,895	14	0	0	**1,059,859**
LDT1	106	22,994	481	2,282	7,286	6,092	34,524	14,280	14,789	7,493	29,665	29,183	2	0	0	**169,072**
LDT2	363	78,938	1,654	7,830	24,998	20,902	118,457	48,989	50,734	25,705	101,772	100,111	8	0	0	**580,098**
LHD1	99	23,293	432	1,866	5,480	4,294	23,196	9,328	9,547	4,867	19,733	0	0	0	0	**102,036**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	11	2,582	48	207	608	476	2,571	1,034	1,058	539	2,188	0	0	0	0	**11,311**
MCY	2	479	11	58	200	176	1,025	428	438	215	808	742	0	0	0	**4,582**
MDV	548	119,044	2,494	11,806	37,691	31,515	178,608	73,860	76,491	38,755	153,443	150,933	12	0	0	**874,652**
MH	6	1,327	25	106	312	245	1,321	531	544	277	1,124	1,154	0	0	0	**6,966**
OBUS	4	886	16	71	208	163	882	355	363	185	750	770	0	0	0	**4,649**
SBUS	1	188	3	15	44	35	188	75	77	39	160	164	0	0	0	**989**
T6	7	1,549	29	124	364	286	1,542	620	635	324	1,312	1,347	0	0	0	**8,132**
T7	1	220	4	18	52	41	219	88	90	46	186	191	0	0	0	**1,154**
UBUS	2	484	9	39	114	89	482	194	198	101	410	421	0	0	0	**2,540**
Total	**1,812**	**396,229**	**8,229**	**38,727**	**123,029**	**102,502**	**579,444**	**239,285**	**247,654**	**125,507**	**497,488**	**467,910**	**36**	**0**	**0**	**2,827,852**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	170	5	28	106	103	653	292	314	159	607	556	0	0	0	**2,991**
LDT1	0	14	0	2	9	8	53	24	25	13	49	45	0	0	0	**241**
LDT2	0	12	0	2	7	7	46	21	22	11	43	39	0	0	0	**210**
LHD1	15	4,371	119	709	2,726	2,649	16,790	7,500	8,069	4,093	15,629	0	0	0	0	**62,653**
LHD2	4	1,048	28	170	653	635	4,024	1,797	1,934	981	3,746	0	0	0	0	**15,016**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	9	8	53	24	26	13	50	46	0	0	0	**245**
MH	1	252	6	28	95	87	520	222	230	114	430	394	0	0	0	**2,375**
OBUS	6	1,488	33	166	595	562	3,516	1,459	1,594	784	2,909	2,325	0	0	0	**15,430**
SBUS	3	826	18	87	311	284	1,702	726	753	373	1,407	1,289	0	0	0	**7,776**
T6	70	16,725	372	1,756	6,305	5,749	34,469	14,695	15,250	7,549	28,497	26,111	2	0	0	**157,480**
T7	489	117,510	2,617	12,349	44,297	40,394	242,181	103,245	107,149	53,041	200,224	183,462	13	0	0	**1,106,484**
UBUS	5	1,443	39	234	900	874	5,543	2,476	2,664	1,351	5,160	4,720	0	0	0	**25,405**
Total	**593**	**143,872**	**3,238**	**15,532**	**56,013**	**51,361**	**309,549**	**132,478**	**138,030**	**68,482**	**258,750**	**218,987**	**15**	**0**	**0**	**1,396,900**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,224,751	3,832,694	3,832,694

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1479	430310	11672	69753	268396	260745	1652939	738335	794413	402919	1538643	1407563	97	0	0
LDT1	207	60097	1630	9742	37484	36416	230850	103116	110948	56272	214888	196581	14	0	0
LDT2	587	170857	4634	27696	106568	103530	656310	293161	315427	159982	610928	558882	38	0	0
LHD1	98	28493	773	4619	17772	17265	109449	48889	52602	26679	101881	93202	6	0	0
LHD2	11	3159	86	512	1970	1914	12133	5420	5831	2958	11294	10332	1	0	0
MCY	20	5832	158	945	3638	3534	22403	10007	10767	5461	20854	19077	1	0	0
MDV	712	207238	5621	33593	129260	125575	796057	355583	382590	194046	741013	677884	47	0	0
MH	6	1623	44	263	1012	983	6234	2785	2996	1520	5803	5309	0	0	0
OBUS	4	1083	29	176	676	656	4161	1859	2000	1014	3873	3543	0	0	0
SBUS	1	230	6	37	144	140	885	395	426	216	824	754	0	0	0
T6	7	1895	51	307	1182	1148	7278	3251	3498	1774	6775	6198	0	0	0
T7	1	269	7	44	168	163	1033	461	496	252	961	880	0	0	0
UBUS	2	592	16	96	369	359	2273	1015	1092	554	2116	1936	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1166	32	189	727	707	4479	2001	2153	1092	4169	3814	0	0	0
LDT1	0	92	2	15	57	55	352	157	169	86	327	299	0	0	0
LDT2	0	80	2	13	50	49	308	138	148	75	287	262	0	0	0
LHD1	70	20441	554	3313	12750	12386	78519	35073	37737	19140	73090	66863	5	0	0
LHD2	17	4878	132	791	3043	2956	18739	8370	9006	4568	17443	15957	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	94	3	15	59	57	361	161	174	88	336	307	0	0	0
MH	1	290	8	47	181	176	1116	498	536	272	1039	950	0	0	0
OBUS	5	1490	40	242	929	903	5723	2556	2751	1395	5327	4874	0	0	0
SBUS	3	940	25	152	586	569	3609	1612	1734	880	3359	3073	0	0	0
T6	66	19236	522	3118	11998	11656	73892	33006	35513	18012	68782	62922	4	0	0
T7	302	88008	2387	14266	54893	53328	338065	151007	162476	82406	314689	287880	20	0	0
UBUS	5	1368	37	222	853	829	5254	2347	2525	1281	4891	4474	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	664	144,247	3,022	14,305	45,672	38,189	216,428	89,501	92,689	46,962	185,936	182,895	14	0	0	**1,059,859**
LDT1	106	22,994	481	2,282	7,286	6,092	34,524	14,280	14,789	7,493	29,665	29,183	2	0	0	**169,072**
LDT2	363	78,938	1,654	7,830	24,998	20,902	118,457	48,989	50,734	25,705	101,772	100,111	8	0	0	**580,098**
LHD1	99	23,293	432	1,866	5,480	4,294	23,196	9,328	9,547	4,867	19,733	0	0	0	0	**102,036**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
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LHD2	11	2,582	48	207	608	476	2,571	1,034	1,058	539	2,188	0	0	0	0	**11,311**
MCY	2	479	11	58	200	176	1,025	428	438	215	808	742	0	0	0	**4,582**
MDV	548	119,044	2,494	11,806	37,691	31,515	178,608	73,860	76,491	38,755	153,443	150,933	12	0	0	**874,652**
MH	6	1,327	25	106	312	245	1,321	531	544	277	1,124	1,154	0	0	0	**6,966**
OBUS	4	886	16	71	208	163	882	355	363	185	750	770	0	0	0	**4,649**
SBUS	1	188	3	15	44	35	188	75	77	39	160	164	0	0	0	**989**
T6	7	1,549	29	124	364	286	1,542	620	635	324	1,312	1,347	0	0	0	**8,132**
T7	1	220	4	18	52	41	219	88	90	46	186	191	0	0	0	**1,154**
UBUS	2	484	9	39	114	89	482	194	198	101	410	421	0	0	0	**2,540**
Total	**1,812**	**396,229**	**8,229**	**38,727**	**123,029**	**102,502**	**579,444**	**239,285**	**247,654**	**125,507**	**497,488**	**467,910**	**36**	**0**	**0**	**2,827,852**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	170	5	28	106	103	653	292	314	159	607	556	0	0	0	**2,991**
LDT1	0	14	0	2	9	8	53	24	25	13	49	45	0	0	0	**241**
LDT2	0	12	0	2	7	7	46	21	22	11	43	39	0	0	0	**210**
LHD1	15	4,371	119	709	2,726	2,649	16,790	7,500	8,069	4,093	15,629	0	0	0	0	**62,653**
LHD2	4	1,048	28	170	653	635	4,024	1,797	1,934	981	3,746	0	0	0	0	**15,016**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	9	8	53	24	26	13	50	46	0	0	0	**245**
MH	1	252	6	28	95	87	520	222	230	114	430	394	0	0	0	**2,375**
OBUS	6	1,488	33	166	595	562	3,516	1,459	1,594	784	2,909	2,325	0	0	0	**15,430**
SBUS	3	826	18	87	311	284	1,702	726	753	373	1,407	1,289	0	0	0	**7,776**
T6	70	16,725	372	1,756	6,305	5,749	34,469	14,695	15,250	7,549	28,497	26,111	2	0	0	**157,480**
T7	489	117,510	2,617	12,349	44,297	40,394	242,181	103,245	107,149	53,041	200,224	183,462	13	0	0	**1,106,484**
UBUS	5	1,443	39	234	900	874	5,543	2,476	2,664	1,351	5,160	4,720	0	0	0	**25,405**
Total	**593**	**143,872**	**3,238**	**15,532**	**56,013**	**51,361**	**309,549**	**132,478**	**138,030**	**68,482**	**258,750**	**218,987**	**15**	**0**	**0**	**1,396,900**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,224,751	3,832,694	3,832,694

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2050

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,381,886,000	2,610	600235	36.9	13.1	548,921
Commercial	2,716,941,342	7,503	684669	42.1	14.9	626,137
Industrial	0		0	0.0	0.0	0
Total	**5,098,827,342**		**1,284,904**	**79.0**	**28.0**	**1,175,058**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	125,938,800	138	736,742	69.3	1.4	670,082
Commercial	145,931,942	403	853,702	80.3	1.6	776,459
Industrial	0		0	0.0	0.0	0
Total	**271,870,742**		**1,590,444**	**149.5**	**3.0**	**1,446,540**

Notes and Sources:

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

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
*OFFROAD only provides emissions rates up to 2040. Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	912,600
	Emissions (MTCO2e per person)	812,214
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

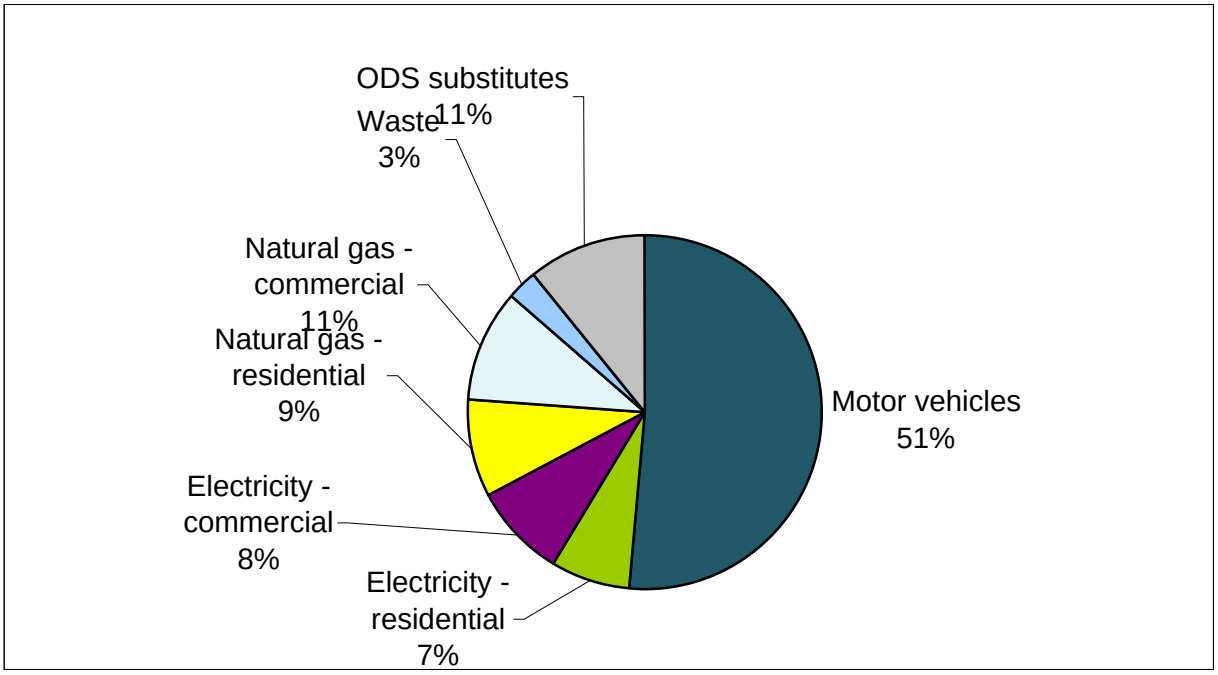
Summary
Year: 2056
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	970,000	Fresno COG
Employment	393,200	
County Information		
Population	1,616,667	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	4,122,629	4,122,629
Electricity - residential	583,447	
Electricity - commercial	679,888	
Natural gas - residential	712,228	
Natural gas - commercial	843,115	
Waste	220,578	
Offroad equipment	1,314	
ODS substitutes	863,300	
Total	***8,026,498***	



Community Greenhouse Gas Inventory

Waste

Year: **2056**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	220,578	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1590	462862	12555	75029	288699	280469	1777980	794189	854508	433399	1655038	1514041	104	0	0
LDT1	222	64643	1753	10479	40320	39170	248313	110917	119341	60529	231143	211452	15	0	0
LDT2	632	183782	4985	29791	114630	111362	705959	315338	339288	172084	657144	601160	41	0	0
LHD1	105	30648	831	4968	19116	18571	117729	52587	56581	28697	109588	100252	7	0	0
LHD2	12	3398	92	551	2119	2059	13051	5830	6272	3181	12149	11114	1	0	0
MCY	22	6273	170	1017	3913	3801	24098	10764	11581	5874	22431	20520	1	0	0
MDV	766	222915	6046	36134	139038	135074	856277	382482	411532	208725	797068	729164	50	0	0
MH	6	1746	47	283	1089	1058	6706	2995	3223	1635	6242	5710	0	0	0
OBUS	4	1165	32	189	727	706	4476	1999	2151	1091	4166	3811	0	0	0
SBUS	1	248	7	40	155	150	952	425	458	232	886	811	0	0	0
T6	7	2038	55	330	1271	1235	7829	3497	3763	1908	7287	6667	0	0	0
T7	1	289	8	47	180	175	1111	496	534	271	1034	946	0	0	0
UBUS	2	637	17	103	397	386	2445	1092	1175	596	2276	2082	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1254	34	203	782	760	4818	2152	2315	1174	4485	4103	0	0	0
LDT1	0	98	3	16	61	60	378	169	182	92	352	322	0	0	0
LDT2	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
LHD1	76	21987	596	3564	13714	13323	84459	37726	40592	20588	78619	71921	5	0	0
LHD2	18	5247	142	851	3273	3180	20157	9004	9687	4913	18763	17164	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	101	3	16	63	61	388	173	187	95	361	331	0	0	0
MH	1	312	8	51	195	189	1200	536	577	293	1117	1022	0	0	0
OBUS	6	1603	43	260	1000	971	6156	2750	2959	1501	5731	5242	0	0	0
SBUS	3	1011	27	164	630	612	3882	1734	1866	946	3614	3306	0	0	0
T6	71	20691	561	3354	12906	12538	79481	35503	38199	19374	73985	67682	5	0	0
T7	325	94666	2568	15345	59046	57363	363639	162430	174767	88640	338494	309657	21	0	0
UBUS	5	1471	40	239	918	892	5652	2525	2716	1378	5261	4813	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	714	155,159	3,251	15,388	49,127	41,078	232,800	96,271	99,700	50,514	200,001	196,731	15	0	0	**1,140,034**
LDT1	114	24,733	518	2,455	7,837	6,553	37,135	15,361	15,907	8,059	31,909	31,391	2	0	0	**181,861**
LDT2	391	84,909	1,779	8,422	26,889	22,484	127,418	52,695	54,572	27,649	109,471	107,684	8	0	0	**623,981**
LHD1	106	25,055	465	2,007	5,895	4,619	24,950	10,034	10,270	5,235	21,226	0	0	0	0	**109,755**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
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LHD2	12	2,778	52	222	653	512	2,766	1,112	1,138	580	2,353	0	0	0	0	**12,167**
MCY	2	515	12	63	215	189	1,103	461	471	231	870	798	0	0	0	**4,928**
MDV	589	128,049	2,683	12,699	40,542	33,899	192,120	79,448	82,278	41,687	165,051	162,351	12	0	0	**940,817**
MH	6	1,427	26	114	336	263	1,421	572	585	298	1,209	1,241	0	0	0	**7,493**
OBUS	4	953	18	76	224	176	949	381	390	199	807	828	0	0	0	**5,001**
SBUS	1	203	4	16	48	37	202	81	83	42	172	176	0	0	0	**1,064**
T6	7	1,666	31	133	392	307	1,659	667	683	348	1,411	1,449	0	0	0	**8,747**
T7	1	236	4	19	56	44	235	95	97	49	200	206	0	0	0	**1,241**
UBUS	2	520	10	42	122	96	518	208	213	109	441	452	0	0	0	**2,732**
Total	**1,949**	**426,203**	**8,851**	**41,657**	**132,336**	**110,256**	**623,277**	**257,386**	**266,388**	**135,002**	**535,121**	**503,306**	**39**	**0**	**0**	**3,041,772**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	183	5	30	114	111	702	314	337	171	653	598	0	0	0	**3,217**
LDT1	0	15	0	2	9	9	57	25	27	14	53	48	0	0	0	**260**
LDT2	0	13	0	2	8	8	49	22	24	12	46	42	0	0	0	**226**
LHD1	16	4,702	128	762	2,932	2,849	18,060	8,067	8,680	4,402	16,811	0	0	0	0	**67,393**
LHD2	4	1,127	31	183	703	683	4,328	1,933	2,080	1,055	4,029	0	0	0	0	**16,151**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	15	0	2	9	9	58	26	28	14	54	49	0	0	0	**264**
MH	1	271	6	30	102	93	559	238	247	122	462	423	0	0	0	**2,555**
OBUS	7	1,600	35	178	640	605	3,782	1,569	1,715	843	3,129	2,501	0	0	0	**16,597**
SBUS	4	888	20	93	335	305	1,831	780	810	401	1,514	1,387	0	0	0	**8,364**
T6	75	17,990	401	1,889	6,782	6,184	37,076	15,806	16,404	8,120	30,653	28,087	2	0	0	**169,393**
T7	526	126,400	2,815	13,284	47,648	43,450	260,502	111,056	115,254	57,054	215,371	197,341	14	0	0	**1,190,187**
UBUS	5	1,552	42	252	968	941	5,962	2,663	2,866	1,453	5,550	5,077	0	0	0	**27,327**
Total	**638**	**154,755**	**3,483**	**16,707**	**60,251**	**55,246**	**332,966**	**142,500**	**148,471**	**73,662**	**278,324**	**235,553**	**16**	**0**	**0**	**1,502,572**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,544,344	4,122,629	4,122,629

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
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Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

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Motor Vehicle Emissions (with Pavley I and LCFS)
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UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1590	462862	12555	75029	288699	280469	1777980	794189	854508	433399	1655038	1514041	104	0	0
LDT1	222	64643	1753	10479	40320	39170	248313	110917	119341	60529	231143	211452	15	0	0
LDT2	632	183782	4985	29791	114630	111362	705959	315338	339288	172084	657144	601160	41	0	0
LHD1	105	30648	831	4968	19116	18571	117729	52587	56581	28697	109588	100252	7	0	0
LHD2	12	3398	92	551	2119	2059	13051	5830	6272	3181	12149	11114	1	0	0
MCY	22	6273	170	1017	3913	3801	24098	10764	11581	5874	22431	20520	1	0	0
MDV	766	222915	6046	36134	139038	135074	856277	382482	411532	208725	797068	729164	50	0	0
MH	6	1746	47	283	1089	1058	6706	2995	3223	1635	6242	5710	0	0	0
OBUS	4	1165	32	189	727	706	4476	1999	2151	1091	4166	3811	0	0	0
SBUS	1	248	7	40	155	150	952	425	458	232	886	811	0	0	0
T6	7	2038	55	330	1271	1235	7829	3497	3763	1908	7287	6667	0	0	0
T7	1	289	8	47	180	175	1111	496	534	271	1034	946	0	0	0
UBUS	2	637	17	103	397	386	2445	1092	1175	596	2276	2082	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1254	34	203	782	760	4818	2152	2315	1174	4485	4103	0	0	0
LDT1	0	98	3	16	61	60	378	169	182	92	352	322	0	0	0
LDT2	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
LHD1	76	21987	596	3564	13714	13323	84459	37726	40592	20588	78619	71921	5	0	0
LHD2	18	5247	142	851	3273	3180	20157	9004	9687	4913	18763	17164	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	101	3	16	63	61	388	173	187	95	361	331	0	0	0
MH	1	312	8	51	195	189	1200	536	577	293	1117	1022	0	0	0
OBUS	6	1603	43	260	1000	971	6156	2750	2959	1501	5731	5242	0	0	0
SBUS	3	1011	27	164	630	612	3882	1734	1866	946	3614	3306	0	0	0
T6	71	20691	561	3354	12906	12538	79481	35503	38199	19374	73985	67682	5	0	0
T7	325	94666	2568	15345	59046	57363	363639	162430	174767	88640	338494	309657	21	0	0
UBUS	5	1471	40	239	918	892	5652	2525	2716	1378	5261	4813	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	714	155,159	3,251	15,388	49,127	41,078	232,800	96,271	99,700	50,514	200,001	196,731	15	0	0	**1,140,034**
LDT1	114	24,733	518	2,455	7,837	6,553	37,135	15,361	15,907	8,059	31,909	31,391	2	0	0	**181,861**
LDT2	391	84,909	1,779	8,422	26,889	22,484	127,418	52,695	54,572	27,649	109,471	107,684	8	0	0	**623,981**
LHD1	106	25,055	465	2,007	5,895	4,619	24,950	10,034	10,270	5,235	21,226	0	0	0	0	**109,755**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	12	2,778	52	222	653	512	2,766	1,112	1,138	580	2,353	0	0	0	0	**12,167**
MCY	2	515	12	63	215	189	1,103	461	471	231	870	798	0	0	0	**4,928**
MDV	589	128,049	2,683	12,699	40,542	33,899	192,120	79,448	82,278	41,687	165,051	162,351	12	0	0	**940,817**
MH	6	1,427	26	114	336	263	1,421	572	585	298	1,209	1,241	0	0	0	**7,493**
OBUS	4	953	18	76	224	176	949	381	390	199	807	828	0	0	0	**5,001**
SBUS	1	203	4	16	48	37	202	81	83	42	172	176	0	0	0	**1,064**
T6	7	1,666	31	133	392	307	1,659	667	683	348	1,411	1,449	0	0	0	**8,747**
T7	1	236	4	19	56	44	235	95	97	49	200	206	0	0	0	**1,241**
UBUS	2	520	10	42	122	96	518	208	213	109	441	452	0	0	0	**2,732**
Total	**1,949**	**426,203**	**8,851**	**41,657**	**132,336**	**110,256**	**623,277**	**257,386**	**266,388**	**135,002**	**535,121**	**503,306**	**39**	**0**	**0**	**3,041,772**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	183	5	30	114	111	702	314	337	171	653	598	0	0	0	**3,217**
LDT1	0	15	0	2	9	9	57	25	27	14	53	48	0	0	0	**260**
LDT2	0	13	0	2	8	8	49	22	24	12	46	42	0	0	0	**226**
LHD1	16	4,702	128	762	2,932	2,849	18,060	8,067	8,680	4,402	16,811	0	0	0	0	**67,393**
LHD2	4	1,127	31	183	703	683	4,328	1,933	2,080	1,055	4,029	0	0	0	0	**16,151**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	15	0	2	9	9	58	26	28	14	54	49	0	0	0	**264**
MH	1	271	6	30	102	93	559	238	247	122	462	423	0	0	0	**2,555**
OBUS	7	1,600	35	178	640	605	3,782	1,569	1,715	843	3,129	2,501	0	0	0	**16,597**
SBUS	4	888	20	93	335	305	1,831	780	810	401	1,514	1,387	0	0	0	**8,364**
T6	75	17,990	401	1,889	6,782	6,184	37,076	15,806	16,404	8,120	30,653	28,087	2	0	0	**169,393**
T7	526	126,400	2,815	13,284	47,648	43,450	260,502	111,056	115,254	57,054	215,371	197,341	14	0	0	**1,190,187**
UBUS	5	1,552	42	252	968	941	5,962	2,663	2,866	1,453	5,550	5,077	0	0	0	**27,327**
Total	**638**	**154,755**	**3,483**	**16,707**	**60,251**	**55,246**	**332,966**	**142,500**	**148,471**	**73,662**	**278,324**	**235,553**	**16**	**0**	**0**	**1,502,572**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,544,344	4,122,629	4,122,629

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,531,700,000	2,610	637988	39.2	13.9	583,447
Commercial	2,950,179,600	7,503	743445	45.7	16.2	679,888
Industrial	0		0	0.0	0.0	0
Total	**5,481,879,600**		**1,381,434**	**85.0**	**30.2**	**1,263,335**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	133,860,000	138	783,081	73.6	1.5	712,228
Commercial	158,459,600	403	926,989	87.2	1.7	843,115
Industrial	0		0	0.0	0.0	0
Total	**292,319,600**		**1,710,070**	**160.8**	**3.2**	**1,555,342**

Notes and Sources:

*Used the 2020 emission factor.

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population in 2035

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2056
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	970,000
	Emissions (MTCO2e per person)	863,300
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

Summary

Year: 2010

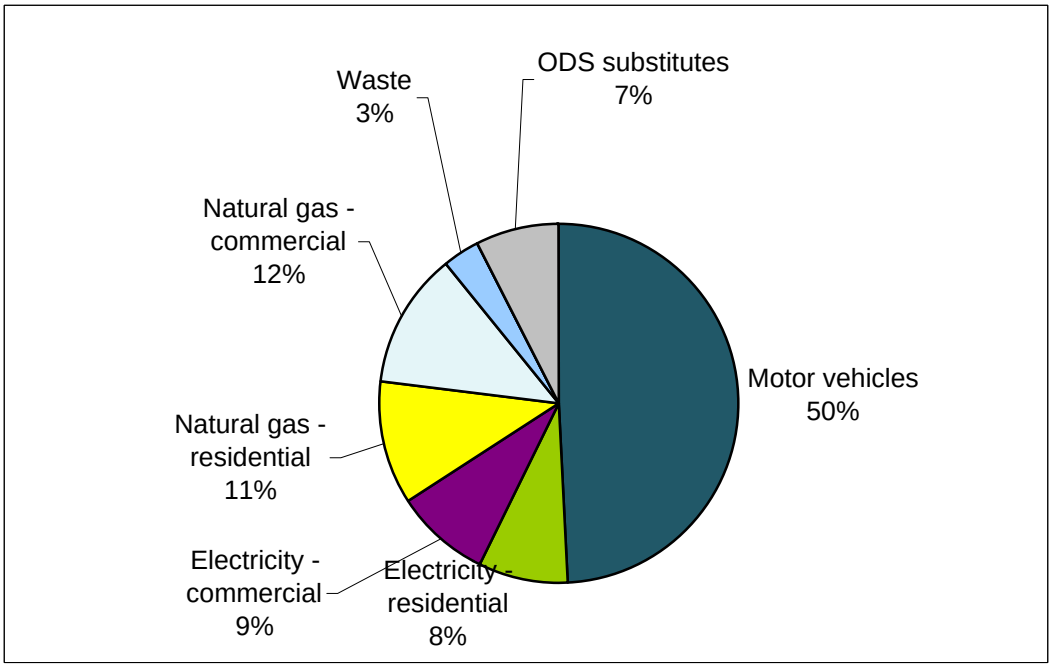
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	545,000	Fresno COG
Employment	209,261	Census 2011
County Information		
Population	930,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

- U.S. Census Bureau. 2011. 2009-2001 American Community Survey 3-Year Estimates Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%

Sources	**MTCO2e**
Motor vehicles	1,795,666
Electricity - residential	289,745
Electricity - commercial	319,817
Natural gas - residential	400,169
Natural gas - commercial	448,706
Waste	123,945
Offroad equipment	1,051
ODS substitutes	273,422
Total	***3,652,521***



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated		
Tons / year (instate)	333,099	
Percent Waste		
Mixed MSW	48.2	
Newspaper	1.3	
Office paper	10.1	
Corrugated cardboard	4.8	
Magazines/third class mail	1.2	
Food scraps	15.5	
Grass	1.9	
Leaves	1.9	
Branches	0.6	
Dimensional lumber	14.5	
Waste Emissions		
Emissions (MTCO2e)	123,945	SEEC 2013
Emissions (MTCO2e/person)	0.2274	Divide emissions by population

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

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

Waste Emissions: Statewide Energy Efficiency Collaborative (SEEC). July 2013. Climate and Energy Management Suite. Version 2. Website: cems.californiaseec.org. Model run by Michael Brandman Associates/FirstCarbon Solutions, output contained in Appendix. Note: it was assumed that the landfills have methane capture. According to the County of Fresno Agenda Item 21, March 11, 2008 regarding the Feasibility Study on Gas to Energy Conversion at Southeast Regional Disposal Site and Amercian Avenue Disposal Site, Amercian Avenue Disposal site had methane capture at that time; that site collects 83 percent of the waste for the City (http://www2.co.fresno.ca.us/0110a/Questys_Agenda/MG151925/AS151956/AS151970/AI151985/DO152036/DO_152036.PDF).

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 9,162,734 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 3,344,397,910 Source: VMT per day * 365 days/year
Annual VMT Growth Rate 2.48%

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.53%	0.10%
LDT1	6.25%	0.01%
LDT2	16.43%	0.01%
LHD1	2.91%	1.81%
LHD2	0.28%	0.48%
MCY	0.67%	0.00%
MDV	18.58%	0.01%
MH	0.16%	0.04%
OBUS	0.11%	0.11%
SBUS	0.02%	0.06%
T6	0.22%	1.31%
T7	0.04%	6.68%
UBUS	0.06%	0.14%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.5%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.2%	LDA, MCY
DSL	Heavy duty	8.3%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.3%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1119	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1283	958	740	586	486	419	374	347	334	333	345	371	415	445	0
LDT2	1533	1145	884	700	581	500	447	414	398	398	413	444	496	531	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	240	220	189	165	147	134	125	119	117	117	120	127	139	158	0
MDV	1926	1438	1111	880	730	628	562	520	501	500	519	558	623	668	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	404	389	366	351	341	335	333	334	338	346	358	376	404	444	0
LDT1	397	388	375	366	360	357	355	356	358	363	370	381	397	420	0
LDT2	394	384	369	359	353	349	347	348	350	356	364	376	393	420	0
LHD1	527	527	527	527	527	527	527	527	527	527	527	0	0	0	0
LHD2	527	527	527	527	527	527	527	527	527	527	527	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	453	422	376	345	325	314	309	310	319	334	359	397	452	534	0
MH	2377	2158	1772	1454	1304	1224	1158	1105	1066	1040	1028	1030	1045	0	0
OBUS	3053	2459	2002	1695	1580	1538	1519	1410	1434	1390	1350	1175	1355	0	0
SBUS	2639	2180	1790	1412	1317	1237	1169	1116	1077	1051	1039	1040	0	0	0
T6	2610	2156	1771	1397	1303	1223	1157	1104	1065	1039	1028	1029	1044	0	0
T7	4024	3324	2729	2152	2009	1886	1783	1702	1642	1602	1584	1587	1610	0	0
UBUS	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	778	226524	6144	36720	141289	137261	870141	388675	418195	212105	809974	740970	51	0	0
LDT1	112	32536	883	5274	20294	19715	124980	55826	60066	30465	116338	106427	7	0	0
LDT2	294	85491	2319	13858	53323	51803	328396	146688	157829	80050	305689	279646	19	0	0
LHD1	52	15159	411	2457	9455	9186	58231	26011	27986	14194	54205	49587	3	0	0
LHD2	5	1482	40	240	924	898	5692	2542	2735	1387	5298	4847	0	0	0
MCY	12	3463	94	561	2160	2098	13301	5941	6392	3242	12381	11326	1	0	0
MDV	332	96692	2623	15674	60309	58590	371420	165906	178506	90537	345737	316283	22	0	0
MH	3	808	22	131	504	489	3103	1386	1491	756	2888	2642	0	0	0
OBUS	2	556	15	90	347	337	2137	954	1027	521	1989	1820	0	0	0
SBUS	0	119	3	19	74	72	458	204	220	112	426	390	0	0	0
T6	4	1124	30	182	701	681	4317	1928	2075	1052	4019	3676	0	0	0
T7	1	191	5	31	119	115	732	327	352	178	681	623	0	0	0
UBUS	1	292	8	47	182	177	1123	502	540	274	1046	957	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	524	14	85	327	318	2014	900	968	491	1875	1715	0	0	0
LDT1	0	32	1	5	20	19	123	55	59	30	114	105	0	0	0
LDT2	0	33	1	5	21	20	126	56	61	31	118	108	0	0	0
LHD1	32	9392	255	1522	5858	5691	36078	16115	17339	8794	33584	30723	2	0	0
LHD2	9	2518	68	408	1571	1526	9673	4321	4649	2358	9004	8237	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	74	2	12	46	45	285	127	137	69	265	242	0	0	0
MH	1	190	5	31	119	115	730	326	351	178	680	622	0	0	0
OBUS	2	559	15	91	349	339	2147	959	1032	523	1998	1828	0	0	0
SBUS	1	321	9	52	200	195	1234	551	593	301	1148	1051	0	0	0
T6	23	6794	184	1101	4238	4117	26099	11658	12543	6362	24294	22224	2	0	0
T7	119	34752	943	5633	21676	21058	133493	59629	64157	32540	124262	113676	8	0	0
UBUS	2	721	20	117	450	437	2769	1237	1331	675	2578	2358	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	349	75,988	1,592	7,535	24,057	20,115	114,001	47,142	48,821	24,736	97,937	96,334	7	0	0	**558,266**
LDT1	58	12,512	262	1,242	3,964	3,314	18,781	7,768	8,044	4,076	16,137	15,874	1	0	0	**91,974**
LDT2	181	39,290	823	3,897	12,442	10,403	58,957	24,382	25,250	12,793	50,652	49,824	4	0	0	**288,718**
LHD1	53	12,393	230	993	2,916	2,285	12,341	4,963	5,080	2,589	10,499	0	0	0	0	**54,287**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
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LHD2	5	1,211	22	97	285	223	1,206	485	496	253	1,026	0	0	0	0	**5,306**
MCY	1	307	7	37	128	113	668	285	299	152	597	579	0	0	0	**3,171**
MDV	257	55,838	1,170	5,538	17,681	14,784	83,785	34,649	35,883	18,181	71,982	70,806	5	0	0	**410,303**
MH	3	660	12	53	155	122	658	264	271	138	559	574	0	0	0	**3,467**
OBUS	2	455	8	36	107	84	453	182	186	95	385	395	0	0	0	**2,388**
SBUS	0	97	2	8	23	18	97	39	40	20	83	85	0	0	0	**511**
T6	4	919	17	74	216	169	915	368	377	192	778	799	0	0	0	**4,824**
T7	1	156	3	12	37	29	155	62	64	33	132	135	0	0	0	**818**
UBUS	1	239	4	19	56	44	238	96	98	50	203	208	0	0	0	**1,255**
Total	**914**	**200,065**	**4,153**	**19,541**	**62,065**	**51,703**	**292,256**	**120,685**	**124,910**	**63,307**	**250,970**	**235,613**	**18**	**0**	**0**	**1,426,202**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	82	2	12	45	43	269	121	131	68	269	259	0	0	0	**1,302**
LDT1	0	5	0	1	3	3	18	8	8	4	17	16	0	0	0	**83**
LDT2	0	5	0	1	3	3	18	8	9	4	17	16	0	0	0	**84**
LHD1	7	1,987	54	322	1,239	1,204	7,632	3,409	3,668	1,860	7,104	0	0	0	0	**28,479**
LHD2	2	533	14	86	332	323	2,048	915	984	499	1,906	0	0	0	0	**7,641**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	13	0	2	6	6	35	16	17	9	38	39	0	0	0	**181**
MH	1	165	4	18	62	57	340	145	150	74	281	257	0	0	0	**1,552**
OBUS	2	552	12	62	221	209	1,310	543	594	292	1,083	862	0	0	0	**5,740**
SBUS	1	281	6	30	106	97	579	247	256	127	479	439	0	0	0	**2,647**
T6	24	5,882	131	618	2,217	2,022	12,123	5,168	5,364	2,655	10,023	9,184	1	0	0	**55,387**
T7	193	46,382	1,033	4,868	17,484	15,944	95,590	40,751	42,292	20,936	79,029	72,413	5	0	0	**436,726**
UBUS	3	744	20	121	464	451	2,857	1,276	1,373	696	2,659	2,433	0	0	0	**13,094**
Total	**233**	**56,630**	**1,277**	**6,139**	**22,183**	**20,360**	**122,817**	**52,606**	**54,847**	**27,226**	**102,906**	**85,918**	**6**	**0**	**0**	**553,147**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	1,979,350	1,795,666	1,795,666

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2010, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LDA	GAS	5	693	1118.51	1112.61	0.003%
Fresno	2010	LDA	DSL	5	2	403.71	399.40	0.000%
Fresno	2010	LDA	GAS	10	1884	835.50	831.08	0.008%
Fresno	2010	LDA	DSL	10	4	388.74	384.86	0.000%
Fresno	2010	LDA	GAS	15	1788	645.40	641.99	0.008%
Fresno	2010	LDA	DSL	15	4	366.25	362.99	0.000%
Fresno	2010	LDA	GAS	20	464306	511.10	508.40	2.031%
Fresno	2010	LDA	DSL	20	1075	351.09	348.26	0.005%
Fresno	2010	LDA	GAS	25	56285	424.07	421.84	0.246%
Fresno	2010	LDA	DSL	25	130	341.24	338.69	0.001%
Fresno	2010	LDA	GAS	30	172555	365.00	363.07	0.755%
Fresno	2010	LDA	DSL	30	399	335.48	333.09	0.002%
Fresno	2010	LDA	GAS	35	672123	326.31	324.59	2.940%
Fresno	2010	LDA	DSL	35	1556	333.12	330.79	0.007%
Fresno	2010	LDA	GAS	40	1261393	302.09	300.50	5.518%
Fresno	2010	LDA	DSL	40	2920	333.89	331.54	0.013%
Fresno	2010	LDA	GAS	45	1084869	290.77	289.23	4.746%
Fresno	2010	LDA	DSL	45	2511	337.89	335.43	0.011%
Fresno	2010	LDA	GAS	50	1492167	290.46	288.93	6.527%
Fresno	2010	LDA	DSL	50	3454	345.57	342.89	0.015%
Fresno	2010	LDA	GAS	55	1064211	301.16	299.57	4.655%
Fresno	2010	LDA	DSL	55	2464	357.86	354.83	0.011%
Fresno	2010	LDA	GAS	60	1286323	323.81	322.10	5.627%
Fresno	2010	LDA	DSL	60	2978	376.34	372.80	0.013%
Fresno	2010	LDA	GAS	65	1270026	361.82	359.91	5.556%
Fresno	2010	LDA	DSL	65	2940	403.61	399.31	0.013%
Fresno	2010	LDA	GAS	70	1123104	387.82	385.77	4.913%
Fresno	2010	LDA	DSL	70	2600	443.84	438.41	0.011%
Fresno	2010	LDT1	GAS	5	100	1283.31	1276.59	0.000%
Fresno	2010	LDT1	DSL	5	0	396.83	393.67	0.000%
Fresno	2010	LDT1	GAS	10	271	957.84	952.82	0.001%
Fresno	2010	LDT1	DSL	10	0	388.06	385.22	0.000%
Fresno	2010	LDT1	GAS	15	257	739.63	735.75	0.001%
Fresno	2010	LDT1	DSL	15	0	374.89	372.50	0.000%
Fresno	2010	LDT1	GAS	20	66689	586.30	583.23	0.292%
Fresno	2010	LDT1	DSL	20	65	366.01	363.94	0.000%
Fresno	2010	LDT1	GAS	25	8084	486.45	483.90	0.035%
Fresno	2010	LDT1	DSL	25	8	360.24	358.37	0.000%
Fresno	2010	LDT1	GAS	30	24784	418.68	416.49	0.108%
Fresno	2010	LDT1	DSL	30	24	356.87	355.11	0.000%
Fresno	2010	LDT1	GAS	35	96538	374.28	372.32	0.422%
Fresno	2010	LDT1	DSL	35	95	355.49	353.78	0.000%
Fresno	2010	LDT1	GAS	40	181176	346.55	344.74	0.793%
Fresno	2010	LDT1	DSL	40	178	355.94	354.22	0.001%
Fresno	2010	LDT1	GAS	45	155822	333.56	331.81	0.682%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LDT1	DSL	45	153	358.28	356.48	0.001%
Fresno	2010	LDT1	GAS	50	214323	333.21	331.46	0.938%
Fresno	2010	LDT1	DSL	50	210	362.78	360.81	0.001%
Fresno	2010	LDT1	GAS	55	152854	345.47	343.66	0.669%
Fresno	2010	LDT1	DSL	55	150	369.97	367.76	0.001%
Fresno	2010	LDT1	GAS	60	184757	371.49	369.54	0.808%
Fresno	2010	LDT1	DSL	60	181	380.80	378.21	0.001%
Fresno	2010	LDT1	GAS	65	182416	415.06	412.89	0.798%
Fresno	2010	LDT1	DSL	65	179	396.77	393.62	0.001%
Fresno	2010	LDT1	GAS	70	161313	444.88	442.55	0.706%
Fresno	2010	LDT1	DSL	70	158	420.33	416.35	0.001%
Fresno	2010	LDT2	GAS	5	262	1532.90	1523.22	0.001%
Fresno	2010	LDT2	DSL	5	0	393.55	388.32	0.000%
Fresno	2010	LDT2	GAS	10	711	1144.66	1137.43	0.003%
Fresno	2010	LDT2	DSL	10	0	383.77	379.04	0.000%
Fresno	2010	LDT2	GAS	15	675	884.09	878.51	0.003%
Fresno	2010	LDT2	DSL	15	0	369.05	365.09	0.000%
Fresno	2010	LDT2	GAS	20	175232	700.40	695.98	0.767%
Fresno	2010	LDT2	DSL	20	67	359.13	355.69	0.000%
Fresno	2010	LDT2	GAS	25	21242	581.13	577.46	0.093%
Fresno	2010	LDT2	DSL	25	8	352.69	349.58	0.000%
Fresno	2010	LDT2	GAS	30	65123	500.18	497.02	0.285%
Fresno	2010	LDT2	DSL	30	25	348.92	346.01	0.000%
Fresno	2010	LDT2	GAS	35	253663	447.15	444.33	1.110%
Fresno	2010	LDT2	DSL	35	98	347.37	344.54	0.000%
Fresno	2010	LDT2	GAS	40	476057	413.99	411.37	2.082%
Fresno	2010	LDT2	DSL	40	183	347.88	345.02	0.001%
Fresno	2010	LDT2	GAS	45	409436	398.47	395.95	1.791%
Fresno	2010	LDT2	DSL	45	158	350.49	347.50	0.001%
Fresno	2010	LDT2	GAS	50	563153	398.05	395.53	2.463%
Fresno	2010	LDT2	DSL	50	217	355.52	352.26	0.001%
Fresno	2010	LDT2	GAS	55	401639	412.70	410.09	1.757%
Fresno	2010	LDT2	DSL	55	155	363.56	359.88	0.001%
Fresno	2010	LDT2	GAS	60	485466	443.76	440.96	2.124%
Fresno	2010	LDT2	DSL	60	187	375.65	371.35	0.001%
Fresno	2010	LDT2	GAS	65	479315	495.83	492.70	2.097%
Fresno	2010	LDT2	DSL	65	185	393.49	388.26	0.001%
Fresno	2010	LDT2	GAS	70	423866	531.46	528.10	1.854%
Fresno	2010	LDT2	DSL	70	163	419.81	413.21	0.001%
Fresno	2010	LHD1	GAS	5	18900	2513.50	2513.50	0.083%
Fresno	2010	LHD1	DSL	5	7256	526.86	526.86	0.032%
Fresno	2010	LHD1	GAS	10	49284	2036.13	2036.13	0.216%
Fresno	2010	LHD1	DSL	10	24129	526.86	526.86	0.106%
Fresno	2010	LHD1	GAS	15	112226	1392.43	1392.43	0.491%
Fresno	2010	LHD1	DSL	15	52256	526.86	526.86	0.229%
Fresno	2010	LHD1	GAS	20	129676	1006.07	1006.07	0.567%
Fresno	2010	LHD1	DSL	20	57290	526.86	526.86	0.251%
Fresno	2010	LHD1	GAS	25	99891	768.01	768.01	0.437%
Fresno	2010	LHD1	DSL	25	61315	526.86	526.86	0.268%
Fresno	2010	LHD1	GAS	30	88336	619.43	619.43	0.386%
Fresno	2010	LHD1	DSL	30	51758	526.86	526.86	0.226%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LHD1	GAS	35	33008	527.85	527.85	0.144%
Fresno	2010	LHD1	DSL	35	27315	526.86	526.86	0.119%
Fresno	2010	LHD1	GAS	40	9743	475.23	475.23	0.043%
Fresno	2010	LHD1	DSL	40	14995	526.86	526.86	0.066%
Fresno	2010	LHD1	GAS	45	11995	452.06	452.06	0.052%
Fresno	2010	LHD1	DSL	45	16184	526.86	526.86	0.071%
Fresno	2010	LHD1	GAS	50	88567	454.32	454.32	0.387%
Fresno	2010	LHD1	DSL	50	62493	526.86	526.86	0.273%
Fresno	2010	LHD1	GAS	55	24360	482.42	482.42	0.107%
Fresno	2010	LHD1	DSL	55	37634	526.86	526.86	0.165%
Fresno	2010	LHD2	GAS	5	1847	2513.50	2513.50	0.008%
Fresno	2010	LHD2	DSL	5	1945	527.22	527.22	0.009%
Fresno	2010	LHD2	GAS	10	4817	2036.13	2036.13	0.021%
Fresno	2010	LHD2	DSL	10	6469	527.22	527.22	0.028%
Fresno	2010	LHD2	GAS	15	10969	1392.43	1392.43	0.048%
Fresno	2010	LHD2	DSL	15	14011	527.22	527.22	0.061%
Fresno	2010	LHD2	GAS	20	12675	1006.07	1006.07	0.055%
Fresno	2010	LHD2	DSL	20	15360	527.22	527.22	0.067%
Fresno	2010	LHD2	GAS	25	9764	768.01	768.01	0.043%
Fresno	2010	LHD2	DSL	25	16439	527.22	527.22	0.072%
Fresno	2010	LHD2	GAS	30	8634	619.43	619.43	0.038%
Fresno	2010	LHD2	DSL	30	13877	527.22	527.22	0.061%
Fresno	2010	LHD2	GAS	35	3226	527.85	527.85	0.014%
Fresno	2010	LHD2	DSL	35	7323	527.22	527.22	0.032%
Fresno	2010	LHD2	GAS	40	952	475.23	475.23	0.004%
Fresno	2010	LHD2	DSL	40	4020	527.22	527.22	0.018%
Fresno	2010	LHD2	GAS	45	1172	452.06	452.06	0.005%
Fresno	2010	LHD2	DSL	45	4339	527.22	527.22	0.019%
Fresno	2010	LHD2	GAS	50	8657	454.32	454.32	0.038%
Fresno	2010	LHD2	DSL	50	16755	527.22	527.22	0.073%
Fresno	2010	LHD2	GAS	55	2381	482.42	482.42	0.010%
Fresno	2010	LHD2	DSL	55	10090	527.22	527.22	0.044%
Fresno	2010	MCY	GAS	5	11	240.29	240.29	0.000%
Fresno	2010	MCY	GAS	10	29	220.49	220.49	0.000%
Fresno	2010	MCY	GAS	15	27	188.67	188.67	0.000%
Fresno	2010	MCY	GAS	20	7097	164.91	164.91	0.031%
Fresno	2010	MCY	GAS	25	860	147.22	147.22	0.004%
Fresno	2010	MCY	GAS	30	2638	134.27	134.27	0.012%
Fresno	2010	MCY	GAS	35	10274	125.16	125.16	0.045%
Fresno	2010	MCY	GAS	40	19281	119.33	119.33	0.084%
Fresno	2010	MCY	GAS	45	16583	116.51	116.51	0.073%
Fresno	2010	MCY	GAS	50	22809	116.66	116.66	0.100%
Fresno	2010	MCY	GAS	55	16267	120.03	120.03	0.071%
Fresno	2010	MCY	GAS	60	19662	127.21	127.21	0.086%
Fresno	2010	MCY	GAS	65	19413	139.27	139.27	0.085%
Fresno	2010	MCY	GAS	70	17167	157.99	157.99	0.075%
Fresno	2010	MDV	GAS	5	296	1926.06	1919.59	0.001%
Fresno	2010	MDV	DSL	5	0	452.63	448.28	0.000%
Fresno	2010	MDV	GAS	10	804	1438.32	1433.48	0.004%
Fresno	2010	MDV	DSL	10	1	422.15	418.22	0.000%
Fresno	2010	MDV	GAS	15	763	1110.93	1107.19	0.003%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	MDV	DSL	15	1	376.32	373.03	0.000%
Fresno	2010	MDV	GAS	20	198189	880.06	877.10	0.867%
Fresno	2010	MDV	DSL	20	152	345.44	342.58	0.001%
Fresno	2010	MDV	GAS	25	24025	730.19	727.74	0.105%
Fresno	2010	MDV	DSL	25	18	325.38	322.80	0.000%
Fresno	2010	MDV	GAS	30	73655	628.47	626.36	0.322%
Fresno	2010	MDV	DSL	30	56	313.64	311.22	0.000%
Fresno	2010	MDV	GAS	35	286896	561.85	559.96	1.255%
Fresno	2010	MDV	DSL	35	220	308.83	306.48	0.001%
Fresno	2010	MDV	GAS	40	538426	520.17	518.42	2.355%
Fresno	2010	MDV	DSL	40	413	310.41	308.04	0.002%
Fresno	2010	MDV	GAS	45	463076	500.67	498.99	2.026%
Fresno	2010	MDV	DSL	45	355	318.54	316.06	0.002%
Fresno	2010	MDV	GAS	50	636932	500.15	498.46	2.786%
Fresno	2010	MDV	DSL	50	488	334.19	331.48	0.002%
Fresno	2010	MDV	GAS	55	454258	518.55	516.81	1.987%
Fresno	2010	MDV	DSL	55	348	359.22	356.17	0.002%
Fresno	2010	MDV	GAS	60	549067	557.58	555.71	2.402%
Fresno	2010	MDV	DSL	60	421	396.88	393.31	0.002%
Fresno	2010	MDV	GAS	65	542110	623.01	620.92	2.371%
Fresno	2010	MDV	DSL	65	415	452.43	448.08	0.002%
Fresno	2010	MDV	GAS	70	479397	667.78	665.53	2.097%
Fresno	2010	MDV	DSL	70	367	534.37	528.90	0.002%
Fresno	2010	MH	GAS	5	307	2513.50	2513.50	0.001%
Fresno	2010	MH	DSL	5	67	2376.97	2376.97	0.000%
Fresno	2010	MH	GAS	10	1543	2036.13	2036.13	0.007%
Fresno	2010	MH	DSL	10	334	2158.29	2158.29	0.001%
Fresno	2010	MH	GAS	15	1949	1392.43	1392.43	0.009%
Fresno	2010	MH	DSL	15	451	1772.14	1772.14	0.002%
Fresno	2010	MH	GAS	20	2021	1006.07	1006.07	0.009%
Fresno	2010	MH	DSL	20	479	1454.25	1454.25	0.002%
Fresno	2010	MH	GAS	25	2252	768.01	768.01	0.010%
Fresno	2010	MH	DSL	25	499	1304.38	1304.38	0.002%
Fresno	2010	MH	GAS	30	2547	619.43	619.43	0.011%
Fresno	2010	MH	DSL	30	599	1224.35	1224.35	0.003%
Fresno	2010	MH	GAS	35	3165	527.85	527.85	0.014%
Fresno	2010	MH	DSL	35	707	1157.94	1157.94	0.003%
Fresno	2010	MH	GAS	40	3940	475.23	475.23	0.017%
Fresno	2010	MH	DSL	40	877	1105.14	1105.14	0.004%
Fresno	2010	MH	GAS	45	3593	452.06	452.06	0.016%
Fresno	2010	MH	DSL	45	718	1065.96	1065.96	0.003%
Fresno	2010	MH	GAS	50	3497	454.32	454.32	0.015%
Fresno	2010	MH	DSL	50	804	1040.39	1040.39	0.004%
Fresno	2010	MH	GAS	55	4573	482.42	482.42	0.020%
Fresno	2010	MH	DSL	55	1178	1028.44	1028.44	0.005%
Fresno	2010	MH	GAS	60	5278	541.21	541.21	0.023%
Fresno	2010	MH	DSL	60	1416	1030.10	1030.10	0.006%
Fresno	2010	MH	GAS	65	825	641.50	641.50	0.004%
Fresno	2010	MH	DSL	65	223	1045.37	1045.37	0.001%
Fresno	2010	OBUS	GAS	5	211	2513.50	2513.50	0.001%
Fresno	2010	OBUS	DSL	5	143	3052.65	3052.65	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	OBUS	GAS	10	1062	2036.13	2036.13	0.005%
Fresno	2010	OBUS	DSL	10	660	2459.32	2459.32	0.003%
Fresno	2010	OBUS	GAS	15	1342	1392.43	1392.43	0.006%
Fresno	2010	OBUS	DSL	15	869	2001.78	2001.78	0.004%
Fresno	2010	OBUS	GAS	20	1392	1006.07	1006.07	0.006%
Fresno	2010	OBUS	DSL	20	1157	1695.25	1695.25	0.005%
Fresno	2010	OBUS	GAS	25	1551	768.01	768.01	0.007%
Fresno	2010	OBUS	DSL	25	1201	1580.12	1580.12	0.005%
Fresno	2010	OBUS	GAS	30	1754	619.43	619.43	0.008%
Fresno	2010	OBUS	DSL	30	1673	1537.77	1537.77	0.007%
Fresno	2010	OBUS	GAS	35	2179	527.85	527.85	0.010%
Fresno	2010	OBUS	DSL	35	2467	1519.45	1519.45	0.011%
Fresno	2010	OBUS	GAS	40	2713	475.23	475.23	0.012%
Fresno	2010	OBUS	DSL	40	2636	1410.01	1410.01	0.012%
Fresno	2010	OBUS	GAS	45	2474	452.06	452.06	0.011%
Fresno	2010	OBUS	DSL	45	2945	1434.26	1434.26	0.013%
Fresno	2010	OBUS	GAS	50	2408	454.32	454.32	0.011%
Fresno	2010	OBUS	DSL	50	3146	1390.38	1390.38	0.014%
Fresno	2010	OBUS	GAS	55	3149	482.42	482.42	0.014%
Fresno	2010	OBUS	DSL	55	4126	1350.21	1350.21	0.018%
Fresno	2010	OBUS	GAS	60	3634	541.21	541.21	0.016%
Fresno	2010	OBUS	DSL	60	2801	1175.03	1175.03	0.012%
Fresno	2010	OBUS	GAS	65	568	641.50	641.50	0.002%
Fresno	2010	OBUS	DSL	65	727	1355.23	1355.23	0.003%
Fresno	2010	SBUS	GAS	5	52	2513.50	2513.50	0.000%
Fresno	2010	SBUS	DSL	5	140	2638.70	2638.70	0.001%
Fresno	2010	SBUS	GAS	10	182	2036.13	2036.13	0.001%
Fresno	2010	SBUS	DSL	10	490	2179.77	2179.77	0.002%
Fresno	2010	SBUS	GAS	15	363	1392.43	1392.43	0.002%
Fresno	2010	SBUS	DSL	15	979	1789.78	1789.78	0.004%
Fresno	2010	SBUS	GAS	20	493	1006.07	1006.07	0.002%
Fresno	2010	SBUS	DSL	20	1329	1411.96	1411.96	0.006%
Fresno	2010	SBUS	GAS	25	779	768.01	768.01	0.003%
Fresno	2010	SBUS	DSL	25	2098	1317.39	1317.39	0.009%
Fresno	2010	SBUS	GAS	30	934	619.43	619.43	0.004%
Fresno	2010	SBUS	DSL	30	2518	1236.57	1236.57	0.011%
Fresno	2010	SBUS	GAS	35	959	527.85	527.85	0.004%
Fresno	2010	SBUS	DSL	35	2584	1169.50	1169.50	0.011%
Fresno	2010	SBUS	GAS	40	647	475.23	475.23	0.003%
Fresno	2010	SBUS	DSL	40	1744	1116.18	1116.18	0.008%
Fresno	2010	SBUS	GAS	45	311	452.06	452.06	0.001%
Fresno	2010	SBUS	DSL	45	837	1076.60	1076.60	0.004%
Fresno	2010	SBUS	GAS	50	156	454.32	454.32	0.001%
Fresno	2010	SBUS	DSL	50	419	1050.78	1050.78	0.002%
Fresno	2010	SBUS	GAS	55	231	482.42	482.42	0.001%
Fresno	2010	SBUS	DSL	55	624	1038.71	1038.71	0.003%
Fresno	2010	SBUS	GAS	60	129	541.21	541.21	0.001%
Fresno	2010	SBUS	DSL	60	347	1040.39	1040.39	0.002%
Fresno	2010	T6	GAS	5	427	2513.50	2513.50	0.002%
Fresno	2010	T6	DSL	5	2401	2610.34	2610.34	0.011%
Fresno	2010	T6	GAS	10	2146	2036.13	2036.13	0.009%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	T6	DSL	10	11950	2156.35	2156.35	0.052%
Fresno	2010	T6	GAS	15	2711	1392.43	1392.43	0.012%
Fresno	2010	T6	DSL	15	16128	1770.55	1770.55	0.071%
Fresno	2010	T6	GAS	20	2812	1006.07	1006.07	0.012%
Fresno	2010	T6	DSL	20	17104	1396.79	1396.79	0.075%
Fresno	2010	T6	GAS	25	3134	768.01	768.01	0.014%
Fresno	2010	T6	DSL	25	17813	1303.23	1303.23	0.078%
Fresno	2010	T6	GAS	30	3543	619.43	619.43	0.015%
Fresno	2010	T6	DSL	30	21419	1223.28	1223.28	0.094%
Fresno	2010	T6	GAS	35	4403	527.85	527.85	0.019%
Fresno	2010	T6	DSL	35	25256	1156.93	1156.93	0.110%
Fresno	2010	T6	GAS	40	5482	475.23	475.23	0.024%
Fresno	2010	T6	DSL	40	31351	1104.18	1104.18	0.137%
Fresno	2010	T6	GAS	45	4999	452.06	452.06	0.022%
Fresno	2010	T6	DSL	45	25673	1065.04	1065.04	0.112%
Fresno	2010	T6	GAS	50	4865	454.32	454.32	0.021%
Fresno	2010	T6	DSL	50	28732	1039.49	1039.49	0.126%
Fresno	2010	T6	GAS	55	6363	482.42	482.42	0.028%
Fresno	2010	T6	DSL	55	42104	1027.55	1027.55	0.184%
Fresno	2010	T6	GAS	60	7343	541.21	541.21	0.032%
Fresno	2010	T6	DSL	60	50595	1029.21	1029.21	0.221%
Fresno	2010	T6	GAS	65	1147	641.50	641.50	0.005%
Fresno	2010	T6	DSL	65	7962	1044.47	1044.47	0.035%
Fresno	2010	T7	GAS	5	30	2513.50	2513.50	0.000%
Fresno	2010	T7	DSL	5	5509	4024.00	4024.00	0.024%
Fresno	2010	T7	GAS	10	149	2036.13	2036.13	0.001%
Fresno	2010	T7	DSL	10	21043	3324.13	3324.13	0.092%
Fresno	2010	T7	GAS	15	163	1392.43	1392.43	0.001%
Fresno	2010	T7	DSL	15	25736	2729.40	2729.40	0.113%
Fresno	2010	T7	GAS	20	278	1006.07	1006.07	0.001%
Fresno	2010	T7	DSL	20	63851	2152.43	2152.43	0.279%
Fresno	2010	T7	GAS	25	363	768.01	768.01	0.002%
Fresno	2010	T7	DSL	25	58129	2009.01	2009.01	0.254%
Fresno	2010	T7	GAS	30	662	619.43	619.43	0.003%
Fresno	2010	T7	DSL	30	98137	1885.76	1885.76	0.429%
Fresno	2010	T7	GAS	35	1178	527.85	527.85	0.005%
Fresno	2010	T7	DSL	35	176552	1783.48	1783.48	0.772%
Fresno	2010	T7	GAS	40	1026	475.23	475.23	0.004%
Fresno	2010	T7	DSL	40	166614	1702.16	1702.16	0.729%
Fresno	2010	T7	GAS	45	1086	452.06	452.06	0.005%
Fresno	2010	T7	DSL	45	233270	1641.82	1641.82	1.020%
Fresno	2010	T7	GAS	50	1136	454.32	454.32	0.005%
Fresno	2010	T7	DSL	50	242595	1602.44	1602.44	1.061%
Fresno	2010	T7	GAS	55	1668	482.42	482.42	0.007%
Fresno	2010	T7	DSL	55	295829	1584.02	1584.02	1.294%
Fresno	2010	T7	GAS	60	412	541.21	541.21	0.002%
Fresno	2010	T7	DSL	60	90120	1586.58	1586.58	0.394%
Fresno	2010	T7	GAS	65	221	641.50	641.50	0.001%
Fresno	2010	T7	DSL	65	49361	1610.11	1610.11	0.216%
Fresno	2010	UBUS	GAS	5	127	2513.50	2513.50	0.001%
Fresno	2010	UBUS	DSL	5	314	2569.78	2569.78	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	Percent of Total VMT (Pa
Fresno	2010	UBUS	GAS	10	457	2036.13	2036.13	0.002%
Fresno	2010	UBUS	DSL	10	1126	2569.78	2569.78	0.005%
Fresno	2010	UBUS	GAS	15	914	1392.43	1392.43	0.004%
Fresno	2010	UBUS	DSL	15	2253	2569.78	2569.78	0.010%
Fresno	2010	UBUS	GAS	20	1206	1006.07	1006.07	0.005%
Fresno	2010	UBUS	DSL	20	2973	2569.78	2569.78	0.013%
Fresno	2010	UBUS	GAS	25	1816	768.01	768.01	0.008%
Fresno	2010	UBUS	DSL	25	4478	2569.78	2569.78	0.020%
Fresno	2010	UBUS	GAS	30	2273	619.43	619.43	0.010%
Fresno	2010	UBUS	DSL	30	5604	2569.78	2569.78	0.025%
Fresno	2010	UBUS	GAS	35	2228	527.85	527.85	0.010%
Fresno	2010	UBUS	DSL	35	5492	2569.78	2569.78	0.024%
Fresno	2010	UBUS	GAS	40	1606	475.23	475.23	0.007%
Fresno	2010	UBUS	DSL	40	3959	2569.78	2569.78	0.017%
Fresno	2010	UBUS	GAS	45	700	452.06	452.06	0.003%
Fresno	2010	UBUS	DSL	45	1726	2569.78	2569.78	0.008%
Fresno	2010	UBUS	GAS	50	356	454.32	454.32	0.002%
Fresno	2010	UBUS	DSL	50	877	2569.78	2569.78	0.004%
Fresno	2010	UBUS	GAS	55	441	482.42	482.42	0.002%
Fresno	2010	UBUS	DSL	55	1087	2569.78	2569.78	0.005%
Fresno	2010	UBUS	GAS	60	722	541.21	541.21	0.003%
Fresno	2010	UBUS	DSL	60	1779	2569.78	2569.78	0.008%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	Used 2010 emission factor estimated by PG&E
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,422,450,000	2,610	316495	22.0	7.8	289,745
Commercial	1,570,085,283	7,503	349344	24.3	8.6	319,817
Industrial	*					0
Total	**2,992,535,283**		**665,839**	**46.4**	**16.5**	**609,562**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	75,210,000	138	439,979	41.4	0.8	400,169
Commercial	84,332,183	403	493,343	46.4	0.9	448,706
Industrial	*					0
Total	**159,542,183**		**933,322**	**87.7**	**1.8**	**848,875**

Notes and Sources:

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

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

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

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

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	1,019	0.1600	0.0100	930
Fresno	545,000	597	0	0	545
Percent Fresno/Fresno County	58.6%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	920	0.360	0.08000	864
Fresno	545,000	539	0	0	506
Percent Fresno/Fresno County	58.6%				

Total Fresno **1,051**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California

Emissions (MMTCO2e)	18.69
Population	37,253,956
Emissions (MTCO2e per person)	0.50

Fresno

Population	545,000
Emissions (MTCO2e per person)	273,422

(estimated by using California per person emissions)

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

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

Community Greenhouse Gas Inventory

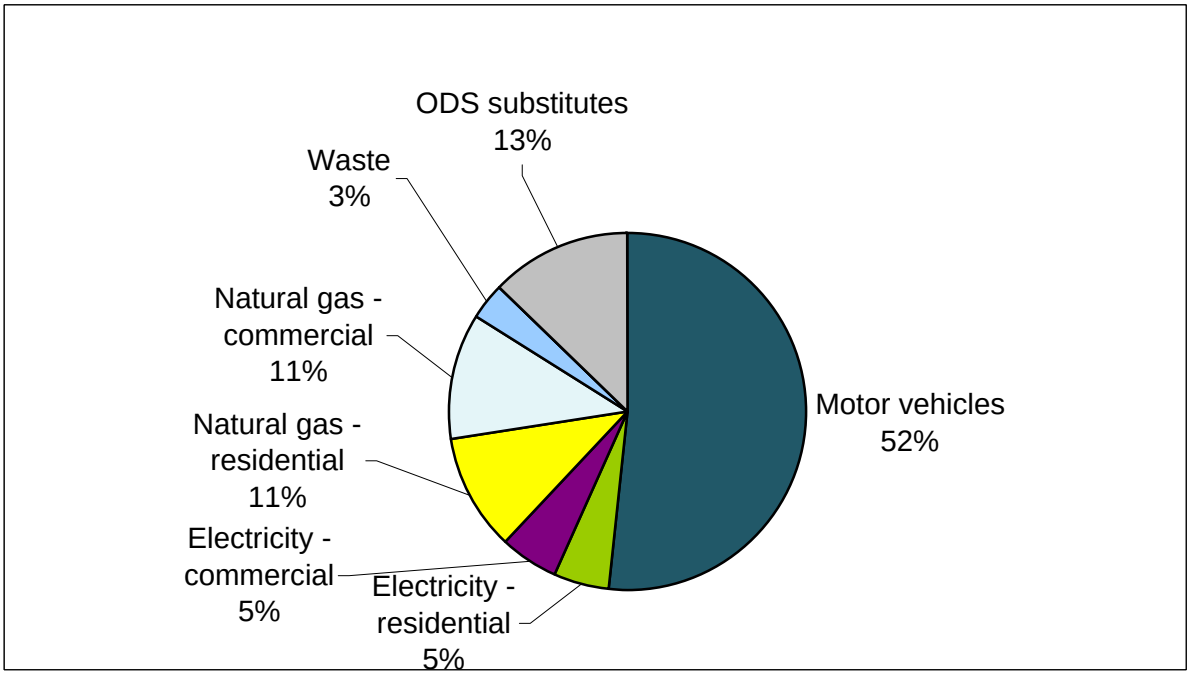
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,337,015	1,828,249
Electricity - residential	226,011	226,011
Electricity - commercial	240,205	240,205
Natural gas - residential	476,679	476,679
Natural gas - commercial	514,647	514,647
Waste	147,628	147,628
Offroad equipment	1,138	1,138
ODS substitutes	576,784	576,784
Total	***4,520,107***	4,011,341



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,149,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,069,502,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1130	835	641	514	428	368	328	304	292	292	303	326	364	390	0
LDT1	1305	964	741	594	495	425	379	351	338	337	350	376	420	451	0
LDT2	1536	1135	872	699	582	500	446	413	397	397	412	443	495	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	264	240	203	177	159	147	140	137	139	145	158	177	206	251	0
MDV	1957	1446	1111	890	742	637	569	526	506	506	525	564	630	676	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	487	444	378	335	306	289	282	285	296	319	354	408	487	603	0
LDT1	486	444	380	338	310	293	287	289	300	322	357	409	486	600	0
LDT2	484	441	378	335	308	291	285	287	298	320	354	407	483	597	0
LHD1	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
LHD2	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	490	446	380	336	307	290	283	285	297	319	355	410	490	608	0
MH	2390	2170	1782	1462	1312	1231	1164	1111	1072	1046	1034	1036	1051	0	0
OBUS	3024	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164	1344	0	0
SBUS	2632	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038	0	0	0
T6	2578	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016	1031	0	0
T7	3978	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568	1592	0	0
UBUS	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1	143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2	366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1	60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2	6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY	15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV	381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH	3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS	2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS	0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6	7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7	1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS	1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1	0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2	0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1	36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2	10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH	1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS	3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS	1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6	37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7	185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS	3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	444	95,444	1,988	9,526	30,550	25,468	144,160	59,580	61,685	31,272	123,830	121,830	9	0	0	**705,341**
LDT1	75	16,108	336	1,608	5,154	4,298	24,327	10,055	10,411	5,278	20,898	20,561	2	0	0	**119,035**
LDT2	226	48,522	1,011	4,843	15,528	12,946	73,283	30,289	31,360	15,898	62,951	61,935	5	0	0	**358,571**
LHD1	60	14,215	264	1,139	3,344	2,620	14,155	5,693	5,826	2,970	12,042	0	0	0	0	**62,268**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,453	27	116	342	268	1,447	582	596	304	1,231	0	0	0	0	**6,365**
MCY	2	417	10	50	173	155	934	409	446	237	979	1,006	0	0	0	**4,816**
MDV	299	64,398	1,341	6,427	20,607	17,181	97,257	40,199	41,620	21,099	83,547	82,199	6	0	0	**475,881**
MH	3	820	15	66	193	151	817	328	336	171	695	713	0	0	0	**4,305**
OBUS	2	487	9	39	115	90	485	195	200	102	412	423	0	0	0	**2,556**
SBUS	0	111	2	9	26	20	110	44	45	23	94	96	0	0	0	**580**
T6	7	1,653	31	132	389	305	1,646	662	678	345	1,400	1,437	0	0	0	**8,679**
T7	1	234	4	19	55	43	233	94	96	49	198	203	0	0	0	**1,227**
UBUS	1	271	5	22	64	50	270	109	111	57	230	236	0	0	0	**1,424**
Total	**1,127**	**244,134**	**5,042**	**23,994**	**76,539**	**63,595**	**359,124**	**148,240**	**153,409**	**77,803**	**308,508**	**290,640**	**22**	**0**	**0**	**1,752,177**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	140	3	17	60	56	344	155	173	94	401	422	0	0	0	**1,866**
LDT1	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**132**
LDT2	0	9	0	1	4	4	22	10	11	6	25	27	0	0	0	**119**
LHD1	8	2,218	60	360	1,384	1,344	8,521	3,806	4,095	2,077	7,931	0	0	0	0	**31,796**
LHD2	2	595	16	96	371	360	2,285	1,021	1,098	557	2,127	0	0	0	0	**8,528**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	16	0	2	7	6	38	17	19	10	44	47	0	0	0	**205**
MH	1	187	4	20	70	64	384	164	170	84	318	291	0	0	0	**1,757**
OBUS	3	736	16	82	295	279	1,749	725	794	390	1,447	1,150	0	0	0	**7,664**
SBUS	1	313	7	33	118	107	644	275	285	141	532	488	0	0	0	**2,943**
T6	39	9,278	207	974	3,497	3,189	19,121	8,152	8,460	4,188	15,808	14,485	1	0	0	**87,360**
T7	295	70,843	1,578	7,442	26,705	24,352	146,004	62,243	64,597	31,977	120,709	110,604	8	0	0	**667,062**
UBUS	3	802	22	130	500	486	3,080	1,376	1,480	751	2,867	2,622	0	0	0	**14,114**
Total	**351**	**85,146**	**1,914**	**9,159**	**33,016**	**30,252**	**182,216**	**77,953**	**81,194**	**40,283**	**152,239**	**130,166**	**9**	**0**	**0**	**823,898**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,576,074	2,337,015	2,337,015

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
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Prepared by FirstCarbon Solutions

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Vehicle Miles Traveled

Vehicle miles traveled / day 11,435,514 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,173,962,610 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	796	0	**796**	5
5 - 10 MPH	661	774	0	**1,435**	5
10 - 15 MPH	128,951	166,457	354,011	**649,418**	10
15 - 20 MPH	4,357	6,447	6,811	**17,615**	15
20 - 25 MPH	19,066	31,870	54,334	**105,270**	20
25 - 30 MPH	77,876	103,120	224,064	**405,060**	25
30 - 35 MPH	86,309	136,586	170,618	**393,513**	30
35 - 40 MPH	508,418	658,756	1,327,422	**2,494,596**	35
40 - 45 MPH	227,365	277,442	609,480	**1,114,287**	40
45 - 50 MPH	193,416	254,865	750,637	**1,198,918**	45
50 - 55 MPH	104,609	147,771	355,701	**608,081**	50
55 - 60 MPH	464,301	552,054	1,305,747	**2,322,102**	55
60 - 65 MPH	445,111	552,939	1,126,227	**2,124,277**	60
65 - 70 MPH	25	32	89	**146**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,260,464**	**2,889,911**	**6,285,139**	**11,435,514**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2232	649418	17615	105270	405060	393513	2494596	1114287	1198918	608081	2322102	2124277	146	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	766	566	434	348	290	249	222	206	198	198	205	221	246	264	0
LDT1	926	684	525	421	351	301	269	249	240	239	248	267	298	320	0
LDT2	1144	845	649	520	434	372	332	308	296	296	307	330	368	395	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	237	216	183	160	143	132	126	124	125	131	142	159	186	225	0
MDV	1526	1128	866	694	579	497	443	410	395	395	409	440	491	527	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
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UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	330	301	258	230	211	200	195	197	205	219	243	278	330	406	0
LDT1	324	297	256	229	211	201	197	198	205	219	241	275	324	396	0
LDT2	353	323	278	248	228	216	212	213	221	237	261	298	353	433	0
LHD1	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
LHD2	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	377	344	294	260	238	225	220	221	230	247	275	316	377	467	0
MH	2151	1953	1604	1316	1180	1108	1048	1000	965	942	931	932	946	0	0
OBUS	2721	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047	1209	0	0
SBUS	2369	1957	1607	1268	1183	1110	1050	1002	967	943	933	934	0	0	0
T6	2320	1917	1574	1241	1158	1087	1028	981	947	924	913	915	928	0	0
T7	3580	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412	1432	0	0
UBUS	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	974	283335	7685	45928	176724	171686	1088370	486153	523077	265300	1013113	926803	64	0	0
LDT1	142	41390	1123	6709	25816	25080	158991	71018	76412	38756	147998	135389	9	0	0
LDT2	364	105917	2873	17169	66063	64180	406857	181735	195538	99175	378724	346459	24	0	0
LHD1	59	17301	469	2804	10791	10483	66457	29685	31939	16199	61861	56591	4	0	0
LHD2	6	1769	48	287	1103	1072	6793	3035	3265	1656	6324	5785	0	0	0
MCY	15	4308	117	698	2687	2610	16547	7391	7952	4033	15402	14090	1	0	0
MDV	379	110346	2993	17887	68826	66864	423870	189334	203715	103322	394561	360947	25	0	0
MH	3	998	27	162	622	605	3834	1712	1843	935	3569	3265	0	0	0
OBUS	2	593	16	96	370	359	2276	1017	1094	555	2119	1938	0	0	0
SBUS	0	135	4	22	84	82	517	231	248	126	481	440	0	0	0
T6	7	2012	55	326	1255	1219	7729	3452	3714	1884	7194	6581	0	0	0
T7	1	285	8	46	177	172	1093	488	525	266	1017	931	0	0	0
UBUS	1	330	9	54	206	200	1268	567	610	309	1181	1080	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	785	21	127	489	475	3014	1346	1449	735	2806	2567	0	0	0
LDT1	0	55	1	9	34	33	211	94	101	51	196	179	0	0	0
LDT2	0	50	1	8	31	30	191	86	92	47	178	163	0	0	0
LHD1	36	10542	286	1709	6575	6388	40494	18088	19462	9871	37694	34483	2	0	0
LHD2	10	2828	77	458	1764	1714	10863	4852	5221	2648	10112	9251	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
MH	1	213	6	35	133	129	818	366	393	199	762	697	0	0	0
OBUS	3	749	20	121	467	454	2877	1285	1383	701	2678	2450	0	0	0
SBUS	1	356	10	58	222	216	1368	611	658	333	1274	1165	0	0	0
T6	37	10797	293	1750	6734	6542	41473	18525	19932	10109	38605	35316	2	0	0
T7	184	53427	1449	8660	33324	32374	205227	91671	98633	50026	191036	174761	12	0	0
UBUS	3	814	22	132	508	493	3127	1397	1503	762	2910	2662	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	299	64,357	1,340	6,423	20,598	17,172	97,203	40,174	41,593	21,086	83,497	82,148	6	0	0	**475,598**
LDT1	53	11,371	237	1,135	3,638	3,034	17,172	7,098	7,349	3,725	14,751	14,514	1	0	0	**84,024**
LDT2	167	35,950	749	3,588	11,504	9,592	54,294	22,441	23,234	11,778	46,640	45,887	4	0	0	**265,661**
LHD1	54	12,729	236	1,020	2,995	2,346	12,676	5,098	5,217	2,659	10,784	0	0	0	0	**55,760**

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Motor Vehicle Emissions (with Pavley I and LCFS)
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LHD2	6	1,301	24	104	306	240	1,296	521	533	272	1,102	0	0	0	0	**5,700**
MCY	1	374	9	45	154	139	836	367	399	212	877	901	0	0	0	**4,313**
MDV	232	49,971	1,041	4,987	15,990	13,332	75,468	31,193	32,296	16,372	64,829	63,783	5	0	0	**369,266**
MH	3	734	14	59	173	135	731	294	301	153	622	638	0	0	0	**3,855**
OBUS	2	436	8	35	103	80	434	175	179	91	369	379	0	0	0	**2,289**
SBUS	0	99	2	8	23	18	99	40	41	21	84	86	0	0	0	**520**
T6	6	1,480	27	119	348	273	1,474	593	607	309	1,254	1,287	0	0	0	**7,772**
T7	1	209	4	17	49	39	208	84	86	44	177	182	0	0	0	**1,099**
UBUS	1	243	5	19	57	45	242	97	100	51	206	211	0	0	0	**1,275**
Total	**826**	**179,254**	**3,695**	**17,557**	**55,939**	**46,445**	**262,133**	**108,174**	**111,934**	**56,774**	**225,193**	**210,018**	**16**	**0**	**0**	**1,277,958**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	95	2	12	41	38	237	106	119	65	273	286	0	0	0	**1,274**
LDT1	0	7	0	1	3	3	17	7	8	5	19	20	0	0	0	**89**
LDT2	0	6	0	1	3	3	16	7	8	4	19	20	0	0	0	**87**
LHD1	7	1,986	54	322	1,239	1,204	7,630	3,408	3,667	1,860	7,102	0	0	0	0	**28,472**
LHD2	2	533	14	86	332	323	2,046	914	984	499	1,905	0	0	0	0	**7,636**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	12	0	1	5	5	29	13	15	8	34	36	0	0	0	**158**
MH	1	167	4	18	63	57	344	147	152	75	285	261	0	0	0	**1,574**
OBUS	3	659	15	74	264	250	1,566	649	711	349	1,296	1,030	0	0	0	**6,863**
SBUS	1	280	6	29	105	96	577	246	255	126	477	437	0	0	0	**2,635**
T6	35	8,308	185	872	3,132	2,856	17,122	7,300	7,576	3,750	14,156	12,971	1	0	0	**78,229**
T7	264	63,438	1,413	6,664	23,914	21,807	130,742	55,737	57,845	28,635	108,092	99,043	7	0	0	**597,336**
UBUS	2	718	19	116	448	435	2,758	1,232	1,325	672	2,567	2,348	0	0	0	**12,639**
Total	**315**	**76,209**	**1,713**	**8,198**	**29,550**	**27,076**	**163,085**	**69,767**	**72,664**	**36,048**	**136,224**	**116,451**	**8**	**0**	**0**	**737,308**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,015,266	1,828,249	1,828,249

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2020, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1097.601204	1129.5953	765.503158	0.004%
Fresno	2020	LDA	DSL	5	3.039576937	487.08109	329.765357	0.000%
Fresno	2020	LDA	GAS	10	19368.49589	834.77968	565.727079	0.068%
Fresno	2020	LDA	DSL	10	53.63699778	443.70668	301.292224	0.000%
Fresno	2020	LDA	GAS	15	9051.364273	640.94058	434.371007	0.032%
Fresno	2020	LDA	DSL	15	25.06585843	378.48579	258.477977	0.000%
Fresno	2020	LDA	GAS	20	570961.7421	513.96372	348.309075	2.019%
Fresno	2020	LDA	DSL	20	1581.159357	334.54556	229.633409	0.006%
Fresno	2020	LDA	GAS	25	115652.1287	428.38541	290.303306	0.409%
Fresno	2020	LDA	DSL	25	320.2743836	306.00044	210.894972	0.001%
Fresno	2020	LDA	GAS	30	266829.8871	367.60468	249.119316	0.943%
Fresno	2020	LDA	DSL	30	738.9295648	289.29397	199.928012	0.003%
Fresno	2020	LDA	GAS	35	920286.3609	328.24025	222.443474	3.254%
Fresno	2020	LDA	DSL	35	2548.5404	282.45305	195.437288	0.009%
Fresno	2020	LDA	GAS	40	1530953.789	303.70517	205.819413	5.413%
Fresno	2020	LDA	DSL	40	4239.656111	284.69426	196.908534	0.015%
Fresno	2020	LDA	GAS	45	1340675.525	292.23901	198.049009	4.740%
Fresno	2020	LDA	DSL	45	3712.720433	296.27271	204.509208	0.013%
Fresno	2020	LDA	GAS	50	1834855.081	292.10301	197.955884	6.487%
Fresno	2020	LDA	DSL	50	5081.247577	318.53069	219.120456	0.018%
Fresno	2020	LDA	GAS	55	1221758.238	302.89634	205.27008	4.319%
Fresno	2020	LDA	DSL	55	3383.404003	354.16085	242.509876	0.012%
Fresno	2020	LDA	GAS	60	1512183.811	325.75529	220.762098	5.346%
Fresno	2020	LDA	DSL	60	4187.676879	407.75495	277.691718	0.015%
Fresno	2020	LDA	GAS	65	1544869.267	363.73237	246.499166	5.462%
Fresno	2020	LDA	DSL	65	4278.192318	486.79924	329.580336	0.015%
Fresno	2020	LDA	GAS	70	1451953.777	390.01281	264.308173	5.133%
Fresno	2020	LDA	DSL	70	4020.882357	603.41836	406.134954	0.014%
Fresno	2020	LDT1	GAS	5	160.3399232	1304.7967	925.652415	0.001%
Fresno	2020	LDT1	DSL	5	0.212505042	486.45442	323.971419	0.000%
Fresno	2020	LDT1	GAS	10	2829.391349	964.45342	684.23582	0.010%
Fresno	2020	LDT1	DSL	10	3.749907629	444.12974	296.951752	0.000%
Fresno	2020	LDT1	GAS	15	1322.24271	740.61424	525.449186	0.005%
Fresno	2020	LDT1	DSL	15	1.752421886	380.48738	256.32308	0.000%
Fresno	2020	LDT1	GAS	20	83407.31561	593.77137	421.24901	0.295%
Fresno	2020	LDT1	DSL	20	110.5431162	337.6106	228.950955	0.000%
Fresno	2020	LDT1	GAS	25	16894.71195	494.765	350.98776	0.060%
Fresno	2020	LDT1	DSL	25	22.39124832	309.75632	211.169055	0.000%
Fresno	2020	LDT1	GAS	30	38979.08188	424.63836	301.25086	0.138%
Fresno	2020	LDT1	DSL	30	51.6605658	293.45418	200.761924	0.000%
Fresno	2020	LDT1	GAS	35	134437.4047	379.17701	269.000862	0.475%
Fresno	2020	LDT1	DSL	35	178.1753487	286.77884	196.500452	0.001%
Fresno	2020	LDT1	GAS	40	223644.9863	350.87622	248.929757	0.791%
Fresno	2020	LDT1	DSL	40	296.4058539	288.9658	197.896581	0.001%
Fresno	2020	LDT1	GAS	45	195848.7412	337.63129	239.533452	0.692%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDT1	DSL	45	259.5663607	300.26399	205.109234	0.001%
Fresno	2020	LDT1	GAS	50	268039.5871	337.46078	239.410422	0.948%
Fresno	2020	LDT1	DSL	50	355.2437845	321.98332	218.97465	0.001%
Fresno	2020	LDT1	GAS	55	178477.0744	349.92509	248.252412	0.631%
Fresno	2020	LDT1	DSL	55	236.5429175	356.75116	241.170106	0.001%
Fresno	2020	LDT1	GAS	60	220903.0487	376.34322	266.996146	0.781%
Fresno	2020	LDT1	DSL	60	292.7718184	409.04819	274.556024	0.001%
Fresno	2020	LDT1	GAS	65	225677.8211	420.22158	298.126155	0.798%
Fresno	2020	LDT1	DSL	65	299.1000053	486.17935	323.795817	0.001%
Fresno	2020	LDT1	GAS	70	212104.5317	450.56841	319.653386	0.750%
Fresno	2020	LDT1	DSL	70	281.110744	599.97604	396.44253	0.001%
Fresno	2020	LDT2	GAS	5	410.3073308	1536.0292	1143.76708	0.001%
Fresno	2020	LDT2	DSL	5	0.193123223	483.63558	352.949647	0.000%
Fresno	2020	LDT2	GAS	10	7240.367106	1135.2759	845.371167	0.026%
Fresno	2020	LDT2	DSL	10	3.40789224	441.45895	322.997862	0.000%
Fresno	2020	LDT2	GAS	15	3383.597905	871.73757	649.13865	0.012%
Fresno	2020	LDT2	DSL	15	1.59258996	378.03921	277.960266	0.000%
Fresno	2020	LDT2	GAS	20	213437.9851	698.95406	520.466327	0.755%
Fresno	2020	LDT2	DSL	20	100.4608962	335.3124	247.617766	0.000%
Fresno	2020	LDT2	GAS	25	43233.29642	582.47638	433.722102	0.153%
Fresno	2020	LDT2	DSL	25	20.34902432	307.5556	227.906247	0.000%
Fresno	2020	LDT2	GAS	30	99746.85881	499.88306	372.227237	0.353%
Fresno	2020	LDT2	DSL	30	46.94879405	291.3105	216.369771	0.000%
Fresno	2020	LDT2	GAS	35	344023.1716	446.36108	332.374045	1.216%
Fresno	2020	LDT2	DSL	35	161.9246321	284.65849	211.645838	0.001%
Fresno	2020	LDT2	GAS	40	572303.9925	413.02584	307.554824	2.023%
Fresno	2020	LDT2	DSL	40	269.3717451	286.83782	213.193489	0.001%
Fresno	2020	LDT2	GAS	45	501173.8359	397.43382	295.94458	1.772%
Fresno	2020	LDT2	DSL	45	235.8922431	298.09651	221.188859	0.001%
Fresno	2020	LDT2	GAS	50	685909.0183	397.23953	295.798871	2.425%
Fresno	2020	LDT2	DSL	50	322.8433094	319.73983	236.558891	0.001%
Fresno	2020	LDT2	GAS	55	456719.9404	411.91427	306.725826	1.615%
Fresno	2020	LDT2	DSL	55	214.9687115	354.38602	261.162921	0.001%
Fresno	2020	LDT2	GAS	60	565287.3873	443.00751	329.879711	1.999%
Fresno	2020	LDT2	DSL	60	266.0691583	406.50012	298.171814	0.001%
Fresno	2020	LDT2	GAS	65	577505.9743	494.65656	368.339783	2.042%
Fresno	2020	LDT2	DSL	65	271.8201986	483.36142	352.754954	0.001%
Fresno	2020	LDT2	GAS	70	542772.0652	530.38611	394.944181	1.919%
Fresno	2020	LDT2	DSL	70	255.4716835	596.75996	433.28506	0.001%
Fresno	2020	LHD1	GAS	5	21384.31271	2513.4972	2262.14749	0.076%
Fresno	2020	LHD1	DSL	5	8073.831436	521.44003	469.296029	0.029%
Fresno	2020	LHD1	GAS	10	55761.32258	2036.1281	1832.51532	0.197%
Fresno	2020	LHD1	DSL	10	26849.16852	521.44005	469.296042	0.095%
Fresno	2020	LHD1	GAS	15	126976.0519	1392.4297	1253.1867	0.449%
Fresno	2020	LHD1	DSL	15	58147.60848	521.44	469.296003	0.206%
Fresno	2020	LHD1	GAS	20	146719.8434	1006.0686	905.461733	0.519%
Fresno	2020	LHD1	DSL	20	63748.56088	521.43999	469.295993	0.225%
Fresno	2020	LHD1	GAS	25	113019.5197	768.01205	691.210844	0.400%
Fresno	2020	LHD1	DSL	25	68227.96575	521.44	469.295996	0.241%
Fresno	2020	LHD1	GAS	30	99946.34197	619.4336	557.490237	0.353%
Fresno	2020	LHD1	DSL	30	57593.04709	521.44001	469.296005	0.204%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LHD1	GAS	35	37346.32043	527.84649	475.061842	0.132%
Fresno	2020	LHD1	DSL	35	30394.08805	521.44001	469.296012	0.107%
Fresno	2020	LHD1	GAS	40	11023.78163	475.23318	427.709861	0.039%
Fresno	2020	LHD1	DSL	40	16685.3603	521.44002	469.296021	0.059%
Fresno	2020	LHD1	GAS	45	13571.24509	452.05583	406.850248	0.048%
Fresno	2020	LHD1	DSL	45	18008.9918	521.44002	469.296015	0.064%
Fresno	2020	LHD1	GAS	50	100208.1816	454.3218	408.889624	0.354%
Fresno	2020	LHD1	DSL	50	69538.42058	521.44004	469.296036	0.246%
Fresno	2020	LHD1	GAS	55	27561.98152	482.41547	434.173925	0.097%
Fresno	2020	LHD1	DSL	55	41876.66483	521.43999	469.295994	0.148%
Fresno	2020	LHD2	GAS	5	2185.999834	2513.4972	2262.14751	0.008%
Fresno	2020	LHD2	DSL	5	2165.940834	521.32551	469.192959	0.008%
Fresno	2020	LHD2	GAS	10	5700.171632	2036.1281	1832.51531	0.020%
Fresno	2020	LHD2	DSL	10	7202.740987	521.32545	469.192908	0.025%
Fresno	2020	LHD2	GAS	15	12980.05837	1392.4297	1253.18673	0.046%
Fresno	2020	LHD2	DSL	15	15599.07284	521.32548	469.192929	0.055%
Fresno	2020	LHD2	GAS	20	14998.35728	1006.0684	905.461596	0.053%
Fresno	2020	LHD2	DSL	20	17101.62232	521.3255	469.192951	0.060%
Fresno	2020	LHD2	GAS	25	11553.35919	768.01208	691.210875	0.041%
Fresno	2020	LHD2	DSL	25	18303.29766	521.32547	469.192927	0.065%
Fresno	2020	LHD2	GAS	30	10216.96052	619.4336	557.490236	0.036%
Fresno	2020	LHD2	DSL	30	15450.30236	521.32548	469.192934	0.055%
Fresno	2020	LHD2	GAS	35	3817.707199	527.84656	475.061906	0.013%
Fresno	2020	LHD2	DSL	35	8153.724442	521.32547	469.192923	0.029%
Fresno	2020	LHD2	GAS	40	1126.900176	475.23317	427.709853	0.004%
Fresno	2020	LHD2	DSL	40	4476.12821	521.32553	469.192978	0.016%
Fresno	2020	LHD2	GAS	45	1387.31323	452.05583	406.850248	0.005%
Fresno	2020	LHD2	DSL	45	4831.21426	521.32552	469.192968	0.017%
Fresno	2020	LHD2	GAS	50	10243.72797	454.32179	408.889615	0.036%
Fresno	2020	LHD2	DSL	50	18654.84861	521.32553	469.192974	0.066%
Fresno	2020	LHD2	GAS	55	2817.508813	482.4155	434.173947	0.010%
Fresno	2020	LHD2	DSL	55	11234.11873	521.32552	469.192971	0.040%
Fresno	2020	MCY	GAS	5	16.68688392	263.60959	237.248635	0.000%
Fresno	2020	MCY	GAS	10	294.4601557	239.987	215.988302	0.001%
Fresno	2020	MCY	GAS	15	137.6083261	203.31025	182.979225	0.000%
Fresno	2020	MCY	GAS	20	8680.359343	177.28794	159.559145	0.031%
Fresno	2020	MCY	GAS	25	1758.264929	159.11187	143.200685	0.006%
Fresno	2020	MCY	GAS	30	4056.627639	147.00431	132.303882	0.014%
Fresno	2020	MCY	GAS	35	13991.15637	139.89607	125.906467	0.049%
Fresno	2020	MCY	GAS	40	23275.16288	137.24882	123.523938	0.082%
Fresno	2020	MCY	GAS	45	20382.35374	138.97664	125.078975	0.072%
Fresno	2020	MCY	GAS	50	27895.39084	145.4486	130.903738	0.099%
Fresno	2020	MCY	GAS	55	18574.45022	157.57522	141.817698	0.066%
Fresno	2020	MCY	GAS	60	22989.80272	177.00467	159.304207	0.081%
Fresno	2020	MCY	GAS	65	23486.72339	206.48665	185.837981	0.083%
Fresno	2020	MCY	GAS	70	22074.1257	250.51598	225.464381	0.078%
Fresno	2020	MDV	GAS	5	427.4652288	1956.688	1525.97278	0.002%
Fresno	2020	MDV	DSL	5	0.333527873	490.28924	377.108778	0.000%
Fresno	2020	MDV	GAS	10	7543.139266	1446.2357	1127.90657	0.027%
Fresno	2020	MDV	DSL	10	5.885501367	446.28971	343.748967	0.000%
Fresno	2020	MDV	GAS	15	3525.090445	1110.5412	866.11421	0.012%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	DSL	15	2.75043645	380.1288	293.586725	0.000%
Fresno	2020	MDV	GAS	20	222363.35	890.39433	694.407181	0.786%
Fresno	2020	MDV	DSL	20	173.4980433	335.55537	259.791799	0.001%
Fresno	2020	MDV	GAS	25	45041.19318	741.97753	578.642654	0.159%
Fresno	2020	MDV	DSL	25	35.14319288	306.59881	237.837356	0.000%
Fresno	2020	MDV	GAS	30	103917.9823	636.78632	496.616032	0.367%
Fresno	2020	MDV	DSL	30	81.08154619	289.65159	224.98822	0.000%
Fresno	2020	MDV	GAS	35	358409.259	568.60891	443.447127	1.267%
Fresno	2020	MDV	DSL	35	279.6472728	282.71202	219.726732	0.001%
Fresno	2020	MDV	GAS	40	596236.1499	526.15478	410.342796	2.108%
Fresno	2020	MDV	DSL	40	465.2106216	284.9856	221.450527	0.002%
Fresno	2020	MDV	GAS	45	522131.5284	506.29265	394.85277	1.846%
Fresno	2020	MDV	DSL	45	407.3908075	296.73091	230.355656	0.001%
Fresno	2020	MDV	GAS	50	714591.7653	506.04172	394.655526	2.526%
Fresno	2020	MDV	DSL	50	557.5570769	319.30972	247.474579	0.002%
Fresno	2020	MDV	GAS	55	475818.7393	524.73439	409.233126	1.682%
Fresno	2020	MDV	DSL	55	371.2554625	355.45334	274.878147	0.001%
Fresno	2020	MDV	GAS	60	588926.1182	564.34648	440.127202	2.082%
Fresno	2020	MDV	DSL	60	459.5070332	409.81987	316.098065	0.002%
Fresno	2020	MDV	GAS	65	601655.6237	630.1431	491.441651	2.127%
Fresno	2020	MDV	DSL	65	469.4391087	490.00332	376.891997	0.002%
Fresno	2020	MDV	GAS	70	565469.2796	675.65501	526.934139	1.999%
Fresno	2020	MDV	DSL	70	441.2049752	608.30305	466.585136	0.002%
Fresno	2020	MH	GAS	5	375.9017657	2513.4973	2262.14753	0.001%
Fresno	2020	MH	DSL	5	74.62377466	2390.0672	2151.06044	0.000%
Fresno	2020	MH	GAS	10	1889.661497	2036.1283	1832.51547	0.007%
Fresno	2020	MH	DSL	10	371.4490664	2170.188	1953.16921	0.001%
Fresno	2020	MH	GAS	15	2386.966339	1392.4297	1253.18671	0.008%
Fresno	2020	MH	DSL	15	501.3272751	1781.9066	1603.71592	0.002%
Fresno	2020	MH	GAS	20	2475.870442	1006.0686	905.461738	0.009%
Fresno	2020	MH	DSL	20	531.6758273	1462.2599	1316.03391	0.002%
Fresno	2020	MH	GAS	25	2758.692156	768.01205	691.210843	0.010%
Fresno	2020	MH	DSL	25	553.719262	1311.5663	1180.40971	0.002%
Fresno	2020	MH	GAS	30	3119.094445	619.43361	557.490248	0.011%
Fresno	2020	MH	DSL	30	665.8025648	1231.0993	1107.98936	0.002%
Fresno	2020	MH	GAS	35	3876.560955	527.84661	475.061951	0.014%
Fresno	2020	MH	DSL	35	785.0689398	1164.3217	1047.88949	0.003%
Fresno	2020	MH	GAS	40	4825.918952	475.2332	427.709878	0.017%
Fresno	2020	MH	DSL	40	974.5408363	1111.2334	1000.11009	0.003%
Fresno	2020	MH	GAS	45	4400.908252	452.05585	406.850268	0.016%
Fresno	2020	MH	DSL	45	798.019717	1071.8346	964.651153	0.003%
Fresno	2020	MH	GAS	50	4282.988184	454.32186	408.889674	0.015%
Fresno	2020	MH	DSL	50	893.1138315	1046.1252	941.512654	0.003%
Fresno	2020	MH	GAS	55	5601.758146	482.41557	434.174012	0.020%
Fresno	2020	MH	DSL	55	1308.777391	1034.1051	930.694616	0.005%
Fresno	2020	MH	GAS	60	6464.173618	541.20922	487.088296	0.023%
Fresno	2020	MH	DSL	60	1572.715418	1035.7744	932.196962	0.006%
Fresno	2020	MH	GAS	65	1010.10891	641.49794	577.348142	0.004%
Fresno	2020	MH	DSL	65	247.5006536	1051.1334	946.020045	0.001%
Fresno	2020	OBUS	GAS	5	223.1933909	2513.4974	2262.14768	0.001%
Fresno	2020	OBUS	DSL	5	189.4743925	3023.7787	2721.40084	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	OBUS	GAS	10	1121.995179	2036.1283	1832.51547	0.004%
Fresno	2020	OBUS	DSL	10	873.8793826	2435.1748	2191.65732	0.003%
Fresno	2020	OBUS	GAS	15	1417.27225	1392.4297	1253.18671	0.005%
Fresno	2020	OBUS	DSL	15	1150.490893	1981.8507	1783.66567	0.004%
Fresno	2020	OBUS	GAS	20	1470.059473	1006.0686	905.461718	0.005%
Fresno	2020	OBUS	DSL	20	1535.69351	1680.0018	1512.00159	0.005%
Fresno	2020	OBUS	GAS	25	1637.986093	768.01209	691.210882	0.006%
Fresno	2020	OBUS	DSL	25	1593.312243	1565.8826	1409.29435	0.006%
Fresno	2020	OBUS	GAS	30	1851.976584	619.43366	557.490296	0.007%
Fresno	2020	OBUS	DSL	30	2222.551712	1524.477	1372.02928	0.008%
Fresno	2020	OBUS	GAS	35	2301.725777	527.84661	475.061952	0.008%
Fresno	2020	OBUS	DSL	35	3281.369258	1506.8029	1356.12259	0.012%
Fresno	2020	OBUS	GAS	40	2865.411437	475.23323	427.709905	0.010%
Fresno	2020	OBUS	DSL	40	3502.618858	1398.0016	1258.20144	0.012%
Fresno	2020	OBUS	GAS	45	2613.059424	452.05584	406.850252	0.009%
Fresno	2020	OBUS	DSL	45	3919.848541	1422.5072	1280.25645	0.014%
Fresno	2020	OBUS	GAS	50	2543.043925	454.32186	408.889677	0.009%
Fresno	2020	OBUS	DSL	50	4186.335389	1378.9402	1241.04618	0.015%
Fresno	2020	OBUS	GAS	55	3326.069877	482.41555	434.173991	0.012%
Fresno	2020	OBUS	DSL	55	5486.643759	1338.9738	1205.07644	0.019%
Fresno	2020	OBUS	GAS	60	3838.132886	541.2092	487.088281	0.014%
Fresno	2020	OBUS	DSL	60	3711.118326	1163.509	1047.15807	0.013%
Fresno	2020	OBUS	GAS	65	599.756791	641.49795	577.348151	0.002%
Fresno	2020	OBUS	DSL	65	966.0730169	1343.8417	1209.45751	0.003%
Fresno	2020	SBUS	GAS	5	58.03696424	2513.497	2262.14732	0.000%
Fresno	2020	SBUS	DSL	5	153.6039937	2632.2332	2369.0099	0.001%
Fresno	2020	SBUS	GAS	10	203.4165827	2036.1281	1832.5153	0.001%
Fresno	2020	SBUS	DSL	10	538.3741248	2174.4303	1956.98731	0.002%
Fresno	2020	SBUS	GAS	15	406.8331817	1392.4295	1253.18659	0.001%
Fresno	2020	SBUS	DSL	15	1076.74825	1785.3958	1606.85622	0.004%
Fresno	2020	SBUS	GAS	20	552.2098641	1006.0685	905.461668	0.002%
Fresno	2020	SBUS	DSL	20	1461.510625	1408.4997	1267.64973	0.005%
Fresno	2020	SBUS	GAS	25	871.7004002	768.0121	691.21089	0.003%
Fresno	2020	SBUS	DSL	25	2307.092737	1314.1617	1182.74553	0.008%
Fresno	2020	SBUS	GAS	30	1045.811315	619.43358	557.490219	0.004%
Fresno	2020	SBUS	DSL	30	2767.904718	1233.5395	1110.18552	0.010%
Fresno	2020	SBUS	GAS	35	1073.393783	527.84651	475.061863	0.004%
Fresno	2020	SBUS	DSL	35	2840.905979	1166.633	1049.96972	0.010%
Fresno	2020	SBUS	GAS	40	724.5975211	475.23316	427.709842	0.003%
Fresno	2020	SBUS	DSL	40	1917.761723	1113.4423	1002.09811	0.007%
Fresno	2020	SBUS	GAS	45	347.6444581	452.05579	406.850211	0.001%
Fresno	2020	SBUS	DSL	45	920.0959117	1073.9674	966.570693	0.003%
Fresno	2020	SBUS	GAS	50	174.1108852	454.32177	408.889594	0.001%
Fresno	2020	SBUS	DSL	50	460.811981	1048.2083	943.387475	0.002%
Fresno	2020	SBUS	GAS	55	259.1529318	482.41547	434.173922	0.001%
Fresno	2020	SBUS	DSL	55	685.8891861	1036.165	932.548455	0.002%
Fresno	2020	SBUS	GAS	60	144.2307875	541.2091	487.088192	0.001%
Fresno	2020	SBUS	DSL	60	381.7295431	1037.8374	934.05363	0.001%
Fresno	2020	T6	GAS	5	757.7971042	2513.4975	2262.14774	0.003%
Fresno	2020	T6	DSL	5	3782.072492	2577.8739	2320.08648	0.013%
Fresno	2020	T6	GAS	10	3809.452781	2036.1283	1832.51547	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	T6	DSL	10	18825.7321	2129.5253	1916.57274	0.067%
Fresno	2020	T6	GAS	15	4811.99169	1392.4297	1253.18675	0.017%
Fresno	2020	T6	DSL	15	25408.20417	1748.5248	1573.67236	0.090%
Fresno	2020	T6	GAS	20	4991.217479	1006.0686	905.46177	0.018%
Fresno	2020	T6	DSL	20	26946.3239	1379.4122	1241.47096	0.095%
Fresno	2020	T6	GAS	25	5561.370137	768.01215	691.210939	0.020%
Fresno	2020	T6	DSL	25	28063.52768	1287.0224	1158.32015	0.099%
Fresno	2020	T6	GAS	30	6287.921467	619.43362	557.49026	0.022%
Fresno	2020	T6	DSL	30	33744.11845	1208.0651	1087.25862	0.119%
Fresno	2020	T6	GAS	35	7814.932614	527.84653	475.061878	0.028%
Fresno	2020	T6	DSL	35	39788.75993	1142.5404	1028.28635	0.141%
Fresno	2020	T6	GAS	40	9728.784867	475.23324	427.709914	0.034%
Fresno	2020	T6	DSL	40	49391.55144	1090.4482	981.403359	0.175%
Fresno	2020	T6	GAS	45	8871.986895	452.05589	406.850299	0.031%
Fresno	2020	T6	DSL	45	40445.13139	1051.7885	946.609636	0.143%
Fresno	2020	T6	GAS	50	8634.26726	454.32179	408.889615	0.031%
Fresno	2020	T6	DSL	50	45264.67932	1026.5613	923.905185	0.160%
Fresno	2020	T6	GAS	55	11292.83405	482.4156	434.174038	0.040%
Fresno	2020	T6	DSL	55	66331.28571	1014.7667	913.290006	0.235%
Fresno	2020	T6	GAS	60	13031.41533	541.20926	487.088332	0.046%
Fresno	2020	T6	DSL	60	79708.15566	1016.4046	914.764098	0.282%
Fresno	2020	T6	GAS	65	2036.323575	641.49801	577.34821	0.007%
Fresno	2020	T6	DSL	65	12543.79741	1031.475	928.327461	0.044%
Fresno	2020	T7	GAS	5	45.14811148	2513.4971	2262.14736	0.000%
Fresno	2020	T7	DSL	5	8396.704746	3977.8081	3580.02731	0.030%
Fresno	2020	T7	GAS	10	220.662119	2036.1283	1832.51544	0.001%
Fresno	2020	T7	DSL	10	32075.80037	3285.9804	2957.38233	0.113%
Fresno	2020	T7	GAS	15	240.6355065	1392.4297	1253.18671	0.001%
Fresno	2020	T7	DSL	15	39228.96626	2698.0747	2428.26726	0.139%
Fresno	2020	T7	GAS	20	411.241983	1006.0685	905.461655	0.001%
Fresno	2020	T7	DSL	20	97100.08386	2129.5835	1916.62514	0.343%
Fresno	2020	T7	GAS	25	536.6970104	768.01215	691.210933	0.002%
Fresno	2020	T7	DSL	25	88604.77385	1985.9498	1787.35483	0.313%
Fresno	2020	T7	GAS	30	980.1093934	619.43364	557.490278	0.003%
Fresno	2020	T7	DSL	30	149589.5276	1864.1142	1677.70278	0.529%
Fresno	2020	T7	GAS	35	1743.255924	527.84661	475.061945	0.006%
Fresno	2020	T7	DSL	35	269115.3006	1763.0057	1586.70517	0.951%
Fresno	2020	T7	GAS	40	1519.637782	475.23317	427.709849	0.005%
Fresno	2020	T7	DSL	40	253966.6678	1682.6245	1514.36201	0.898%
Fresno	2020	T7	GAS	45	1607.939024	452.0558	406.850223	0.006%
Fresno	2020	T7	DSL	45	355569.7933	1622.9703	1460.67329	1.257%
Fresno	2020	T7	GAS	50	1682.35955	454.3218	408.889618	0.006%
Fresno	2020	T7	DSL	50	369783.8463	1584.0433	1425.63901	1.307%
Fresno	2020	T7	GAS	55	2469.579288	482.41551	434.173958	0.009%
Fresno	2020	T7	DSL	55	450928.7666	1565.8435	1409.25918	1.594%
Fresno	2020	T7	GAS	60	609.4964239	541.20921	487.088286	0.002%
Fresno	2020	T7	DSL	60	137368.6558	1568.3709	1411.53379	0.486%
Fresno	2020	T7	GAS	65	326.6774339	641.49796	577.348164	0.001%
Fresno	2020	T7	DSL	65	75239.57125	1591.6254	1432.46284	0.266%
Fresno	2020	UBUS	GAS	5	142.5170016	2513.497	2262.14729	0.001%
Fresno	2020	UBUS	DSL	5	351.317801	2440.8645	2196.77806	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	UBUS	GAS	10	511.5367803	2036.1283	1832.51547	0.002%
Fresno	2020	UBUS	DSL	10	1260.986146	2440.8645	2196.77804	0.004%
Fresno	2020	UBUS	GAS	15	1023.073523	1392.4297	1253.18671	0.004%
Fresno	2020	UBUS	DSL	15	2521.972627	2440.8642	2196.77781	0.009%
Fresno	2020	UBUS	GAS	20	1350.100402	1006.0686	905.461701	0.005%
Fresno	2020	UBUS	DSL	20	3328.12413	2440.8647	2196.77822	0.012%
Fresno	2020	UBUS	GAS	25	2033.347957	768.01208	691.210868	0.007%
Fresno	2020	UBUS	DSL	25	5012.394	2440.8646	2196.77812	0.018%
Fresno	2020	UBUS	GAS	30	2544.884591	619.43361	557.490252	0.009%
Fresno	2020	UBUS	DSL	30	6273.37969	2440.8644	2196.77797	0.022%
Fresno	2020	UBUS	GAS	35	2493.975603	527.84654	475.061885	0.009%
Fresno	2020	UBUS	DSL	35	6147.88385	2440.8645	2196.77802	0.022%
Fresno	2020	UBUS	GAS	40	1797.928884	475.23316	427.709842	0.006%
Fresno	2020	UBUS	DSL	40	4432.06321	2440.8647	2196.77821	0.016%
Fresno	2020	UBUS	GAS	45	783.7715293	452.05586	406.850272	0.003%
Fresno	2020	UBUS	DSL	45	1932.070593	2440.8644	2196.77797	0.007%
Fresno	2020	UBUS	GAS	50	398.2134972	454.3218	408.889617	0.001%
Fresno	2020	UBUS	DSL	50	981.633661	2440.8646	2196.77811	0.003%
Fresno	2020	UBUS	GAS	55	493.7042317	482.41551	434.173958	0.002%
Fresno	2020	UBUS	DSL	55	1217.027328	2440.8644	2196.77795	0.004%
Fresno	2020	UBUS	GAS	60	808.0757296	541.20919	487.088268	0.003%
Fresno	2020	UBUS	DSL	60	1991.982525	2440.8644	2196.778	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	Used 2020 emission factor projected by PG&E
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	245690	26.3	9.3	226,011
Commercial	1,800,825,042	7,503	261120	27.9	9.9	240,205
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**506,809**	**54.2**	**19.2**	**466,216**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

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

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

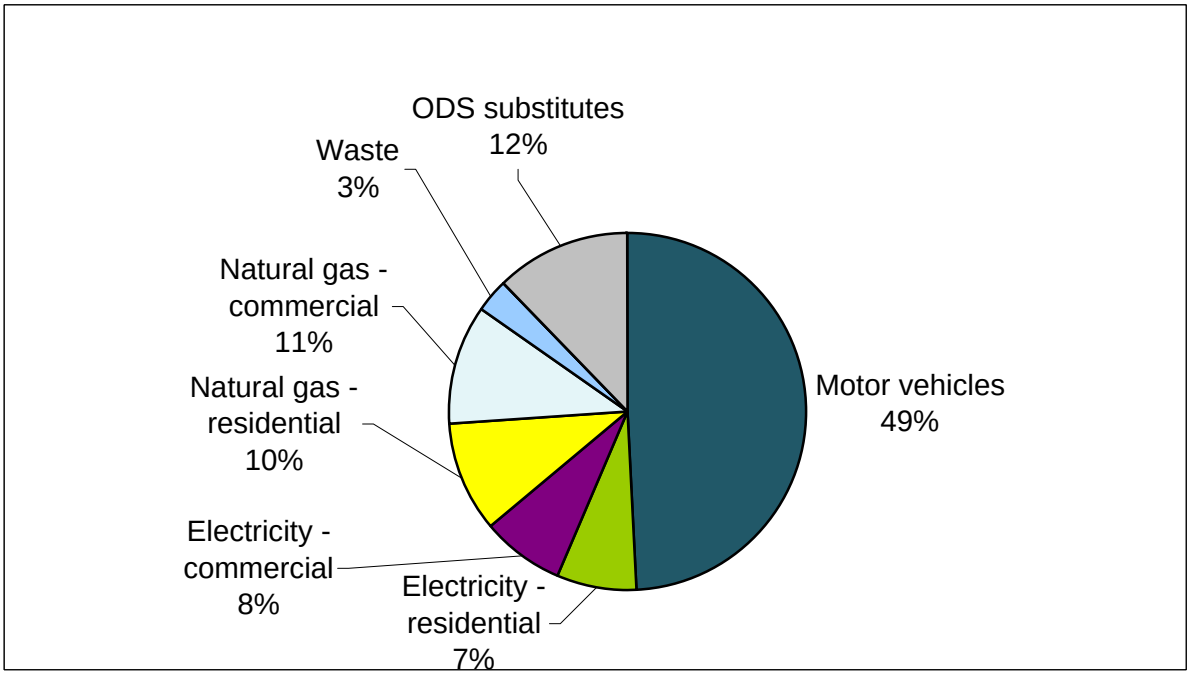
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,337,015	1,828,249
Electricity - residential	345,142	313,405
Electricity - commercial	366,817	334,657
Natural gas - residential	476,679	431,774
Natural gas - commercial	514,647	469,526
Waste	147,628	147,628
Offroad equipment	1,138	1,138
ODS substitutes	576,784	576,784
Total	***4,765,850***	4,103,161



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,149,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,069,502,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1130	835	641	514	428	368	328	304	292	292	303	326	364	390	0
LDT1	1305	964	741	594	495	425	379	351	338	337	350	376	420	451	0
LDT2	1536	1135	872	699	582	500	446	413	397	397	412	443	495	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	264	240	203	177	159	147	140	137	139	145	158	177	206	251	0
MDV	1957	1446	1111	890	742	637	569	526	506	506	525	564	630	676	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	487	444	378	335	306	289	282	285	296	319	354	408	487	603	0
LDT1	486	444	380	338	310	293	287	289	300	322	357	409	486	600	0
LDT2	484	441	378	335	308	291	285	287	298	320	354	407	483	597	0
LHD1	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
LHD2	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	490	446	380	336	307	290	283	285	297	319	355	410	490	608	0
MH	2390	2170	1782	1462	1312	1231	1164	1111	1072	1046	1034	1036	1051	0	0
OBUS	3024	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164	1344	0	0
SBUS	2632	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038	0	0	0
T6	2578	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016	1031	0	0
T7	3978	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568	1592	0	0
UBUS	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1	143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2	366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1	60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2	6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY	15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV	381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH	3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS	2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS	0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6	7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7	1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS	1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1	0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2	0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1	36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2	10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH	1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS	3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS	1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6	37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7	185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS	3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	444	95,444	1,988	9,526	30,550	25,468	144,160	59,580	61,685	31,272	123,830	121,830	9	0	0	**705,341**
LDT1	75	16,108	336	1,608	5,154	4,298	24,327	10,055	10,411	5,278	20,898	20,561	2	0	0	**119,035**
LDT2	226	48,522	1,011	4,843	15,528	12,946	73,283	30,289	31,360	15,898	62,951	61,935	5	0	0	**358,571**
LHD1	60	14,215	264	1,139	3,344	2,620	14,155	5,693	5,826	2,970	12,042	0	0	0	0	**62,268**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,453	27	116	342	268	1,447	582	596	304	1,231	0	0	0	0	**6,365**
MCY	2	417	10	50	173	155	934	409	446	237	979	1,006	0	0	0	**4,816**
MDV	299	64,398	1,341	6,427	20,607	17,181	97,257	40,199	41,620	21,099	83,547	82,199	6	0	0	**475,881**
MH	3	820	15	66	193	151	817	328	336	171	695	713	0	0	0	**4,305**
OBUS	2	487	9	39	115	90	485	195	200	102	412	423	0	0	0	**2,556**
SBUS	0	111	2	9	26	20	110	44	45	23	94	96	0	0	0	**580**
T6	7	1,653	31	132	389	305	1,646	662	678	345	1,400	1,437	0	0	0	**8,679**
T7	1	234	4	19	55	43	233	94	96	49	198	203	0	0	0	**1,227**
UBUS	1	271	5	22	64	50	270	109	111	57	230	236	0	0	0	**1,424**
Total	**1,127**	**244,134**	**5,042**	**23,994**	**76,539**	**63,595**	**359,124**	**148,240**	**153,409**	**77,803**	**308,508**	**290,640**	**22**	**0**	**0**	**1,752,177**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	140	3	17	60	56	344	155	173	94	401	422	0	0	0	**1,866**
LDT1	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**132**
LDT2	0	9	0	1	4	4	22	10	11	6	25	27	0	0	0	**119**
LHD1	8	2,218	60	360	1,384	1,344	8,521	3,806	4,095	2,077	7,931	0	0	0	0	**31,796**
LHD2	2	595	16	96	371	360	2,285	1,021	1,098	557	2,127	0	0	0	0	**8,528**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	16	0	2	7	6	38	17	19	10	44	47	0	0	0	**205**
MH	1	187	4	20	70	64	384	164	170	84	318	291	0	0	0	**1,757**
OBUS	3	736	16	82	295	279	1,749	725	794	390	1,447	1,150	0	0	0	**7,664**
SBUS	1	313	7	33	118	107	644	275	285	141	532	488	0	0	0	**2,943**
T6	39	9,278	207	974	3,497	3,189	19,121	8,152	8,460	4,188	15,808	14,485	1	0	0	**87,360**
T7	295	70,843	1,578	7,442	26,705	24,352	146,004	62,243	64,597	31,977	120,709	110,604	8	0	0	**667,062**
UBUS	3	802	22	130	500	486	3,080	1,376	1,480	751	2,867	2,622	0	0	0	**14,114**
Total	**351**	**85,146**	**1,914**	**9,159**	**33,016**	**30,252**	**182,216**	**77,953**	**81,194**	**40,283**	**152,239**	**130,166**	**9**	**0**	**0**	**823,898**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,576,074	2,337,015	2,337,015

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,435,514 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,173,962,610 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	796	0	**796**	5
5 - 10 MPH	661	774	0	**1,435**	5
10 - 15 MPH	128,951	166,457	354,011	**649,418**	10
15 - 20 MPH	4,357	6,447	6,811	**17,615**	15
20 - 25 MPH	19,066	31,870	54,334	**105,270**	20
25 - 30 MPH	77,876	103,120	224,064	**405,060**	25
30 - 35 MPH	86,309	136,586	170,618	**393,513**	30
35 - 40 MPH	508,418	658,756	1,327,422	**2,494,596**	35
40 - 45 MPH	227,365	277,442	609,480	**1,114,287**	40
45 - 50 MPH	193,416	254,865	750,637	**1,198,918**	45
50 - 55 MPH	104,609	147,771	355,701	**608,081**	50
55 - 60 MPH	464,301	552,054	1,305,747	**2,322,102**	55
60 - 65 MPH	445,111	552,939	1,126,227	**2,124,277**	60
65 - 70 MPH	25	32	89	**146**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,260,464**	**2,889,911**	**6,285,139**	**11,435,514**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2232	649418	17615	105270	405060	393513	2494596	1114287	1198918	608081	2322102	2124277	146	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	766	566	434	348	290	249	222	206	198	198	205	221	246	264	0
LDT1	926	684	525	421	351	301	269	249	240	239	248	267	298	320	0
LDT2	1144	845	649	520	434	372	332	308	296	296	307	330	368	395	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	237	216	183	160	143	132	126	124	125	131	142	159	186	225	0
MDV	1526	1128	866	694	579	497	443	410	395	395	409	440	491	527	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	330	301	258	230	211	200	195	197	205	219	243	278	330	406	0
LDT1	324	297	256	229	211	201	197	198	205	219	241	275	324	396	0
LDT2	353	323	278	248	228	216	212	213	221	237	261	298	353	433	0
LHD1	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
LHD2	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	377	344	294	260	238	225	220	221	230	247	275	316	377	467	0
MH	2151	1953	1604	1316	1180	1108	1048	1000	965	942	931	932	946	0	0
OBUS	2721	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047	1209	0	0
SBUS	2369	1957	1607	1268	1183	1110	1050	1002	967	943	933	934	0	0	0
T6	2320	1917	1574	1241	1158	1087	1028	981	947	924	913	915	928	0	0
T7	3580	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412	1432	0	0
UBUS	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	974	283335	7685	45928	176724	171686	1088370	486153	523077	265300	1013113	926803	64	0	0
LDT1	142	41390	1123	6709	25816	25080	158991	71018	76412	38756	147998	135389	9	0	0
LDT2	364	105917	2873	17169	66063	64180	406857	181735	195538	99175	378724	346459	24	0	0
LHD1	59	17301	469	2804	10791	10483	66457	29685	31939	16199	61861	56591	4	0	0
LHD2	6	1769	48	287	1103	1072	6793	3035	3265	1656	6324	5785	0	0	0
MCY	15	4308	117	698	2687	2610	16547	7391	7952	4033	15402	14090	1	0	0
MDV	379	110346	2993	17887	68826	66864	423870	189334	203715	103322	394561	360947	25	0	0
MH	3	998	27	162	622	605	3834	1712	1843	935	3569	3265	0	0	0
OBUS	2	593	16	96	370	359	2276	1017	1094	555	2119	1938	0	0	0
SBUS	0	135	4	22	84	82	517	231	248	126	481	440	0	0	0
T6	7	2012	55	326	1255	1219	7729	3452	3714	1884	7194	6581	0	0	0
T7	1	285	8	46	177	172	1093	488	525	266	1017	931	0	0	0
UBUS	1	330	9	54	206	200	1268	567	610	309	1181	1080	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	785	21	127	489	475	3014	1346	1449	735	2806	2567	0	0	0
LDT1	0	55	1	9	34	33	211	94	101	51	196	179	0	0	0
LDT2	0	50	1	8	31	30	191	86	92	47	178	163	0	0	0
LHD1	36	10542	286	1709	6575	6388	40494	18088	19462	9871	37694	34483	2	0	0
LHD2	10	2828	77	458	1764	1714	10863	4852	5221	2648	10112	9251	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
MH	1	213	6	35	133	129	818	366	393	199	762	697	0	0	0
OBUS	3	749	20	121	467	454	2877	1285	1383	701	2678	2450	0	0	0
SBUS	1	356	10	58	222	216	1368	611	658	333	1274	1165	0	0	0
T6	37	10797	293	1750	6734	6542	41473	18525	19932	10109	38605	35316	2	0	0
T7	184	53427	1449	8660	33324	32374	205227	91671	98633	50026	191036	174761	12	0	0
UBUS	3	814	22	132	508	493	3127	1397	1503	762	2910	2662	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	299	64,357	1,340	6,423	20,598	17,172	97,203	40,174	41,593	21,086	83,497	82,148	6	0	0	**475,598**
LDT1	53	11,371	237	1,135	3,638	3,034	17,172	7,098	7,349	3,725	14,751	14,514	1	0	0	**84,024**
LDT2	167	35,950	749	3,588	11,504	9,592	54,294	22,441	23,234	11,778	46,640	45,887	4	0	0	**265,661**
LHD1	54	12,729	236	1,020	2,995	2,346	12,676	5,098	5,217	2,659	10,784	0	0	0	0	**55,760**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,301	24	104	306	240	1,296	521	533	272	1,102	0	0	0	0	**5,700**
MCY	1	374	9	45	154	139	836	367	399	212	877	901	0	0	0	**4,313**
MDV	232	49,971	1,041	4,987	15,990	13,332	75,468	31,193	32,296	16,372	64,829	63,783	5	0	0	**369,266**
MH	3	734	14	59	173	135	731	294	301	153	622	638	0	0	0	**3,855**
OBUS	2	436	8	35	103	80	434	175	179	91	369	379	0	0	0	**2,289**
SBUS	0	99	2	8	23	18	99	40	41	21	84	86	0	0	0	**520**
T6	6	1,480	27	119	348	273	1,474	593	607	309	1,254	1,287	0	0	0	**7,772**
T7	1	209	4	17	49	39	208	84	86	44	177	182	0	0	0	**1,099**
UBUS	1	243	5	19	57	45	242	97	100	51	206	211	0	0	0	**1,275**
Total	**826**	**179,254**	**3,695**	**17,557**	**55,939**	**46,445**	**262,133**	**108,174**	**111,934**	**56,774**	**225,193**	**210,018**	**16**	**0**	**0**	**1,277,958**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	95	2	12	41	38	237	106	119	65	273	286	0	0	0	**1,274**
LDT1	0	7	0	1	3	3	17	7	8	5	19	20	0	0	0	**89**
LDT2	0	6	0	1	3	3	16	7	8	4	19	20	0	0	0	**87**
LHD1	7	1,986	54	322	1,239	1,204	7,630	3,408	3,667	1,860	7,102	0	0	0	0	**28,472**
LHD2	2	533	14	86	332	323	2,046	914	984	499	1,905	0	0	0	0	**7,636**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	12	0	1	5	5	29	13	15	8	34	36	0	0	0	**158**
MH	1	167	4	18	63	57	344	147	152	75	285	261	0	0	0	**1,574**
OBUS	3	659	15	74	264	250	1,566	649	711	349	1,296	1,030	0	0	0	**6,863**
SBUS	1	280	6	29	105	96	577	246	255	126	477	437	0	0	0	**2,635**
T6	35	8,308	185	872	3,132	2,856	17,122	7,300	7,576	3,750	14,156	12,971	1	0	0	**78,229**
T7	264	63,438	1,413	6,664	23,914	21,807	130,742	55,737	57,845	28,635	108,092	99,043	7	0	0	**597,336**
UBUS	2	718	19	116	448	435	2,758	1,232	1,325	672	2,567	2,348	0	0	0	**12,639**
Total	**315**	**76,209**	**1,713**	**8,198**	**29,550**	**27,076**	**163,085**	**69,767**	**72,664**	**36,048**	**136,224**	**116,451**	**8**	**0**	**0**	**737,308**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,015,266	1,828,249	1,828,249

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2020, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1097.601204	1129.5953	765.503158	0.004%
Fresno	2020	LDA	DSL	5	3.039576937	487.08109	329.765357	0.000%
Fresno	2020	LDA	GAS	10	19368.49589	834.77968	565.727079	0.068%
Fresno	2020	LDA	DSL	10	53.63699778	443.70668	301.292224	0.000%
Fresno	2020	LDA	GAS	15	9051.364273	640.94058	434.371007	0.032%
Fresno	2020	LDA	DSL	15	25.06585843	378.48579	258.477977	0.000%
Fresno	2020	LDA	GAS	20	570961.7421	513.96372	348.309075	2.019%
Fresno	2020	LDA	DSL	20	1581.159357	334.54556	229.633409	0.006%
Fresno	2020	LDA	GAS	25	115652.1287	428.38541	290.303306	0.409%
Fresno	2020	LDA	DSL	25	320.2743836	306.00044	210.894972	0.001%
Fresno	2020	LDA	GAS	30	266829.8871	367.60468	249.119316	0.943%
Fresno	2020	LDA	DSL	30	738.9295648	289.29397	199.928012	0.003%
Fresno	2020	LDA	GAS	35	920286.3609	328.24025	222.443474	3.254%
Fresno	2020	LDA	DSL	35	2548.5404	282.45305	195.437288	0.009%
Fresno	2020	LDA	GAS	40	1530953.789	303.70517	205.819413	5.413%
Fresno	2020	LDA	DSL	40	4239.656111	284.69426	196.908534	0.015%
Fresno	2020	LDA	GAS	45	1340675.525	292.23901	198.049009	4.740%
Fresno	2020	LDA	DSL	45	3712.720433	296.27271	204.509208	0.013%
Fresno	2020	LDA	GAS	50	1834855.081	292.10301	197.955884	6.487%
Fresno	2020	LDA	DSL	50	5081.247577	318.53069	219.120456	0.018%
Fresno	2020	LDA	GAS	55	1221758.238	302.89634	205.27008	4.319%
Fresno	2020	LDA	DSL	55	3383.404003	354.16085	242.509876	0.012%
Fresno	2020	LDA	GAS	60	1512183.811	325.75529	220.762098	5.346%
Fresno	2020	LDA	DSL	60	4187.676879	407.75495	277.691718	0.015%
Fresno	2020	LDA	GAS	65	1544869.267	363.73237	246.499166	5.462%
Fresno	2020	LDA	DSL	65	4278.192318	486.79924	329.580336	0.015%
Fresno	2020	LDA	GAS	70	1451953.777	390.01281	264.308173	5.133%
Fresno	2020	LDA	DSL	70	4020.882357	603.41836	406.134954	0.014%
Fresno	2020	LDT1	GAS	5	160.3399232	1304.7967	925.652415	0.001%
Fresno	2020	LDT1	DSL	5	0.212505042	486.45442	323.971419	0.000%
Fresno	2020	LDT1	GAS	10	2829.391349	964.45342	684.23582	0.010%
Fresno	2020	LDT1	DSL	10	3.749907629	444.12974	296.951752	0.000%
Fresno	2020	LDT1	GAS	15	1322.24271	740.61424	525.449186	0.005%
Fresno	2020	LDT1	DSL	15	1.752421886	380.48738	256.32308	0.000%
Fresno	2020	LDT1	GAS	20	83407.31561	593.77137	421.24901	0.295%
Fresno	2020	LDT1	DSL	20	110.5431162	337.6106	228.950955	0.000%
Fresno	2020	LDT1	GAS	25	16894.71195	494.765	350.98776	0.060%
Fresno	2020	LDT1	DSL	25	22.39124832	309.75632	211.169055	0.000%
Fresno	2020	LDT1	GAS	30	38979.08188	424.63836	301.25086	0.138%
Fresno	2020	LDT1	DSL	30	51.6605658	293.45418	200.761924	0.000%
Fresno	2020	LDT1	GAS	35	134437.4047	379.17701	269.000862	0.475%
Fresno	2020	LDT1	DSL	35	178.1753487	286.77884	196.500452	0.001%
Fresno	2020	LDT1	GAS	40	223644.9863	350.87622	248.929757	0.791%
Fresno	2020	LDT1	DSL	40	296.4058539	288.9658	197.896581	0.001%
Fresno	2020	LDT1	GAS	45	195848.7412	337.63129	239.533452	0.692%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDT1	DSL	45	259.5663607	300.26399	205.109234	0.001%
Fresno	2020	LDT1	GAS	50	268039.5871	337.46078	239.410422	0.948%
Fresno	2020	LDT1	DSL	50	355.2437845	321.98332	218.97465	0.001%
Fresno	2020	LDT1	GAS	55	178477.0744	349.92509	248.252412	0.631%
Fresno	2020	LDT1	DSL	55	236.5429175	356.75116	241.170106	0.001%
Fresno	2020	LDT1	GAS	60	220903.0487	376.34322	266.996146	0.781%
Fresno	2020	LDT1	DSL	60	292.7718184	409.04819	274.556024	0.001%
Fresno	2020	LDT1	GAS	65	225677.8211	420.22158	298.126155	0.798%
Fresno	2020	LDT1	DSL	65	299.1000053	486.17935	323.795817	0.001%
Fresno	2020	LDT1	GAS	70	212104.5317	450.56841	319.653386	0.750%
Fresno	2020	LDT1	DSL	70	281.110744	599.97604	396.44253	0.001%
Fresno	2020	LDT2	GAS	5	410.3073308	1536.0292	1143.76708	0.001%
Fresno	2020	LDT2	DSL	5	0.193123223	483.63558	352.949647	0.000%
Fresno	2020	LDT2	GAS	10	7240.367106	1135.2759	845.371167	0.026%
Fresno	2020	LDT2	DSL	10	3.40789224	441.45895	322.997862	0.000%
Fresno	2020	LDT2	GAS	15	3383.597905	871.73757	649.13865	0.012%
Fresno	2020	LDT2	DSL	15	1.59258996	378.03921	277.960266	0.000%
Fresno	2020	LDT2	GAS	20	213437.9851	698.95406	520.466327	0.755%
Fresno	2020	LDT2	DSL	20	100.4608962	335.3124	247.617766	0.000%
Fresno	2020	LDT2	GAS	25	43233.29642	582.47638	433.722102	0.153%
Fresno	2020	LDT2	DSL	25	20.34902432	307.5556	227.906247	0.000%
Fresno	2020	LDT2	GAS	30	99746.85881	499.88306	372.227237	0.353%
Fresno	2020	LDT2	DSL	30	46.94879405	291.3105	216.369771	0.000%
Fresno	2020	LDT2	GAS	35	344023.1716	446.36108	332.374045	1.216%
Fresno	2020	LDT2	DSL	35	161.9246321	284.65849	211.645838	0.001%
Fresno	2020	LDT2	GAS	40	572303.9925	413.02584	307.554824	2.023%
Fresno	2020	LDT2	DSL	40	269.3717451	286.83782	213.193489	0.001%
Fresno	2020	LDT2	GAS	45	501173.8359	397.43382	295.94458	1.772%
Fresno	2020	LDT2	DSL	45	235.8922431	298.09651	221.188859	0.001%
Fresno	2020	LDT2	GAS	50	685909.0183	397.23953	295.798871	2.425%
Fresno	2020	LDT2	DSL	50	322.8433094	319.73983	236.558891	0.001%
Fresno	2020	LDT2	GAS	55	456719.9404	411.91427	306.725826	1.615%
Fresno	2020	LDT2	DSL	55	214.9687115	354.38602	261.162921	0.001%
Fresno	2020	LDT2	GAS	60	565287.3873	443.00751	329.879711	1.999%
Fresno	2020	LDT2	DSL	60	266.0691583	406.50012	298.171814	0.001%
Fresno	2020	LDT2	GAS	65	577505.9743	494.65656	368.339783	2.042%
Fresno	2020	LDT2	DSL	65	271.8201986	483.36142	352.754954	0.001%
Fresno	2020	LDT2	GAS	70	542772.0652	530.38611	394.944181	1.919%
Fresno	2020	LDT2	DSL	70	255.4716835	596.75996	433.28506	0.001%
Fresno	2020	LHD1	GAS	5	21384.31271	2513.4972	2262.14749	0.076%
Fresno	2020	LHD1	DSL	5	8073.831436	521.44003	469.296029	0.029%
Fresno	2020	LHD1	GAS	10	55761.32258	2036.1281	1832.51532	0.197%
Fresno	2020	LHD1	DSL	10	26849.16852	521.44005	469.296042	0.095%
Fresno	2020	LHD1	GAS	15	126976.0519	1392.4297	1253.1867	0.449%
Fresno	2020	LHD1	DSL	15	58147.60848	521.44	469.296003	0.206%
Fresno	2020	LHD1	GAS	20	146719.8434	1006.0686	905.461733	0.519%
Fresno	2020	LHD1	DSL	20	63748.56088	521.43999	469.295993	0.225%
Fresno	2020	LHD1	GAS	25	113019.5197	768.01205	691.210844	0.400%
Fresno	2020	LHD1	DSL	25	68227.96575	521.44	469.295996	0.241%
Fresno	2020	LHD1	GAS	30	99946.34197	619.4336	557.490237	0.353%
Fresno	2020	LHD1	DSL	30	57593.04709	521.44001	469.296005	0.204%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LHD1	GAS	35	37346.32043	527.84649	475.061842	0.132%
Fresno	2020	LHD1	DSL	35	30394.08805	521.44001	469.296012	0.107%
Fresno	2020	LHD1	GAS	40	11023.78163	475.23318	427.709861	0.039%
Fresno	2020	LHD1	DSL	40	16685.3603	521.44002	469.296021	0.059%
Fresno	2020	LHD1	GAS	45	13571.24509	452.05583	406.850248	0.048%
Fresno	2020	LHD1	DSL	45	18008.9918	521.44002	469.296015	0.064%
Fresno	2020	LHD1	GAS	50	100208.1816	454.3218	408.889624	0.354%
Fresno	2020	LHD1	DSL	50	69538.42058	521.44004	469.296036	0.246%
Fresno	2020	LHD1	GAS	55	27561.98152	482.41547	434.173925	0.097%
Fresno	2020	LHD1	DSL	55	41876.66483	521.43999	469.295994	0.148%
Fresno	2020	LHD2	GAS	5	2185.999834	2513.4972	2262.14751	0.008%
Fresno	2020	LHD2	DSL	5	2165.940834	521.32551	469.192959	0.008%
Fresno	2020	LHD2	GAS	10	5700.171632	2036.1281	1832.51531	0.020%
Fresno	2020	LHD2	DSL	10	7202.740987	521.32545	469.192908	0.025%
Fresno	2020	LHD2	GAS	15	12980.05837	1392.4297	1253.18673	0.046%
Fresno	2020	LHD2	DSL	15	15599.07284	521.32548	469.192929	0.055%
Fresno	2020	LHD2	GAS	20	14998.35728	1006.0684	905.461596	0.053%
Fresno	2020	LHD2	DSL	20	17101.62232	521.3255	469.192951	0.060%
Fresno	2020	LHD2	GAS	25	11553.35919	768.01208	691.210875	0.041%
Fresno	2020	LHD2	DSL	25	18303.29766	521.32547	469.192927	0.065%
Fresno	2020	LHD2	GAS	30	10216.96052	619.4336	557.490236	0.036%
Fresno	2020	LHD2	DSL	30	15450.30236	521.32548	469.192934	0.055%
Fresno	2020	LHD2	GAS	35	3817.707199	527.84656	475.061906	0.013%
Fresno	2020	LHD2	DSL	35	8153.724442	521.32547	469.192923	0.029%
Fresno	2020	LHD2	GAS	40	1126.900176	475.23317	427.709853	0.004%
Fresno	2020	LHD2	DSL	40	4476.12821	521.32553	469.192978	0.016%
Fresno	2020	LHD2	GAS	45	1387.31323	452.05583	406.850248	0.005%
Fresno	2020	LHD2	DSL	45	4831.21426	521.32552	469.192968	0.017%
Fresno	2020	LHD2	GAS	50	10243.72797	454.32179	408.889615	0.036%
Fresno	2020	LHD2	DSL	50	18654.84861	521.32553	469.192974	0.066%
Fresno	2020	LHD2	GAS	55	2817.508813	482.4155	434.173947	0.010%
Fresno	2020	LHD2	DSL	55	11234.11873	521.32552	469.192971	0.040%
Fresno	2020	MCY	GAS	5	16.68688392	263.60959	237.248635	0.000%
Fresno	2020	MCY	GAS	10	294.4601557	239.987	215.988302	0.001%
Fresno	2020	MCY	GAS	15	137.6083261	203.31025	182.979225	0.000%
Fresno	2020	MCY	GAS	20	8680.359343	177.28794	159.559145	0.031%
Fresno	2020	MCY	GAS	25	1758.264929	159.11187	143.200685	0.006%
Fresno	2020	MCY	GAS	30	4056.627639	147.00431	132.303882	0.014%
Fresno	2020	MCY	GAS	35	13991.15637	139.89607	125.906467	0.049%
Fresno	2020	MCY	GAS	40	23275.16288	137.24882	123.523938	0.082%
Fresno	2020	MCY	GAS	45	20382.35374	138.97664	125.078975	0.072%
Fresno	2020	MCY	GAS	50	27895.39084	145.4486	130.903738	0.099%
Fresno	2020	MCY	GAS	55	18574.45022	157.57522	141.817698	0.066%
Fresno	2020	MCY	GAS	60	22989.80272	177.00467	159.304207	0.081%
Fresno	2020	MCY	GAS	65	23486.72339	206.48665	185.837981	0.083%
Fresno	2020	MCY	GAS	70	22074.1257	250.51598	225.464381	0.078%
Fresno	2020	MDV	GAS	5	427.4652288	1956.688	1525.97278	0.002%
Fresno	2020	MDV	DSL	5	0.333527873	490.28924	377.108778	0.000%
Fresno	2020	MDV	GAS	10	7543.139266	1446.2357	1127.90657	0.027%
Fresno	2020	MDV	DSL	10	5.885501367	446.28971	343.748967	0.000%
Fresno	2020	MDV	GAS	15	3525.090445	1110.5412	866.11421	0.012%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	DSL	15	2.75043645	380.1288	293.586725	0.000%
Fresno	2020	MDV	GAS	20	222363.35	890.39433	694.407181	0.786%
Fresno	2020	MDV	DSL	20	173.4980433	335.55537	259.791799	0.001%
Fresno	2020	MDV	GAS	25	45041.19318	741.97753	578.642654	0.159%
Fresno	2020	MDV	DSL	25	35.14319288	306.59881	237.837356	0.000%
Fresno	2020	MDV	GAS	30	103917.9823	636.78632	496.616032	0.367%
Fresno	2020	MDV	DSL	30	81.08154619	289.65159	224.98822	0.000%
Fresno	2020	MDV	GAS	35	358409.259	568.60891	443.447127	1.267%
Fresno	2020	MDV	DSL	35	279.6472728	282.71202	219.726732	0.001%
Fresno	2020	MDV	GAS	40	596236.1499	526.15478	410.342796	2.108%
Fresno	2020	MDV	DSL	40	465.2106216	284.9856	221.450527	0.002%
Fresno	2020	MDV	GAS	45	522131.5284	506.29265	394.85277	1.846%
Fresno	2020	MDV	DSL	45	407.3908075	296.73091	230.355656	0.001%
Fresno	2020	MDV	GAS	50	714591.7653	506.04172	394.655526	2.526%
Fresno	2020	MDV	DSL	50	557.5570769	319.30972	247.474579	0.002%
Fresno	2020	MDV	GAS	55	475818.7393	524.73439	409.233126	1.682%
Fresno	2020	MDV	DSL	55	371.2554625	355.45334	274.878147	0.001%
Fresno	2020	MDV	GAS	60	588926.1182	564.34648	440.127202	2.082%
Fresno	2020	MDV	DSL	60	459.5070332	409.81987	316.098065	0.002%
Fresno	2020	MDV	GAS	65	601655.6237	630.1431	491.441651	2.127%
Fresno	2020	MDV	DSL	65	469.4391087	490.00332	376.891997	0.002%
Fresno	2020	MDV	GAS	70	565469.2796	675.65501	526.934139	1.999%
Fresno	2020	MDV	DSL	70	441.2049752	608.30305	466.585136	0.002%
Fresno	2020	MH	GAS	5	375.9017657	2513.4973	2262.14753	0.001%
Fresno	2020	MH	DSL	5	74.62377466	2390.0672	2151.06044	0.000%
Fresno	2020	MH	GAS	10	1889.661497	2036.1283	1832.51547	0.007%
Fresno	2020	MH	DSL	10	371.4490664	2170.188	1953.16921	0.001%
Fresno	2020	MH	GAS	15	2386.966339	1392.4297	1253.18671	0.008%
Fresno	2020	MH	DSL	15	501.3272751	1781.9066	1603.71592	0.002%
Fresno	2020	MH	GAS	20	2475.870442	1006.0686	905.461738	0.009%
Fresno	2020	MH	DSL	20	531.6758273	1462.2599	1316.03391	0.002%
Fresno	2020	MH	GAS	25	2758.692156	768.01205	691.210843	0.010%
Fresno	2020	MH	DSL	25	553.719262	1311.5663	1180.40971	0.002%
Fresno	2020	MH	GAS	30	3119.094445	619.43361	557.490248	0.011%
Fresno	2020	MH	DSL	30	665.8025648	1231.0993	1107.98936	0.002%
Fresno	2020	MH	GAS	35	3876.560955	527.84661	475.061951	0.014%
Fresno	2020	MH	DSL	35	785.0689398	1164.3217	1047.88949	0.003%
Fresno	2020	MH	GAS	40	4825.918952	475.2332	427.709878	0.017%
Fresno	2020	MH	DSL	40	974.5408363	1111.2334	1000.11009	0.003%
Fresno	2020	MH	GAS	45	4400.908252	452.05585	406.850268	0.016%
Fresno	2020	MH	DSL	45	798.019717	1071.8346	964.651153	0.003%
Fresno	2020	MH	GAS	50	4282.988184	454.32186	408.889674	0.015%
Fresno	2020	MH	DSL	50	893.1138315	1046.1252	941.512654	0.003%
Fresno	2020	MH	GAS	55	5601.758146	482.41557	434.174012	0.020%
Fresno	2020	MH	DSL	55	1308.777391	1034.1051	930.694616	0.005%
Fresno	2020	MH	GAS	60	6464.173618	541.20922	487.088296	0.023%
Fresno	2020	MH	DSL	60	1572.715418	1035.7744	932.196962	0.006%
Fresno	2020	MH	GAS	65	1010.10891	641.49794	577.348142	0.004%
Fresno	2020	MH	DSL	65	247.5006536	1051.1334	946.020045	0.001%
Fresno	2020	OBUS	GAS	5	223.1933909	2513.4974	2262.14768	0.001%
Fresno	2020	OBUS	DSL	5	189.4743925	3023.7787	2721.40084	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	OBUS	GAS	10	1121.995179	2036.1283	1832.51547	0.004%
Fresno	2020	OBUS	DSL	10	873.8793826	2435.1748	2191.65732	0.003%
Fresno	2020	OBUS	GAS	15	1417.27225	1392.4297	1253.18671	0.005%
Fresno	2020	OBUS	DSL	15	1150.490893	1981.8507	1783.66567	0.004%
Fresno	2020	OBUS	GAS	20	1470.059473	1006.0686	905.461718	0.005%
Fresno	2020	OBUS	DSL	20	1535.69351	1680.0018	1512.00159	0.005%
Fresno	2020	OBUS	GAS	25	1637.986093	768.01209	691.210882	0.006%
Fresno	2020	OBUS	DSL	25	1593.312243	1565.8826	1409.29435	0.006%
Fresno	2020	OBUS	GAS	30	1851.976584	619.43366	557.490296	0.007%
Fresno	2020	OBUS	DSL	30	2222.551712	1524.477	1372.02928	0.008%
Fresno	2020	OBUS	GAS	35	2301.725777	527.84661	475.061952	0.008%
Fresno	2020	OBUS	DSL	35	3281.369258	1506.8029	1356.12259	0.012%
Fresno	2020	OBUS	GAS	40	2865.411437	475.23323	427.709905	0.010%
Fresno	2020	OBUS	DSL	40	3502.618858	1398.0016	1258.20144	0.012%
Fresno	2020	OBUS	GAS	45	2613.059424	452.05584	406.850252	0.009%
Fresno	2020	OBUS	DSL	45	3919.848541	1422.5072	1280.25645	0.014%
Fresno	2020	OBUS	GAS	50	2543.043925	454.32186	408.889677	0.009%
Fresno	2020	OBUS	DSL	50	4186.335389	1378.9402	1241.04618	0.015%
Fresno	2020	OBUS	GAS	55	3326.069877	482.41555	434.173991	0.012%
Fresno	2020	OBUS	DSL	55	5486.643759	1338.9738	1205.07644	0.019%
Fresno	2020	OBUS	GAS	60	3838.132886	541.2092	487.088281	0.014%
Fresno	2020	OBUS	DSL	60	3711.118326	1163.509	1047.15807	0.013%
Fresno	2020	OBUS	GAS	65	599.756791	641.49795	577.348151	0.002%
Fresno	2020	OBUS	DSL	65	966.0730169	1343.8417	1209.45751	0.003%
Fresno	2020	SBUS	GAS	5	58.03696424	2513.497	2262.14732	0.000%
Fresno	2020	SBUS	DSL	5	153.6039937	2632.2332	2369.0099	0.001%
Fresno	2020	SBUS	GAS	10	203.4165827	2036.1281	1832.5153	0.001%
Fresno	2020	SBUS	DSL	10	538.3741248	2174.4303	1956.98731	0.002%
Fresno	2020	SBUS	GAS	15	406.8331817	1392.4295	1253.18659	0.001%
Fresno	2020	SBUS	DSL	15	1076.74825	1785.3958	1606.85622	0.004%
Fresno	2020	SBUS	GAS	20	552.2098641	1006.0685	905.461668	0.002%
Fresno	2020	SBUS	DSL	20	1461.510625	1408.4997	1267.64973	0.005%
Fresno	2020	SBUS	GAS	25	871.7004002	768.0121	691.21089	0.003%
Fresno	2020	SBUS	DSL	25	2307.092737	1314.1617	1182.74553	0.008%
Fresno	2020	SBUS	GAS	30	1045.811315	619.43358	557.490219	0.004%
Fresno	2020	SBUS	DSL	30	2767.904718	1233.5395	1110.18552	0.010%
Fresno	2020	SBUS	GAS	35	1073.393783	527.84651	475.061863	0.004%
Fresno	2020	SBUS	DSL	35	2840.905979	1166.633	1049.96972	0.010%
Fresno	2020	SBUS	GAS	40	724.5975211	475.23316	427.709842	0.003%
Fresno	2020	SBUS	DSL	40	1917.761723	1113.4423	1002.09811	0.007%
Fresno	2020	SBUS	GAS	45	347.6444581	452.05579	406.850211	0.001%
Fresno	2020	SBUS	DSL	45	920.0959117	1073.9674	966.570693	0.003%
Fresno	2020	SBUS	GAS	50	174.1108852	454.32177	408.889594	0.001%
Fresno	2020	SBUS	DSL	50	460.811981	1048.2083	943.387475	0.002%
Fresno	2020	SBUS	GAS	55	259.1529318	482.41547	434.173922	0.001%
Fresno	2020	SBUS	DSL	55	685.8891861	1036.165	932.548455	0.002%
Fresno	2020	SBUS	GAS	60	144.2307875	541.2091	487.088192	0.001%
Fresno	2020	SBUS	DSL	60	381.7295431	1037.8374	934.05363	0.001%
Fresno	2020	T6	GAS	5	757.7971042	2513.4975	2262.14774	0.003%
Fresno	2020	T6	DSL	5	3782.072492	2577.8739	2320.08648	0.013%
Fresno	2020	T6	GAS	10	3809.452781	2036.1283	1832.51547	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	T6	DSL	10	18825.7321	2129.5253	1916.57274	0.067%
Fresno	2020	T6	GAS	15	4811.99169	1392.4297	1253.18675	0.017%
Fresno	2020	T6	DSL	15	25408.20417	1748.5248	1573.67236	0.090%
Fresno	2020	T6	GAS	20	4991.217479	1006.0686	905.46177	0.018%
Fresno	2020	T6	DSL	20	26946.3239	1379.4122	1241.47096	0.095%
Fresno	2020	T6	GAS	25	5561.370137	768.01215	691.210939	0.020%
Fresno	2020	T6	DSL	25	28063.52768	1287.0224	1158.32015	0.099%
Fresno	2020	T6	GAS	30	6287.921467	619.43362	557.49026	0.022%
Fresno	2020	T6	DSL	30	33744.11845	1208.0651	1087.25862	0.119%
Fresno	2020	T6	GAS	35	7814.932614	527.84653	475.061878	0.028%
Fresno	2020	T6	DSL	35	39788.75993	1142.5404	1028.28635	0.141%
Fresno	2020	T6	GAS	40	9728.784867	475.23324	427.709914	0.034%
Fresno	2020	T6	DSL	40	49391.55144	1090.4482	981.403359	0.175%
Fresno	2020	T6	GAS	45	8871.986895	452.05589	406.850299	0.031%
Fresno	2020	T6	DSL	45	40445.13139	1051.7885	946.609636	0.143%
Fresno	2020	T6	GAS	50	8634.26726	454.32179	408.889615	0.031%
Fresno	2020	T6	DSL	50	45264.67932	1026.5613	923.905185	0.160%
Fresno	2020	T6	GAS	55	11292.83405	482.4156	434.174038	0.040%
Fresno	2020	T6	DSL	55	66331.28571	1014.7667	913.290006	0.235%
Fresno	2020	T6	GAS	60	13031.41533	541.20926	487.088332	0.046%
Fresno	2020	T6	DSL	60	79708.15566	1016.4046	914.764098	0.282%
Fresno	2020	T6	GAS	65	2036.323575	641.49801	577.34821	0.007%
Fresno	2020	T6	DSL	65	12543.79741	1031.475	928.327461	0.044%
Fresno	2020	T7	GAS	5	45.14811148	2513.4971	2262.14736	0.000%
Fresno	2020	T7	DSL	5	8396.704746	3977.8081	3580.02731	0.030%
Fresno	2020	T7	GAS	10	220.662119	2036.1283	1832.51544	0.001%
Fresno	2020	T7	DSL	10	32075.80037	3285.9804	2957.38233	0.113%
Fresno	2020	T7	GAS	15	240.6355065	1392.4297	1253.18671	0.001%
Fresno	2020	T7	DSL	15	39228.96626	2698.0747	2428.26726	0.139%
Fresno	2020	T7	GAS	20	411.241983	1006.0685	905.461655	0.001%
Fresno	2020	T7	DSL	20	97100.08386	2129.5835	1916.62514	0.343%
Fresno	2020	T7	GAS	25	536.6970104	768.01215	691.210933	0.002%
Fresno	2020	T7	DSL	25	88604.77385	1985.9498	1787.35483	0.313%
Fresno	2020	T7	GAS	30	980.1093934	619.43364	557.490278	0.003%
Fresno	2020	T7	DSL	30	149589.5276	1864.1142	1677.70278	0.529%
Fresno	2020	T7	GAS	35	1743.255924	527.84661	475.061945	0.006%
Fresno	2020	T7	DSL	35	269115.3006	1763.0057	1586.70517	0.951%
Fresno	2020	T7	GAS	40	1519.637782	475.23317	427.709849	0.005%
Fresno	2020	T7	DSL	40	253966.6678	1682.6245	1514.36201	0.898%
Fresno	2020	T7	GAS	45	1607.939024	452.0558	406.850223	0.006%
Fresno	2020	T7	DSL	45	355569.7933	1622.9703	1460.67329	1.257%
Fresno	2020	T7	GAS	50	1682.35955	454.3218	408.889618	0.006%
Fresno	2020	T7	DSL	50	369783.8463	1584.0433	1425.63901	1.307%
Fresno	2020	T7	GAS	55	2469.579288	482.41551	434.173958	0.009%
Fresno	2020	T7	DSL	55	450928.7666	1565.8435	1409.25918	1.594%
Fresno	2020	T7	GAS	60	609.4964239	541.20921	487.088286	0.002%
Fresno	2020	T7	DSL	60	137368.6558	1568.3709	1411.53379	0.486%
Fresno	2020	T7	GAS	65	326.6774339	641.49796	577.348164	0.001%
Fresno	2020	T7	DSL	65	75239.57125	1591.6254	1432.46284	0.266%
Fresno	2020	UBUS	GAS	5	142.5170016	2513.497	2262.14729	0.001%
Fresno	2020	UBUS	DSL	5	351.317801	2440.8645	2196.77806	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	UBUS	GAS	10	511.5367803	2036.1283	1832.51547	0.002%
Fresno	2020	UBUS	DSL	10	1260.986146	2440.8645	2196.77804	0.004%
Fresno	2020	UBUS	GAS	15	1023.073523	1392.4297	1253.18671	0.004%
Fresno	2020	UBUS	DSL	15	2521.972627	2440.8642	2196.77781	0.009%
Fresno	2020	UBUS	GAS	20	1350.100402	1006.0686	905.461701	0.005%
Fresno	2020	UBUS	DSL	20	3328.12413	2440.8647	2196.77822	0.012%
Fresno	2020	UBUS	GAS	25	2033.347957	768.01208	691.210868	0.007%
Fresno	2020	UBUS	DSL	25	5012.394	2440.8646	2196.77812	0.018%
Fresno	2020	UBUS	GAS	30	2544.884591	619.43361	557.490252	0.009%
Fresno	2020	UBUS	DSL	30	6273.37969	2440.8644	2196.77797	0.022%
Fresno	2020	UBUS	GAS	35	2493.975603	527.84654	475.061885	0.009%
Fresno	2020	UBUS	DSL	35	6147.88385	2440.8645	2196.77802	0.022%
Fresno	2020	UBUS	GAS	40	1797.928884	475.23316	427.709842	0.006%
Fresno	2020	UBUS	DSL	40	4432.06321	2440.8647	2196.77821	0.016%
Fresno	2020	UBUS	GAS	45	783.7715293	452.05586	406.850272	0.003%
Fresno	2020	UBUS	DSL	45	1932.070593	2440.8644	2196.77797	0.007%
Fresno	2020	UBUS	GAS	50	398.2134972	454.3218	408.889617	0.001%
Fresno	2020	UBUS	DSL	50	981.633661	2440.8646	2196.77811	0.003%
Fresno	2020	UBUS	GAS	55	493.7042317	482.41551	434.173958	0.002%
Fresno	2020	UBUS	DSL	55	1217.027328	2440.8644	2196.77795	0.004%
Fresno	2020	UBUS	GAS	60	808.0757296	541.20919	487.088268	0.003%
Fresno	2020	UBUS	DSL	60	1991.982525	2440.8644	2196.778	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	Used 2010 emission factor projected by PG&E for BAU
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	377007	26.3	9.3	345,142
Commercial	1,800,825,042	7,503	400684	27.9	9.9	366,817
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**777,690**	**54.2**	**19.2**	**711,959**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

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

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

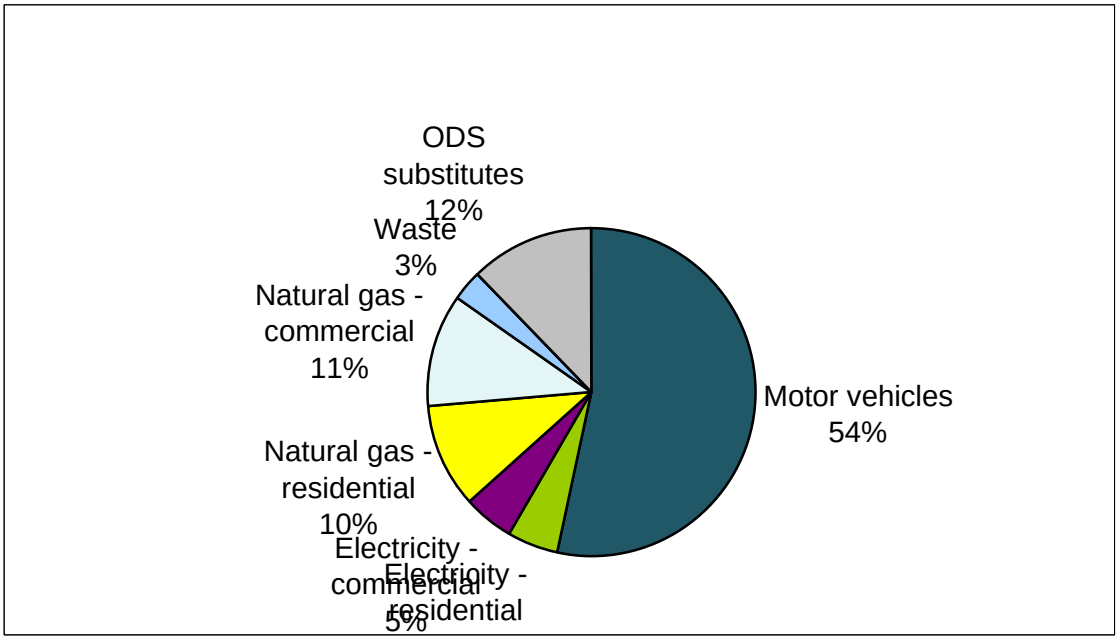
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**	**Without RPS**
Motor vehicles	3,036,848	2,205,409	3,036,848
Electricity - residential	271,756	271,756	315,237
Electricity - commercial	295,057	295,057	342,266
Natural gas - residential	573,160	519,166	519,166
Natural gas - commercial	632,169	564,560	632,169
Waste	177,508	177,508	177,508
Offroad equipment	1,314	1,314	1,314
ODS substitutes	694,734	694,734	694,734
Total	***5,682,546***	***4,729,504***	**5,719,242**



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	584	125,207	2,632	12,514	40,093	33,484	189,354	78,142	80,989	41,049	162,603	159,987	12	0	0	**926,067**
LDT1	101	21,588	454	2,157	6,911	5,772	32,644	13,473	13,964	7,077	28,034	27,583	2	0	0	**159,661**
LDT2	293	62,914	1,322	6,287	20,142	16,822	95,135	39,264	40,694	20,625	81,699	80,386	6	0	0	**465,297**
LHD1	79	18,609	345	1,490	4,378	3,430	18,531	7,452	7,627	3,888	15,765	0	0	0	0	**81,517**

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LHD2	8	1,858	34	149	437	343	1,851	744	762	388	1,574	0	0	0	0	**8,141**
MCY	2	566	13	68	234	210	1,272	559	611	326	1,356	1,400	0	0	0	**6,615**
MDV	386	82,755	1,739	8,270	26,493	22,126	125,134	51,647	53,527	27,129	107,463	105,736	8	0	0	**612,028**
MH	4	1,057	20	85	249	195	1,053	423	433	221	896	919	0	0	0	**5,550**
OBUS	3	640	12	51	150	118	637	256	262	134	542	556	0	0	0	**3,358**
SBUS	1	145	3	12	34	27	144	58	59	30	122	126	0	0	0	**759**
T6	9	2,069	38	166	487	381	2,061	829	848	432	1,753	1,799	0	0	0	**10,864**
T7	1	238	4	19	56	44	237	95	97	50	201	207	0	0	0	**1,248**
UBUS	2	355	7	28	83	65	353	142	145	74	300	308	0	0	0	**1,862**
Total	**1,471**	**318,002**	**6,622**	**31,296**	**99,748**	**83,017**	**468,405**	**193,086**	**200,021**	**101,423**	**402,309**	**379,007**	**29**	**0**	**0**	**2,284,436**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	182	4	22	75	68	421	190	214	118	507	543	0	0	0	**2,344**
LDT1	0	13	0	2	6	5	31	14	16	9	37	40	0	0	0	**173**
LDT2	0	11	0	1	5	4	26	12	13	7	32	34	0	0	0	**146**
LHD1	10	2,899	79	470	1,808	1,757	11,136	4,974	5,352	2,714	10,366	0	0	0	0	**41,555**
LHD2	3	764	21	124	477	463	2,936	1,311	1,411	716	2,733	0	0	0	0	**10,956**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	20	0	2	8	8	47	21	24	13	56	60	0	0	0	**260**
MH	1	246	5	27	93	84	506	216	224	111	419	384	0	0	0	**2,314**
OBUS	4	923	20	103	370	350	2,196	910	996	490	1,816	1,443	0	0	0	**9,618**
SBUS	1	302	7	32	114	104	623	265	275	136	515	472	0	0	0	**2,845**
T6	51	12,194	272	1,280	4,597	4,192	25,132	10,714	11,119	5,504	20,778	19,039	1	0	0	**114,823**
T7	380	91,355	2,035	9,592	34,437	31,403	188,276	80,265	83,299	41,235	155,658	142,627	10	0	0	**860,192**
UBUS	3	987	27	160	616	598	3,792	1,694	1,822	924	3,530	3,229	0	0	0	**17,380**
Total	**454**	**109,898**	**2,470**	**11,815**	**42,605**	**39,037**	**235,122**	**100,586**	**104,766**	**51,978**	**196,447**	**167,870**	**11**	**0**	**0**	**1,063,059**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,347,495	3,036,848	3,036,848

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Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,034	0	**1,034**	5
5 - 10 MPH	859	1,004	0	**1,863**	5
10 - 15 MPH	167,394	216,081	459,549	**843,024**	10
15 - 20 MPH	5,656	8,370	8,841	**22,866**	15
20 - 25 MPH	24,751	41,371	70,532	**136,653**	20
25 - 30 MPH	101,092	133,862	290,863	**525,817**	25
30 - 35 MPH	112,039	177,305	221,483	**510,827**	30
35 - 40 MPH	659,988	855,145	1,723,155	**3,238,288**	35
40 - 45 MPH	295,148	360,153	791,178	**1,446,479**	40
45 - 50 MPH	251,077	330,845	974,418	**1,556,341**	45
50 - 55 MPH	135,795	191,825	461,743	**789,362**	50
55 - 60 MPH	602,719	716,634	1,695,018	**3,014,370**	55
60 - 65 MPH	577,808	717,782	1,461,979	**2,757,569**	60
65 - 70 MPH	32	42	115	**190**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,934,356**	**3,751,455**	**8,158,873**	**14,844,684**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2897	843024	22866	136653	525817	510827	3238288	1446479	1556341	789362	3014370	2757569	190	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

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UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1272	370168	10040	60004	230884	224302	1421917	635142	683382	346605	1323596	1210835	83	0	0
LDT1	189	54943	1490	8906	34269	33292	211050	94272	101432	51445	196457	179720	12	0	0
LDT2	470	136907	3713	22193	85393	82958	525898	234908	252750	128192	489533	447829	31	0	0
LHD1	77	22544	611	3654	14061	13660	86596	38681	41619	21109	80608	73741	5	0	0
LHD2	8	2251	61	365	1404	1364	8648	3863	4156	2108	8050	7364	1	0	0
MCY	20	5763	156	934	3595	3492	22139	9889	10640	5397	20608	18853	1	0	0
MDV	483	140560	3813	22785	87671	85172	539929	241176	259493	131613	502595	459777	32	0	0
MH	4	1281	35	208	799	776	4920	2198	2364	1199	4580	4189	0	0	0
OBUS	3	775	21	126	483	470	2977	1330	1431	726	2771	2535	0	0	0
SBUS	1	175	5	28	109	106	672	300	323	164	626	573	0	0	0
T6	9	2507	68	406	1564	1519	9629	4301	4628	2347	8964	8200	1	0	0
T7	1	288	8	47	180	174	1106	494	532	270	1029	942	0	0	0
UBUS	1	430	12	70	268	260	1650	737	793	402	1536	1405	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	988	27	160	616	599	3794	1695	1824	925	3532	3231	0	0	0
LDT1	0	73	2	12	45	44	280	125	135	68	261	238	0	0	0
LDT2	0	62	2	10	38	37	237	106	114	58	221	202	0	0	0
LHD1	47	13777	374	2233	8593	8348	52921	23639	25434	12900	49262	45065	3	0	0
LHD2	12	3632	99	589	2265	2201	13951	6232	6705	3401	12987	11880	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	110	3	18	68	66	421	188	202	103	392	358	0	0	0
MH	1	277	8	45	173	168	1064	475	511	259	991	906	0	0	0
OBUS	3	942	26	153	588	571	3619	1617	1740	882	3369	3082	0	0	0
SBUS	1	345	9	56	215	209	1324	591	636	323	1232	1127	0	0	0
T6	49	14224	386	2306	8872	8619	54638	24406	26259	13319	50860	46527	3	0	0
T7	237	68946	1870	11176	43003	41777	264839	118298	127283	64557	246526	225524	16	0	0
UBUS	4	1059	29	172	660	642	4067	1817	1955	991	3786	3464	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	344	73,750	1,550	7,371	23,616	19,722	111,533	46,027	47,704	24,178	95,776	94,236	7	0	0	**545,471**
LDT1	61	13,019	274	1,301	4,168	3,481	19,686	8,125	8,421	4,268	16,906	16,634	1	0	0	**96,282**
LDT2	197	42,332	890	4,231	13,553	11,319	64,012	26,419	27,381	13,878	54,972	54,088	4	0	0	**313,078**
LHD1	70	16,587	308	1,328	3,902	3,058	16,517	6,642	6,798	3,465	14,052	0	0	0	0	**72,658**

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LHD2	7	1,656	31	133	390	305	1,649	663	679	346	1,403	0	0	0	0	**7,256**
MCY	2	505	12	60	209	187	1,133	498	545	291	1,208	1,248	0	0	0	**5,896**
MDV	266	57,011	1,198	5,697	18,251	15,243	86,205	35,580	36,875	18,689	74,031	72,842	6	0	0	**421,628**
MH	4	942	17	75	222	174	938	377	386	197	798	819	0	0	0	**4,947**
OBUS	2	570	11	46	134	105	568	228	234	119	483	496	0	0	0	**2,993**
SBUS	1	129	2	10	30	24	128	52	53	27	109	112	0	0	0	**676**
T6	8	1,844	34	148	434	340	1,837	739	756	385	1,563	1,604	0	0	0	**9,683**
T7	1	212	4	17	50	39	211	85	87	44	179	184	0	0	0	**1,112**
UBUS	1	316	6	25	74	58	315	127	130	66	268	275	0	0	0	**1,659**
Total	**964**	**208,872**	**4,336**	**20,443**	**65,031**	**54,055**	**304,733**	**125,563**	**130,049**	**65,954**	**261,749**	**242,537**	**19**	**0**	**0**	**1,484,303**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	109	2	13	45	41	252	113	128	70	303	324	0	0	0	**1,401**
LDT1	0	8	0	1	3	3	18	8	9	5	22	24	0	0	0	**102**
LDT2	0	8	0	1	3	3	18	8	9	5	21	23	0	0	0	**99**
LHD1	9	2,584	70	419	1,612	1,566	9,926	4,434	4,770	2,419	9,239	0	0	0	0	**37,039**
LHD2	2	681	18	110	425	413	2,617	1,169	1,258	638	2,436	0	0	0	0	**9,765**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	6	5	32	14	16	9	39	41	0	0	0	**178**
MH	1	219	5	24	83	75	451	192	200	99	373	342	0	0	0	**2,063**
OBUS	4	823	18	92	330	312	1,957	811	888	437	1,619	1,286	0	0	0	**8,572**
SBUS	1	269	6	28	102	93	555	237	246	122	459	420	0	0	0	**2,536**
T6	45	10,869	242	1,141	4,097	3,736	22,401	9,550	9,911	4,906	18,520	16,970	1	0	0	**102,344**
T7	339	81,426	1,813	8,550	30,695	27,990	167,815	71,542	74,247	36,754	138,741	127,126	9	0	0	**766,708**
UBUS	3	880	24	143	549	533	3,380	1,510	1,624	824	3,146	2,878	0	0	0	**15,491**
Total	**404**	**97,890**	**2,200**	**10,524**	**37,948**	**34,770**	**209,421**	**89,588**	**93,305**	**46,288**	**174,919**	**149,435**	**10**	**0**	**0**	**946,703**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,431,006	2,205,409	2,205,409

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,037,366,000	2,610	295418	31.6	11.2	271,756
Commercial	2,212,049,466	7,503	320747	34.3	12.2	295,057
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**616,165**	**65.9**	**23.4**	**566,813**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

*Used the 2020 emission factor.

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

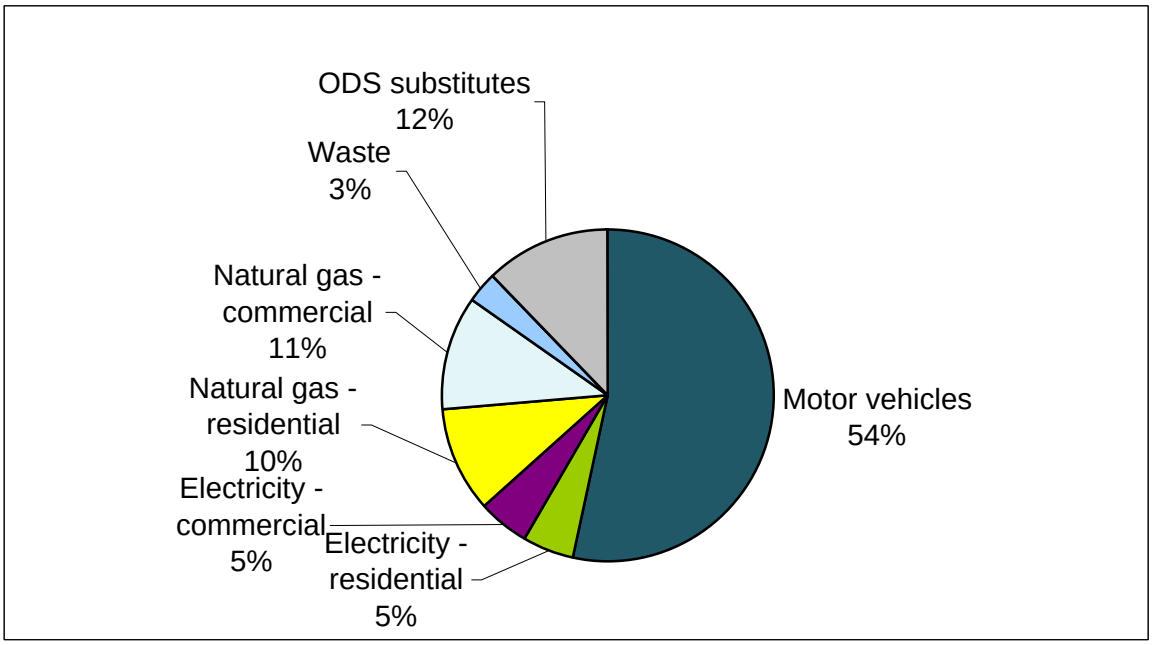
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**	**Without RPS**	
Motor vehicles	3,036,848	2,205,409	3,036,848	
Electricity - residential	271,756	271,756	414,999	used 2010 factors
Electricity - commercial	295,057	295,057	450,581	used 2010 factors
Natural gas - residential	573,160	573,160	573,160	
Natural gas - commercial	632,169	632,169	632,169	
Waste	177,508	177,508	177,508	
Offroad equipment	1,314	1,314	1,314	
ODS substitutes	694,734	694,734	694,734	
Total	***5,682,546***	***4,851,107***	**5,981,314**	



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

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UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	584	125,207	2,632	12,514	40,093	33,484	189,354	78,142	80,989	41,049	162,603	159,987	12	0	0	**926,067**
LDT1	101	21,588	454	2,157	6,911	5,772	32,644	13,473	13,964	7,077	28,034	27,583	2	0	0	**159,661**
LDT2	293	62,914	1,322	6,287	20,142	16,822	95,135	39,264	40,694	20,625	81,699	80,386	6	0	0	**465,297**
LHD1	79	18,609	345	1,490	4,378	3,430	18,531	7,452	7,627	3,888	15,765	0	0	0	0	**81,517**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
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LHD2	8	1,858	34	149	437	343	1,851	744	762	388	1,574	0	0	0	0	**8,141**
MCY	2	566	13	68	234	210	1,272	559	611	326	1,356	1,400	0	0	0	**6,615**
MDV	386	82,755	1,739	8,270	26,493	22,126	125,134	51,647	53,527	27,129	107,463	105,736	8	0	0	**612,028**
MH	4	1,057	20	85	249	195	1,053	423	433	221	896	919	0	0	0	**5,550**
OBUS	3	640	12	51	150	118	637	256	262	134	542	556	0	0	0	**3,358**
SBUS	1	145	3	12	34	27	144	58	59	30	122	126	0	0	0	**759**
T6	9	2,069	38	166	487	381	2,061	829	848	432	1,753	1,799	0	0	0	**10,864**
T7	1	238	4	19	56	44	237	95	97	50	201	207	0	0	0	**1,248**
UBUS	2	355	7	28	83	65	353	142	145	74	300	308	0	0	0	**1,862**
Total	**1,471**	**318,002**	**6,622**	**31,296**	**99,748**	**83,017**	**468,405**	**193,086**	**200,021**	**101,423**	**402,309**	**379,007**	**29**	**0**	**0**	**2,284,436**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	182	4	22	75	68	421	190	214	118	507	543	0	0	0	**2,344**
LDT1	0	13	0	2	6	5	31	14	16	9	37	40	0	0	0	**173**
LDT2	0	11	0	1	5	4	26	12	13	7	32	34	0	0	0	**146**
LHD1	10	2,899	79	470	1,808	1,757	11,136	4,974	5,352	2,714	10,366	0	0	0	0	**41,555**
LHD2	3	764	21	124	477	463	2,936	1,311	1,411	716	2,733	0	0	0	0	**10,956**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	20	0	2	8	8	47	21	24	13	56	60	0	0	0	**260**
MH	1	246	5	27	93	84	506	216	224	111	419	384	0	0	0	**2,314**
OBUS	4	923	20	103	370	350	2,196	910	996	490	1,816	1,443	0	0	0	**9,618**
SBUS	1	302	7	32	114	104	623	265	275	136	515	472	0	0	0	**2,845**
T6	51	12,194	272	1,280	4,597	4,192	25,132	10,714	11,119	5,504	20,778	19,039	1	0	0	**114,823**
T7	380	91,355	2,035	9,592	34,437	31,403	188,276	80,265	83,299	41,235	155,658	142,627	10	0	0	**860,192**
UBUS	3	987	27	160	616	598	3,792	1,694	1,822	924	3,530	3,229	0	0	0	**17,380**
Total	**454**	**109,898**	**2,470**	**11,815**	**42,605**	**39,037**	**235,122**	**100,586**	**104,766**	**51,978**	**196,447**	**167,870**	**11**	**0**	**0**	**1,063,059**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,347,495	3,036,848	3,036,848

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
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Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,034	0	**1,034**	5
5 - 10 MPH	859	1,004	0	**1,863**	5
10 - 15 MPH	167,394	216,081	459,549	**843,024**	10
15 - 20 MPH	5,656	8,370	8,841	**22,866**	15
20 - 25 MPH	24,751	41,371	70,532	**136,653**	20
25 - 30 MPH	101,092	133,862	290,863	**525,817**	25
30 - 35 MPH	112,039	177,305	221,483	**510,827**	30
35 - 40 MPH	659,988	855,145	1,723,155	**3,238,288**	35
40 - 45 MPH	295,148	360,153	791,178	**1,446,479**	40
45 - 50 MPH	251,077	330,845	974,418	**1,556,341**	45
50 - 55 MPH	135,795	191,825	461,743	**789,362**	50
55 - 60 MPH	602,719	716,634	1,695,018	**3,014,370**	55
60 - 65 MPH	577,808	717,782	1,461,979	**2,757,569**	60
65 - 70 MPH	32	42	115	**190**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,934,356**	**3,751,455**	**8,158,873**	**14,844,684**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2897	843024	22866	136653	525817	510827	3238288	1446479	1556341	789362	3014370	2757569	190	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
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UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1272	370168	10040	60004	230884	224302	1421917	635142	683382	346605	1323596	1210835	83	0	0
LDT1	189	54943	1490	8906	34269	33292	211050	94272	101432	51445	196457	179720	12	0	0
LDT2	470	136907	3713	22193	85393	82958	525898	234908	252750	128192	489533	447829	31	0	0
LHD1	77	22544	611	3654	14061	13660	86596	38681	41619	21109	80608	73741	5	0	0
LHD2	8	2251	61	365	1404	1364	8648	3863	4156	2108	8050	7364	1	0	0
MCY	20	5763	156	934	3595	3492	22139	9889	10640	5397	20608	18853	1	0	0
MDV	483	140560	3813	22785	87671	85172	539929	241176	259493	131613	502595	459777	32	0	0
MH	4	1281	35	208	799	776	4920	2198	2364	1199	4580	4189	0	0	0
OBUS	3	775	21	126	483	470	2977	1330	1431	726	2771	2535	0	0	0
SBUS	1	175	5	28	109	106	672	300	323	164	626	573	0	0	0
T6	9	2507	68	406	1564	1519	9629	4301	4628	2347	8964	8200	1	0	0
T7	1	288	8	47	180	174	1106	494	532	270	1029	942	0	0	0
UBUS	1	430	12	70	268	260	1650	737	793	402	1536	1405	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	988	27	160	616	599	3794	1695	1824	925	3532	3231	0	0	0
LDT1	0	73	2	12	45	44	280	125	135	68	261	238	0	0	0
LDT2	0	62	2	10	38	37	237	106	114	58	221	202	0	0	0
LHD1	47	13777	374	2233	8593	8348	52921	23639	25434	12900	49262	45065	3	0	0
LHD2	12	3632	99	589	2265	2201	13951	6232	6705	3401	12987	11880	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	110	3	18	68	66	421	188	202	103	392	358	0	0	0
MH	1	277	8	45	173	168	1064	475	511	259	991	906	0	0	0
OBUS	3	942	26	153	588	571	3619	1617	1740	882	3369	3082	0	0	0
SBUS	1	345	9	56	215	209	1324	591	636	323	1232	1127	0	0	0
T6	49	14224	386	2306	8872	8619	54638	24406	26259	13319	50860	46527	3	0	0
T7	237	68946	1870	11176	43003	41777	264839	118298	127283	64557	246526	225524	16	0	0
UBUS	4	1059	29	172	660	642	4067	1817	1955	991	3786	3464	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	344	73,750	1,550	7,371	23,616	19,722	111,533	46,027	47,704	24,178	95,776	94,236	7	0	0	**545,471**
LDT1	61	13,019	274	1,301	4,168	3,481	19,686	8,125	8,421	4,268	16,906	16,634	1	0	0	**96,282**
LDT2	197	42,332	890	4,231	13,553	11,319	64,012	26,419	27,381	13,878	54,972	54,088	4	0	0	**313,078**
LHD1	70	16,587	308	1,328	3,902	3,058	16,517	6,642	6,798	3,465	14,052	0	0	0	0	**72,658**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,656	31	133	390	305	1,649	663	679	346	1,403	0	0	0	0	**7,256**
MCY	2	505	12	60	209	187	1,133	498	545	291	1,208	1,248	0	0	0	**5,896**
MDV	266	57,011	1,198	5,697	18,251	15,243	86,205	35,580	36,875	18,689	74,031	72,842	6	0	0	**421,628**
MH	4	942	17	75	222	174	938	377	386	197	798	819	0	0	0	**4,947**
OBUS	2	570	11	46	134	105	568	228	234	119	483	496	0	0	0	**2,993**
SBUS	1	129	2	10	30	24	128	52	53	27	109	112	0	0	0	**676**
T6	8	1,844	34	148	434	340	1,837	739	756	385	1,563	1,604	0	0	0	**9,683**
T7	1	212	4	17	50	39	211	85	87	44	179	184	0	0	0	**1,112**
UBUS	1	316	6	25	74	58	315	127	130	66	268	275	0	0	0	**1,659**
Total	**964**	**208,872**	**4,336**	**20,443**	**65,031**	**54,055**	**304,733**	**125,563**	**130,049**	**65,954**	**261,749**	**242,537**	**19**	**0**	**0**	**1,484,303**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	109	2	13	45	41	252	113	128	70	303	324	0	0	0	**1,401**
LDT1	0	8	0	1	3	3	18	8	9	5	22	24	0	0	0	**102**
LDT2	0	8	0	1	3	3	18	8	9	5	21	23	0	0	0	**99**
LHD1	9	2,584	70	419	1,612	1,566	9,926	4,434	4,770	2,419	9,239	0	0	0	0	**37,039**
LHD2	2	681	18	110	425	413	2,617	1,169	1,258	638	2,436	0	0	0	0	**9,765**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	6	5	32	14	16	9	39	41	0	0	0	**178**
MH	1	219	5	24	83	75	451	192	200	99	373	342	0	0	0	**2,063**
OBUS	4	823	18	92	330	312	1,957	811	888	437	1,619	1,286	0	0	0	**8,572**
SBUS	1	269	6	28	102	93	555	237	246	122	459	420	0	0	0	**2,536**
T6	45	10,869	242	1,141	4,097	3,736	22,401	9,550	9,911	4,906	18,520	16,970	1	0	0	**102,344**
T7	339	81,426	1,813	8,550	30,695	27,990	167,815	71,542	74,247	36,754	138,741	127,126	9	0	0	**766,708**
UBUS	3	880	24	143	549	533	3,380	1,510	1,624	824	3,146	2,878	0	0	0	**15,491**
Total	**404**	**97,890**	**2,200**	**10,524**	**37,948**	**34,770**	**209,421**	**89,588**	**93,305**	**46,288**	**174,919**	**149,435**	**10**	**0**	**0**	**946,703**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,431,006	2,205,409	2,205,409

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,037,366,000	2,610	295418	31.6	11.2	271,756
Commercial	2,212,049,466	7,503	320747	34.3	12.2	295,057
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**616,165**	**65.9**	**23.4**	**566,813**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

*Used the 2020 emission factor.

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

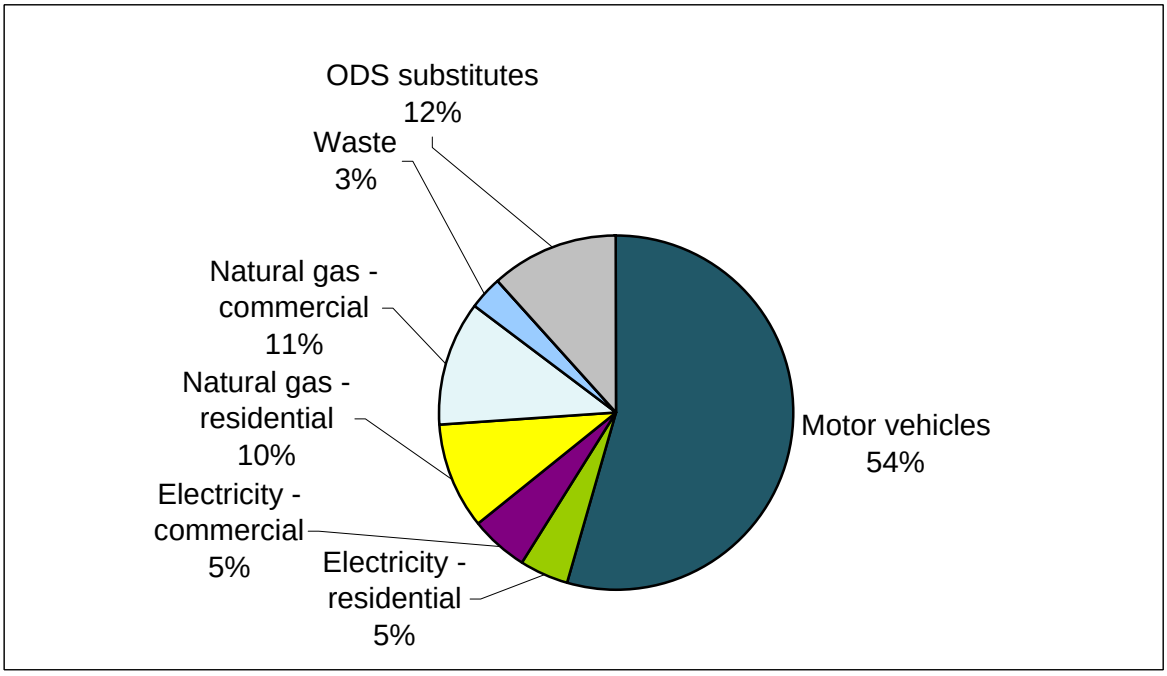
Summary
Year: 2050
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	912,600	Fresno COG
Employment	362,145	
County Information		
Population	1,521,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,745,122	2,711,894
Electricity - residential	317,710	317,710
Electricity - commercial	362,433	362,433
Natural gas - residential	670,082	670,082
Natural gas - commercial	776,525	776,525
Waste	207,525	207,525
Offroad equipment	1,314	1,314
ODS substitutes	812,214	812,214
Total	***6,892,926***	5,859,698



3%

Community Greenhouse Gas Inventory

Waste

Year: **2050**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	207,525	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1584	460945	12503	74719	287504	279308	1770618	790900	850970	431604	1648185	1507772	104	0	0
LDT1	235	68417	1856	11090	42673	41457	262807	117391	126307	64062	244635	223794	15	0	0
LDT2	586	170481	4624	27635	106334	103302	654865	292515	314732	159629	609583	557651	38	0	0
LHD1	96	28072	761	4550	17509	17010	107832	48167	51825	26285	100376	91825	6	0	0
LHD2	10	2803	76	454	1749	1699	10769	4810	5176	2625	10024	9170	1	0	0
MCY	25	7177	195	1163	4476	4349	27568	12314	13250	6720	25662	23476	2	0	0
MDV	601	175030	4748	28372	109171	106059	672338	300320	323130	163888	625847	572530	39	0	0
MH	5	1595	43	259	995	966	6126	2736	2944	1493	5703	5217	0	0	0
OBUS	3	965	26	156	602	585	3707	1656	1781	904	3450	3156	0	0	0
SBUS	1	218	6	35	136	132	837	374	402	204	779	713	0	0	0
T6	11	3122	85	506	1947	1892	11991	5356	5763	2923	11162	10211	1	0	0
T7	1	359	10	58	224	217	1377	615	662	336	1282	1173	0	0	0
UBUS	2	535	15	87	334	324	2055	918	987	501	1913	1750	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1230	33	199	767	745	4725	2111	2271	1152	4398	4023	0	0	0
LDT1	0	91	2	15	57	55	349	156	168	85	325	297	0	0	0
LDT2	0	77	2	12	48	47	295	132	142	72	275	251	0	0	0
LHD1	59	17156	465	2781	10700	10395	65899	29436	31671	16063	61342	56116	4	0	0
LHD2	16	4523	123	733	2821	2740	17373	7760	8349	4235	16171	14794	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	136	4	22	85	83	524	234	252	128	488	446	0	0	0
MH	1	345	9	56	215	209	1325	592	637	323	1233	1128	0	0	0
OBUS	4	1173	32	190	732	711	4507	2013	2166	1099	4195	3838	0	0	0
SBUS	1	429	12	70	268	260	1649	736	792	402	1535	1404	0	0	0
T6	61	17712	480	2871	11048	10733	68037	30391	32699	16585	63333	57937	4	0	0
T7	295	85853	2329	13917	53549	52022	329786	147309	158497	80388	306983	280830	19	0	0
UBUS	5	1319	36	214	822	799	5065	2262	2434	1235	4715	4313	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	720	154,409	3,245	15,432	49,444	41,293	233,517	96,366	99,878	50,622	200,527	197,301	15	0	0	**1,142,050**
LDT1	124	26,623	559	2,661	8,523	7,118	40,258	16,616	17,220	8,728	34,572	34,017	3	0	0	**196,898**
LDT2	362	77,587	1,630	7,754	24,839	20,745	117,323	48,422	50,185	25,435	100,753	99,134	8	0	0	**573,816**
LHD1	97	22,949	426	1,838	5,399	4,230	22,853	9,190	9,406	4,795	19,442	0	0	0	0	**100,529**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	10	2,292	43	184	539	422	2,282	918	939	479	1,942	0	0	0	0	**10,039**
MCY	3	698	16	83	288	259	1,568	689	754	402	1,672	1,727	0	0	0	**8,158**
MDV	476	102,056	2,144	10,199	32,671	27,287	154,319	63,693	66,011	33,457	132,526	130,396	10	0	0	**754,769**
MH	6	1,304	24	104	307	240	1,298	522	534	272	1,105	1,134	0	0	0	**6,845**
OBUS	3	789	15	63	186	145	786	316	323	165	668	686	0	0	0	**4,142**
SBUS	1	178	3	14	42	33	177	71	73	37	151	155	0	0	0	**936**
T6	11	2,552	47	204	600	470	2,541	1,022	1,046	533	2,162	2,219	0	0	0	**13,398**
T7	1	293	5	23	69	54	292	117	120	61	248	255	0	0	0	**1,539**
UBUS	2	437	8	35	103	81	435	175	179	91	370	380	0	0	0	**2,296**
Total	**1,815**	**392,168**	**8,167**	**38,596**	**123,012**	**102,379**	**577,649**	**238,118**	**246,671**	**125,078**	**496,138**	**467,402**	**36**	**0**	**0**	**2,817,228**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	225	5	27	92	84	519	234	264	145	626	670	0	0	0	**2,890**
LDT1	0	17	0	2	7	6	38	17	19	11	46	49	0	0	0	**213**
LDT2	0	14	0	2	6	5	32	15	16	9	39	42	0	0	0	**181**
LHD1	12	3,575	97	580	2,230	2,166	13,733	6,134	6,600	3,348	12,784	0	0	0	0	**51,247**
LHD2	3	943	26	153	588	571	3,621	1,617	1,740	883	3,370	0	0	0	0	**13,511**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	25	1	3	10	9	58	26	29	16	69	74	0	0	0	**321**
MH	1	303	7	33	114	104	624	266	276	137	516	473	0	0	0	**2,854**
OBUS	5	1,138	25	127	457	432	2,708	1,122	1,229	604	2,240	1,779	0	0	0	**11,861**
SBUS	2	373	8	39	140	128	768	327	340	168	635	582	0	0	0	**3,508**
T6	63	15,039	335	1,579	5,669	5,170	30,994	13,213	13,713	6,788	25,624	23,479	2	0	0	**141,603**
T7	469	112,661	2,509	11,829	42,469	38,727	232,187	98,985	102,727	50,852	191,961	175,891	12	0	0	**1,060,812**
UBUS	4	1,217	33	197	759	738	4,676	2,089	2,248	1,140	4,353	3,982	0	0	0	**21,433**
Total	**560**	**135,529**	**3,046**	**14,571**	**52,542**	**48,141**	**289,958**	**124,046**	**129,201**	**64,101**	**242,263**	**207,022**	**14**	**0**	**0**	**1,310,993**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,128,221	3,745,122	3,745,122

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,253,855 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,662,657,075 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,271	0	**1,271**	5
5 - 10 MPH	1,056	1,235	0	**2,291**	5
10 - 15 MPH	205,836	265,706	565,087	**1,036,629**	10
15 - 20 MPH	6,955	10,292	10,871	**28,118**	15
20 - 25 MPH	30,435	50,872	86,730	**168,037**	20
25 - 30 MPH	124,308	164,604	357,661	**646,573**	25
30 - 35 MPH	137,770	218,025	272,348	**628,142**	30
35 - 40 MPH	811,558	1,051,535	2,118,888	**3,981,981**	35
40 - 45 MPH	362,930	442,865	972,877	**1,778,672**	40
45 - 50 MPH	308,739	406,826	1,198,199	**1,913,764**	45
50 - 55 MPH	166,981	235,879	567,785	**970,644**	50
55 - 60 MPH	741,136	881,213	2,084,289	**3,706,639**	55
60 - 65 MPH	710,505	882,625	1,797,731	**3,390,862**	60
65 - 70 MPH	40	52	141	**233**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,608,249**	**4,612,999**	**10,032,608**	**18,253,855**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
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15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3562	1036629	28118	168037	646573	628142	3981981	1778672	1913764	970644	3706639	3390862	233	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
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UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1564	455179	12346	73784	283907	275814	1748469	781006	840325	426205	1627567	1488911	102	0	0
LDT1	232	67561	1833	10952	42139	40938	259519	115922	124727	63260	241574	220994	15	0	0
LDT2	578	168348	4566	27289	105003	102010	646673	288856	310795	157632	601958	550675	38	0	0
LHD1	95	27721	752	4494	17290	16797	106484	47564	51177	25956	99121	90676	6	0	0
LHD2	10	2768	75	449	1727	1677	10634	4750	5111	2592	9899	9055	1	0	0
MCY	24	7087	192	1149	4420	4294	27224	12160	13084	6636	25341	23182	2	0	0
MDV	594	172840	4688	28017	107805	104732	663927	296563	319087	161838	618018	565368	39	0	0
MH	5	1575	43	255	982	954	6050	2702	2907	1475	5631	5151	0	0	0
OBUS	3	953	26	154	594	577	3660	1635	1759	892	3407	3117	0	0	0
SBUS	1	215	6	35	134	130	827	369	397	202	770	704	0	0	0
T6	11	3083	84	500	1923	1868	11841	5289	5691	2886	11022	10083	1	0	0
T7	1	354	10	57	221	215	1360	607	654	331	1266	1158	0	0	0
UBUS	2	528	14	86	329	320	2029	906	975	495	1889	1728	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1215	33	197	758	736	4666	2084	2242	1137	4343	3973	0	0	0
LDT1	0	90	2	15	56	54	344	154	165	84	321	293	0	0	0
LDT2	0	76	2	12	47	46	291	130	140	71	271	248	0	0	0
LHD1	58	16941	460	2746	10566	10265	65075	29068	31275	15863	60575	55414	4	0	0
LHD2	15	4466	121	724	2786	2706	17155	7663	8245	4182	15969	14609	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	135	4	22	84	82	518	231	249	126	482	441	0	0	0
MH	1	341	9	55	212	206	1308	584	629	319	1218	1114	0	0	0
OBUS	4	1159	31	188	723	702	4451	1988	2139	1085	4143	3790	0	0	0
SBUS	1	424	11	69	264	257	1628	727	782	397	1515	1386	0	0	0
T6	60	17491	474	2835	10909	10598	67186	30011	32290	16377	62540	57213	4	0	0
T7	291	84779	2300	13743	52879	51372	325661	145466	156515	79383	303142	277317	19	0	0
UBUS	4	1302	35	211	812	789	5002	2234	2404	1219	4656	4259	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	423	90,687	1,906	9,064	29,039	24,252	137,147	56,597	58,660	29,731	117,772	115,877	9	0	0	**670,742**
LDT1	75	16,008	336	1,600	5,125	4,280	24,207	9,991	10,355	5,248	20,788	20,454	2	0	0	**118,393**
LDT2	243	52,054	1,094	5,202	16,665	13,918	78,713	32,487	33,670	17,065	67,596	66,510	5	0	0	**384,978**
LHD1	87	20,396	378	1,634	4,798	3,760	20,310	8,168	8,360	4,261	17,279	0	0	0	0	**89,344**

Community Greenhouse Gas Inventory
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LHD2	9	2,037	38	163	479	375	2,028	816	835	426	1,726	0	0	0	0	**8,922**
MCY	2	621	14	74	256	230	1,394	613	670	357	1,486	1,535	0	0	0	**7,250**
MDV	327	70,103	1,473	7,006	22,442	18,743	106,003	43,751	45,344	22,982	91,033	89,570	7	0	0	**518,457**
MH	5	1,159	21	93	273	214	1,154	464	475	242	982	1,007	0	0	0	**6,083**
OBUS	3	701	13	56	165	129	698	281	287	146	594	610	0	0	0	**3,681**
SBUS	1	158	3	13	37	29	158	63	65	33	134	138	0	0	0	**832**
T6	10	2,268	42	182	534	418	2,259	908	930	474	1,921	1,972	0	0	0	**11,907**
T7	1	260	5	21	61	48	259	104	107	54	221	226	0	0	0	**1,368**
UBUS	2	389	7	31	91	72	387	156	159	81	329	338	0	0	0	**2,040**
Total	**1,185**	**256,841**	**5,331**	**25,137**	**79,966**	**66,469**	**374,716**	**154,399**	**159,916**	**81,101**	**321,861**	**298,237**	**23**	**0**	**0**	**1,825,183**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	134	3	16	55	50	309	139	157	87	373	399	0	0	0	**1,722**
LDT1	0	10	0	1	4	4	23	10	11	6	27	29	0	0	0	**126**
LDT2	0	9	0	1	4	4	22	10	11	6	26	28	0	0	0	**122**
LHD1	11	3,177	86	515	1,982	1,925	12,205	5,452	5,866	2,975	11,361	0	0	0	0	**45,545**
LHD2	3	838	23	136	523	508	3,218	1,437	1,547	784	2,995	0	0	0	0	**12,008**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	17	0	2	7	6	39	18	20	11	47	51	0	0	0	**219**
MH	1	269	6	29	102	93	555	237	246	122	459	420	0	0	0	**2,537**
OBUS	4	1,012	22	113	406	384	2,406	997	1,092	537	1,990	1,581	0	0	0	**10,541**
SBUS	1	331	7	35	125	114	682	291	302	149	564	517	0	0	0	**3,118**
T6	56	13,365	298	1,403	5,038	4,594	27,545	11,743	12,187	6,033	22,773	20,867	1	0	0	**125,848**
T7	416	100,127	2,230	10,513	37,744	34,418	206,354	87,972	91,298	45,195	170,604	156,322	11	0	0	**942,787**
UBUS	4	1,082	29	175	675	656	4,156	1,856	1,997	1,013	3,869	3,539	0	0	0	**19,048**
Total	**497**	**120,371**	**2,705**	**12,940**	**46,664**	**42,755**	**257,516**	**110,162**	**114,734**	**56,918**	**215,090**	**183,753**	**13**	**0**	**0**	**1,164,119**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,989,301	2,711,894	2,711,894

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
*EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

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Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

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Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

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Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

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Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2050

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,381,886,000	2,610	345373	36.9	13.1	317,710
Commercial	2,717,173,935	7,503	393990	42.1	14.9	362,433
Industrial	0		0	0.0	0.0	0
Total	**5,099,059,935**		**739,364**	**79.0**	**28.0**	**680,144**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	125,938,800	138	736,742	69.3	1.4	670,082
Commercial	145,944,435	403	853,775	80.3	1.6	776,525
Industrial	0		0	0.0	0.0	0
Total	**271,883,235**		**1,590,517**	**149.5**	**3.0**	**1,446,607**

Notes and Sources:

*Used the 2020 emission factor.

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
*OFFROAD only provides emissions rates up to 2040. Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population.

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	912,600
	Emissions (MTCO2e per person)	812,214
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

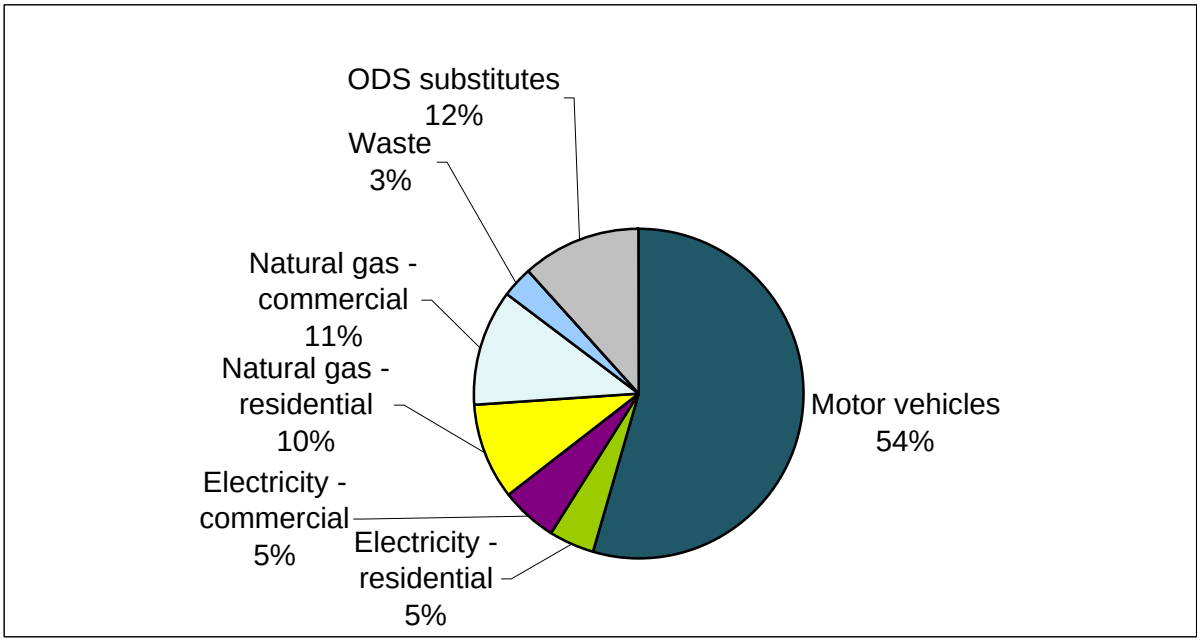
Summary
Year: 2056
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	970,000	Fresno COG
Employment	393,200	
County Information		
Population	1,616,667	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	4,028,432	2,914,488
Electricity - residential	337,694	337,694
Electricity - commercial	393,513	393,513
Natural gas - residential	712,228	712,228
Natural gas - commercial	843,115	843,115
Waste	220,578	220,578
Offroad equipment	1,314	1,314
ODS substitutes	863,300	863,300
Total	***7,400,173***	***6,286,229***



Community Greenhouse Gas Inventory

Waste

Year: **2056**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	220,578	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1704	495815	13449	80371	309253	300437	1904561	850730	915344	464254	1772866	1621832	111	0	0
LDT1	253	73592	1996	11929	45901	44593	282688	126271	135861	68908	263141	240723	17	0	0
LDT2	630	183378	4974	29725	114377	111117	704404	314643	338541	171705	655697	599836	41	0	0
LHD1	104	30196	819	4895	18834	18297	115990	51810	55745	28274	107969	98771	7	0	0
LHD2	10	3016	82	489	1881	1827	11583	5174	5567	2824	10782	9864	1	0	0
MCY	27	7720	209	1251	4815	4678	29654	13246	14252	7228	27603	25252	2	0	0
MDV	647	188270	5107	30518	117429	114082	723198	323038	347574	176286	673191	615841	42	0	0
MH	6	1715	47	278	1070	1039	6590	2943	3167	1606	6134	5611	0	0	0
OBUS	4	1038	28	168	647	629	3987	1781	1916	972	3711	3395	0	0	0
SBUS	1	234	6	38	146	142	901	402	433	220	838	767	0	0	0
T6	12	3358	91	544	2094	2035	12898	5761	6199	3144	12006	10983	1	0	0
T7	1	386	10	63	241	234	1481	662	712	361	1379	1261	0	0	0
UBUS	2	575	16	93	359	349	2210	987	1062	539	2057	1882	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	5	1323	36	214	825	802	5082	2270	2443	1239	4731	4328	0	0	0
LDT1	0	98	3	16	61	59	375	168	180	91	349	319	0	0	0
LDT2	0	83	2	13	52	50	317	142	153	77	295	270	0	0	0
LHD1	63	18453	501	2991	11510	11182	70884	31663	34067	17279	65983	60362	4	0	0
LHD2	17	4865	132	789	3034	2948	18687	8347	8981	4555	17395	15913	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	1	147	4	24	92	89	564	252	271	137	525	480	0	0	0
MH	1	371	10	60	231	225	1425	637	685	347	1327	1214	0	0	0
OBUS	4	1262	34	205	787	765	4848	2166	2330	1182	4513	4128	0	0	0
SBUS	2	462	13	75	288	280	1773	792	852	432	1651	1510	0	0	0
T6	65	19052	517	3088	11883	11545	73184	32690	35173	17839	68124	62320	4	0	0
T7	317	92348	2505	14970	57600	55958	354734	158453	170487	86470	330205	302074	21	0	0
UBUS	5	1418	38	230	885	859	5448	2434	2618	1328	5071	4639	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	774	166,090	3,491	16,600	53,185	44,417	251,182	103,656	107,434	54,452	215,696	212,226	16	0	0	**1,228,443**
LDT1	133	28,637	602	2,862	9,168	7,657	43,303	17,872	18,523	9,388	37,188	36,590	3	0	0	**211,793**
LDT2	389	83,457	1,754	8,340	26,718	22,315	126,198	52,085	53,981	27,359	108,375	106,633	8	0	0	**617,224**
LHD1	105	24,685	458	1,977	5,808	4,550	24,582	9,886	10,118	5,157	20,913	0	0	0	0	**108,133**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	10	2,465	46	197	580	454	2,455	987	1,010	515	2,088	0	0	0	0	**10,799**
MCY	3	751	17	90	310	279	1,687	742	811	432	1,798	1,858	0	0	0	**8,775**
MDV	512	109,777	2,307	10,970	35,143	29,351	165,992	68,511	71,005	35,987	142,551	140,260	11	0	0	**811,866**
MH	6	1,402	26	112	330	259	1,397	562	575	293	1,188	1,219	0	0	0	**7,363**
OBUS	4	849	16	68	200	156	845	340	348	177	719	738	0	0	0	**4,455**
SBUS	1	192	4	15	45	35	191	77	79	40	162	167	0	0	0	**1,006**
T6	12	2,745	51	220	646	506	2,733	1,099	1,125	573	2,325	2,387	0	0	0	**14,411**
T7	1	315	6	25	74	58	314	126	129	66	267	274	0	0	0	**1,655**
UBUS	2	470	9	38	111	87	468	188	193	98	398	409	0	0	0	**2,469**
Total	**1,952**	**421,835**	**8,785**	**41,515**	**132,317**	**110,124**	**621,347**	**256,132**	**265,331**	**134,540**	**533,670**	**502,760**	**39**	**0**	**0**	**3,030,345**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	242	5	29	99	91	558	252	284	156	673	721	0	0	0	**3,109**
LDT1	0	18	0	2	7	7	41	19	21	12	50	53	0	0	0	**229**
LDT2	0	15	0	2	6	6	35	16	18	10	42	45	0	0	0	**194**
LHD1	13	3,846	104	623	2,399	2,330	14,772	6,598	7,100	3,601	13,751	0	0	0	0	**55,123**
LHD2	3	1,014	28	164	632	614	3,895	1,740	1,872	949	3,625	0	0	0	0	**14,534**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	27	1	3	11	10	62	28	31	17	75	80	0	0	0	**345**
MH	1	326	7	36	123	112	672	286	297	147	555	509	0	0	0	**3,070**
OBUS	5	1,224	27	137	491	465	2,912	1,207	1,322	650	2,409	1,914	0	0	0	**12,758**
SBUS	2	401	9	42	151	138	826	352	365	181	683	626	0	0	0	**3,774**
T6	67	16,176	360	1,699	6,098	5,561	33,338	14,213	14,750	7,302	27,562	25,255	2	0	0	**152,315**
T7	504	121,184	2,699	12,724	45,682	41,657	249,751	106,473	110,498	54,699	206,483	189,197	13	0	0	**1,141,060**
UBUS	4	1,310	36	212	817	793	5,030	2,247	2,418	1,226	4,682	4,283	0	0	0	**23,054**
Total	**602**	**145,781**	**3,277**	**15,673**	**56,516**	**51,783**	**311,893**	**133,429**	**138,974**	**68,950**	**260,590**	**222,682**	**15**	**0**	**0**	**1,410,166**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,440,511	4,028,432	4,028,432

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,617,524 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,160,396,260 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,366	0	**1,366**	5
5 - 10 MPH	1,135	1,327	0	**2,462**	5
10 - 15 MPH	221,214	285,555	607,302	**1,114,071**	10
15 - 20 MPH	7,474	11,060	11,684	**30,218**	15
20 - 25 MPH	32,708	54,673	93,209	**180,590**	20
25 - 30 MPH	133,595	176,901	384,380	**694,876**	25
30 - 35 MPH	148,062	234,312	292,694	**675,068**	30
35 - 40 MPH	872,186	1,130,091	2,277,181	**4,279,457**	35
40 - 45 MPH	390,043	475,949	1,045,557	**1,911,549**	40
45 - 50 MPH	331,803	437,218	1,287,712	**2,056,733**	45
50 - 55 MPH	179,455	253,500	610,201	**1,043,157**	50
55 - 60 MPH	796,504	947,045	2,239,998	**3,983,546**	55
60 - 65 MPH	763,583	948,563	1,932,032	**3,644,178**	60
65 - 70 MPH	43	56	152	**250**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,877,806**	**4,957,617**	**10,782,101**	**19,617,524**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3828	1114071	30218	180590	694876	675068	4279457	1911549	2056733	1043157	3983546	3644178	250	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
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UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1681	489183	13269	79296	305117	296419	1879089	839352	903102	458045	1749156	1600141	110	0	0
LDT1	249	72608	1969	11770	45287	43996	278907	124582	134044	67986	259621	237504	16	0	0
LDT2	622	180925	4907	29328	112848	109631	694983	310435	334013	169409	646927	591814	41	0	0
LHD1	102	29792	808	4829	18582	18052	114438	51117	55000	27895	106525	97450	7	0	0
LHD2	10	2975	81	482	1856	1803	11428	5105	5493	2786	10638	9732	1	0	0
MCY	26	7617	207	1235	4751	4615	29257	13069	14061	7132	27234	24914	2	0	0
MDV	638	185752	5038	30110	115859	112556	713526	318718	342925	173929	664188	607604	42	0	0
MH	6	1693	46	274	1056	1026	6501	2904	3125	1585	6052	5536	0	0	0
OBUS	4	1024	28	166	639	621	3934	1757	1891	959	3662	3350	0	0	0
SBUS	1	231	6	38	144	140	889	397	427	217	827	757	0	0	0
T6	11	3313	90	537	2066	2007	12725	5684	6116	3102	11846	10836	1	0	0
T7	1	380	10	62	237	231	1462	653	702	356	1360	1245	0	0	0
UBUS	2	568	15	92	354	344	2181	974	1048	532	2030	1857	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1305	35	212	814	791	5014	2240	2410	1222	4668	4270	0	0	0
LDT1	0	96	3	16	60	58	370	165	178	90	344	315	0	0	0
LDT2	0	82	2	13	51	49	313	140	150	76	291	267	0	0	0
LHD1	63	18206	494	2951	11356	11032	69936	31239	33612	17048	65100	59554	4	0	0
LHD2	16	4800	130	778	2994	2908	18437	8235	8861	4494	17162	15700	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	145	4	23	90	88	556	248	267	136	518	474	0	0	0
MH	1	366	10	59	228	222	1406	628	676	343	1309	1197	0	0	0
OBUS	4	1245	34	202	777	755	4783	2137	2299	1166	4452	4073	0	0	0
SBUS	2	455	12	74	284	276	1750	782	841	426	1629	1490	0	0	0
T6	65	18797	510	3047	11724	11390	72205	32253	34702	17601	67213	61487	4	0	0
T7	313	91113	2471	14769	56830	55209	349990	156333	168207	85313	325789	298034	20	0	0
UBUS	5	1399	38	227	873	848	5375	2401	2583	1310	5004	4577	0	0	0

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

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	454	97,461	2,048	9,741	31,209	26,064	147,393	60,826	63,042	31,952	126,570	124,534	10	0	0	**720,850**
LDT1	80	17,204	362	1,719	5,508	4,600	26,015	10,737	11,128	5,640	22,341	21,982	2	0	0	**127,238**
LDT2	261	55,943	1,176	5,591	17,910	14,958	84,593	34,914	36,185	18,340	72,646	71,478	5	0	0	**413,738**
LHD1	93	21,919	407	1,756	5,157	4,041	21,828	8,778	8,984	4,580	18,570	0	0	0	0	**96,018**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
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LHD2	9	2,189	41	175	515	404	2,180	877	897	457	1,854	0	0	0	0	**9,589**
MCY	3	667	15	80	276	248	1,498	658	720	384	1,597	1,650	0	0	0	**7,792**
MDV	351	75,341	1,583	7,529	24,119	20,144	113,922	47,020	48,731	24,698	97,834	96,262	7	0	0	**557,189**
MH	5	1,245	23	100	293	230	1,240	499	510	260	1,055	1,083	0	0	0	**6,538**
OBUS	3	753	14	60	177	139	750	302	309	157	638	655	0	0	0	**3,956**
SBUS	1	170	3	14	40	31	170	68	70	36	144	148	0	0	0	**894**
T6	10	2,437	45	195	573	449	2,427	976	999	509	2,065	2,119	0	0	0	**12,797**
T7	1	280	5	22	66	52	279	112	115	58	237	243	0	0	0	**1,470**
UBUS	2	418	8	33	98	77	416	167	171	87	354	363	0	0	0	**2,193**
Total	**1,274**	**276,029**	**5,730**	**27,015**	**85,940**	**71,435**	**402,710**	**165,934**	**171,862**	**87,159**	**345,906**	**320,517**	**25**	**0**	**0**	**1,961,534**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	144	3	17	59	54	333	150	169	93	401	429	0	0	0	**1,851**
LDT1	0	11	0	1	4	4	24	11	12	7	29	31	0	0	0	**135**
LDT2	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**131**
LHD1	12	3,415	93	554	2,130	2,069	13,117	5,859	6,304	3,197	12,210	0	0	0	0	**48,947**
LHD2	3	900	24	146	562	546	3,458	1,545	1,662	843	3,219	0	0	0	0	**12,905**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	18	0	2	8	7	42	19	21	12	51	55	0	0	0	**235**
MH	1	289	6	32	109	99	596	254	264	131	493	452	0	0	0	**2,726**
OBUS	5	1,087	24	122	436	413	2,586	1,072	1,174	577	2,139	1,699	0	0	0	**11,329**
SBUS	1	356	8	37	134	122	733	313	324	161	606	556	0	0	0	**3,351**
T6	60	14,364	320	1,508	5,415	4,938	29,603	12,620	13,097	6,484	24,474	22,426	2	0	0	**135,250**
T7	448	107,607	2,397	11,299	40,564	36,990	221,770	94,544	98,118	48,571	183,349	168,000	12	0	0	**1,013,219**
UBUS	4	1,163	32	188	725	705	4,467	1,995	2,147	1,089	4,158	3,804	0	0	0	**20,471**
Total	**534**	**129,364**	**2,908**	**13,907**	**50,150**	**45,950**	**276,754**	**118,392**	**123,305**	**61,170**	**231,158**	**197,481**	**13**	**0**	**0**	**1,251,085**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,212,619	2,914,488	2,914,488

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

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
*EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	691	1132.07	673.30	0.002%
Fresno	2035	LDA	DSL	5	2	503.98	303.82	0.000%
Fresno	2035	LDA	GAS	10	35639	834.33	496.22	0.094%
Fresno	2035	LDA	DSL	10	95	455.14	274.43	0.000%
Fresno	2035	LDA	GAS	15	21241	646.52	384.52	0.056%
Fresno	2035	LDA	DSL	15	57	381.70	230.24	0.000%
Fresno	2035	LDA	GAS	20	808501	514.42	305.95	2.136%
Fresno	2035	LDA	DSL	20	2157	332.22	200.46	0.006%
Fresno	2035	LDA	GAS	25	197185	428.34	254.76	0.521%
Fresno	2035	LDA	DSL	25	526	300.08	181.12	0.001%
Fresno	2035	LDA	GAS	30	537843	368.22	219.00	1.421%
Fresno	2035	LDA	DSL	30	1435	281.26	169.80	0.004%
Fresno	2035	LDA	GAS	35	1366088	328.48	195.36	3.608%
Fresno	2035	LDA	DSL	35	3645	273.56	165.16	0.010%
Fresno	2035	LDA	GAS	40	1943582	303.47	180.49	5.134%
Fresno	2035	LDA	DSL	40	5186	276.08	166.68	0.014%
Fresno	2035	LDA	GAS	45	1929012	292.33	173.86	5.095%
Fresno	2035	LDA	DSL	45	5148	289.12	174.53	0.014%
Fresno	2035	LDA	GAS	50	2232463	292.13	173.74	5.897%
Fresno	2035	LDA	DSL	50	5957	314.19	189.61	0.016%
Fresno	2035	LDA	GAS	55	1665080	303.03	180.23	4.398%
Fresno	2035	LDA	DSL	55	4443	354.31	213.75	0.012%
Fresno	2035	LDA	GAS	60	1897400	325.92	193.84	5.012%
Fresno	2035	LDA	DSL	60	5063	414.66	250.07	0.013%
Fresno	2035	LDA	GAS	65	2035032	363.78	216.36	5.375%
Fresno	2035	LDA	DSL	65	5430	503.66	303.63	0.014%
Fresno	2035	LDA	GAS	70	1953744	390.12	232.03	5.161%
Fresno	2035	LDA	DSL	70	5214	634.98	382.65	0.014%
Fresno	2035	LDT1	GAS	5	103	1314.77	800.57	0.000%
Fresno	2035	LDT1	DSL	5	0	504.83	301.83	0.000%
Fresno	2035	LDT1	GAS	10	5290	969.21	590.16	0.014%
Fresno	2035	LDT1	DSL	10	7	455.72	272.47	0.000%
Fresno	2035	LDT1	GAS	15	3153	750.85	457.20	0.008%
Fresno	2035	LDT1	DSL	15	4	381.89	228.33	0.000%
Fresno	2035	LDT1	GAS	20	120003	597.52	363.84	0.317%
Fresno	2035	LDT1	DSL	20	159	332.15	198.59	0.000%
Fresno	2035	LDT1	GAS	25	29268	497.46	302.91	0.077%
Fresno	2035	LDT1	DSL	25	39	299.83	179.27	0.000%
Fresno	2035	LDT1	GAS	30	79830	427.66	260.41	0.211%
Fresno	2035	LDT1	DSL	30	106	280.92	167.96	0.000%
Fresno	2035	LDT1	GAS	35	202764	381.53	232.32	0.536%
Fresno	2035	LDT1	DSL	35	269	273.18	163.33	0.001%
Fresno	2035	LDT1	GAS	40	288480	352.53	214.66	0.762%
Fresno	2035	LDT1	DSL	40	383	275.71	164.84	0.001%
Fresno	2035	LDT1	GAS	45	286317	339.57	206.77	0.756%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	380	288.82	172.68	0.001%
Fresno	2035	LDT1	GAS	50	331357	339.33	206.62	0.875%
Fresno	2035	LDT1	DSL	50	440	314.02	187.75	0.001%
Fresno	2035	LDT1	GAS	55	247142	351.99	214.33	0.653%
Fresno	2035	LDT1	DSL	55	328	354.35	211.86	0.001%
Fresno	2035	LDT1	GAS	60	281625	378.58	230.52	0.744%
Fresno	2035	LDT1	DSL	60	374	415.03	248.14	0.001%
Fresno	2035	LDT1	GAS	65	302053	422.57	257.31	0.798%
Fresno	2035	LDT1	DSL	65	401	504.51	301.64	0.001%
Fresno	2035	LDT1	GAS	70	289988	453.16	275.93	0.766%
Fresno	2035	LDT1	DSL	70	385	636.53	380.57	0.001%
Fresno	2035	LDT2	GAS	5	255	1537.71	1044.73	0.001%
Fresno	2035	LDT2	DSL	5	0	502.58	342.88	0.000%
Fresno	2035	LDT2	GAS	10	13181	1133.52	770.12	0.035%
Fresno	2035	LDT2	DSL	10	6	454.17	309.95	0.000%
Fresno	2035	LDT2	GAS	15	7856	878.17	596.63	0.021%
Fresno	2035	LDT2	DSL	15	4	381.38	260.45	0.000%
Fresno	2035	LDT2	GAS	20	299025	698.83	474.79	0.790%
Fresno	2035	LDT2	DSL	20	135	332.34	227.10	0.000%
Fresno	2035	LDT2	GAS	25	72929	581.82	395.29	0.193%
Fresno	2035	LDT2	DSL	25	33	300.48	205.43	0.000%
Fresno	2035	LDT2	GAS	30	198922	500.18	339.82	0.525%
Fresno	2035	LDT2	DSL	30	90	281.83	192.75	0.000%
Fresno	2035	LDT2	GAS	35	505249	446.22	303.16	1.335%
Fresno	2035	LDT2	DSL	35	228	274.20	187.55	0.001%
Fresno	2035	LDT2	GAS	40	718836	412.30	280.12	1.899%
Fresno	2035	LDT2	DSL	40	324	276.70	189.26	0.001%
Fresno	2035	LDT2	GAS	45	713447	397.14	269.82	1.885%
Fresno	2035	LDT2	DSL	45	321	289.62	198.04	0.001%
Fresno	2035	LDT2	GAS	50	825679	396.86	269.63	2.181%
Fresno	2035	LDT2	DSL	50	372	314.47	214.94	0.001%
Fresno	2035	LDT2	GAS	55	615832	411.66	279.69	1.627%
Fresno	2035	LDT2	DSL	55	277	354.23	241.98	0.001%
Fresno	2035	LDT2	GAS	60	701756	442.76	300.82	1.854%
Fresno	2035	LDT2	DSL	60	316	414.05	282.66	0.001%
Fresno	2035	LDT2	GAS	65	752659	494.22	335.77	1.988%
Fresno	2035	LDT2	DSL	65	339	502.27	342.66	0.001%
Fresno	2035	LDT2	GAS	70	722594	529.99	360.08	1.909%
Fresno	2035	LDT2	DSL	70	326	632.42	431.18	0.001%
Fresno	2035	LHD1	GAS	5	28731	2513.50	2262.15	0.076%
Fresno	2035	LHD1	DSL	5	10879	519.04	467.14	0.029%
Fresno	2035	LHD1	GAS	10	74918	2036.13	1832.52	0.198%
Fresno	2035	LHD1	DSL	10	36179	519.04	467.14	0.096%
Fresno	2035	LHD1	GAS	15	170598	1392.43	1253.19	0.451%
Fresno	2035	LHD1	DSL	15	78354	519.04	467.14	0.207%
Fresno	2035	LHD1	GAS	20	197125	1006.07	905.46	0.521%
Fresno	2035	LHD1	DSL	20	85901	519.04	467.14	0.227%
Fresno	2035	LHD1	GAS	25	151847	768.01	691.21	0.401%
Fresno	2035	LHD1	DSL	25	91937	519.04	467.14	0.243%
Fresno	2035	LHD1	GAS	30	134283	619.43	557.49	0.355%
Fresno	2035	LHD1	DSL	30	77607	519.04	467.14	0.205%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50177	527.85	475.06	0.133%
Fresno	2035	LHD1	DSL	35	40956	519.04	467.14	0.108%
Fresno	2035	LHD1	GAS	40	14811	475.23	427.71	0.039%
Fresno	2035	LHD1	DSL	40	22483	519.04	467.14	0.059%
Fresno	2035	LHD1	GAS	45	18234	452.06	406.85	0.048%
Fresno	2035	LHD1	DSL	45	24267	519.04	467.14	0.064%
Fresno	2035	LHD1	GAS	50	134634	454.32	408.89	0.356%
Fresno	2035	LHD1	DSL	50	93703	519.04	467.14	0.248%
Fresno	2035	LHD1	GAS	55	37031	482.42	434.17	0.098%
Fresno	2035	LHD1	DSL	55	56429	519.04	467.14	0.149%
Fresno	2035	LHD2	GAS	5	2869	2513.50	2262.15	0.008%
Fresno	2035	LHD2	DSL	5	2868	519.11	467.20	0.008%
Fresno	2035	LHD2	GAS	10	7482	2036.13	1832.52	0.020%
Fresno	2035	LHD2	DSL	10	9538	519.11	467.20	0.025%
Fresno	2035	LHD2	GAS	15	17037	1392.43	1253.19	0.045%
Fresno	2035	LHD2	DSL	15	20656	519.11	467.20	0.055%
Fresno	2035	LHD2	GAS	20	19686	1006.07	905.46	0.052%
Fresno	2035	LHD2	DSL	20	22646	519.11	467.20	0.060%
Fresno	2035	LHD2	GAS	25	15164	768.01	691.21	0.040%
Fresno	2035	LHD2	DSL	25	24237	519.11	467.20	0.064%
Fresno	2035	LHD2	GAS	30	13410	619.43	557.49	0.035%
Fresno	2035	LHD2	DSL	30	20459	519.11	467.20	0.054%
Fresno	2035	LHD2	GAS	35	5011	527.85	475.06	0.013%
Fresno	2035	LHD2	DSL	35	10797	519.11	467.20	0.029%
Fresno	2035	LHD2	GAS	40	1479	475.23	427.71	0.004%
Fresno	2035	LHD2	DSL	40	5927	519.11	467.20	0.016%
Fresno	2035	LHD2	GAS	45	1821	452.06	406.85	0.005%
Fresno	2035	LHD2	DSL	45	6397	519.11	467.20	0.017%
Fresno	2035	LHD2	GAS	50	13445	454.32	408.89	0.036%
Fresno	2035	LHD2	DSL	50	24702	519.11	467.20	0.065%
Fresno	2035	LHD2	GAS	55	3698	482.42	434.17	0.010%
Fresno	2035	LHD2	DSL	55	14876	519.11	467.20	0.039%
Fresno	2035	MCY	GAS	5	11	266.39	239.75	0.000%
Fresno	2035	MCY	GAS	10	555	242.30	218.07	0.001%
Fresno	2035	MCY	GAS	15	331	205.03	184.53	0.001%
Fresno	2035	MCY	GAS	20	12588	178.74	160.86	0.033%
Fresno	2035	MCY	GAS	25	3070	160.51	144.46	0.008%
Fresno	2035	MCY	GAS	30	8374	148.52	133.67	0.022%
Fresno	2035	MCY	GAS	35	21270	141.68	127.51	0.056%
Fresno	2035	MCY	GAS	40	30261	139.44	125.49	0.080%
Fresno	2035	MCY	GAS	45	30035	141.74	127.57	0.079%
Fresno	2035	MCY	GAS	50	34759	149.02	134.11	0.092%
Fresno	2035	MCY	GAS	55	25925	162.25	146.03	0.068%
Fresno	2035	MCY	GAS	60	29542	183.23	164.91	0.078%
Fresno	2035	MCY	GAS	65	31685	214.91	193.42	0.084%
Fresno	2035	MCY	GAS	70	30420	262.14	235.92	0.080%
Fresno	2035	MDV	GAS	5	262	1969.99	1370.34	0.001%
Fresno	2035	MDV	DSL	5	0	504.23	348.36	0.000%
Fresno	2035	MDV	GAS	10	13533	1452.25	1010.20	0.036%
Fresno	2035	MDV	DSL	10	11	455.31	314.59	0.000%
Fresno	2035	MDV	GAS	15	8066	1125.04	782.58	0.021%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6	381.76	263.81	0.000%
Fresno	2035	MDV	GAS	20	307003	895.32	622.79	0.811%
Fresno	2035	MDV	DSL	20	239	332.20	229.60	0.001%
Fresno	2035	MDV	GAS	25	74875	745.38	518.49	0.198%
Fresno	2035	MDV	DSL	25	58	300.00	207.37	0.000%
Fresno	2035	MDV	GAS	30	204229	640.79	445.74	0.539%
Fresno	2035	MDV	DSL	30	159	281.16	194.36	0.000%
Fresno	2035	MDV	GAS	35	518730	571.67	397.66	1.370%
Fresno	2035	MDV	DSL	35	404	273.45	189.04	0.001%
Fresno	2035	MDV	GAS	40	738016	528.23	367.44	1.949%
Fresno	2035	MDV	DSL	40	575	275.97	190.78	0.002%
Fresno	2035	MDV	GAS	45	732483	508.81	353.94	1.935%
Fresno	2035	MDV	DSL	45	571	289.03	199.80	0.002%
Fresno	2035	MDV	GAS	50	847709	508.45	353.68	2.239%
Fresno	2035	MDV	DSL	50	661	314.14	217.13	0.002%
Fresno	2035	MDV	GAS	55	632263	527.41	366.87	1.670%
Fresno	2035	MDV	DSL	55	493	354.32	244.87	0.001%
Fresno	2035	MDV	GAS	60	720479	567.26	394.59	1.903%
Fresno	2035	MDV	DSL	60	562	414.77	286.60	0.001%
Fresno	2035	MDV	GAS	65	772741	633.18	440.44	2.041%
Fresno	2035	MDV	DSL	65	602	503.92	348.14	0.002%
Fresno	2035	MDV	GAS	70	741874	679.00	472.32	1.960%
Fresno	2035	MDV	DSL	70	578	635.44	438.94	0.002%
Fresno	2035	MH	GAS	5	497	2513.50	2262.15	0.001%
Fresno	2035	MH	DSL	5	100	2409.45	2168.51	0.000%
Fresno	2035	MH	GAS	10	2500	2036.13	1832.52	0.007%
Fresno	2035	MH	DSL	10	498	2187.79	1969.01	0.001%
Fresno	2035	MH	GAS	15	3158	1392.43	1253.19	0.008%
Fresno	2035	MH	DSL	15	672	1796.36	1616.72	0.002%
Fresno	2035	MH	GAS	20	3276	1006.07	905.46	0.009%
Fresno	2035	MH	DSL	20	713	1474.12	1326.71	0.002%
Fresno	2035	MH	GAS	25	3650	768.01	691.21	0.010%
Fresno	2035	MH	DSL	25	742	1322.20	1189.98	0.002%
Fresno	2035	MH	GAS	30	4127	619.43	557.49	0.011%
Fresno	2035	MH	DSL	30	893	1241.08	1116.98	0.002%
Fresno	2035	MH	GAS	35	5129	527.85	475.06	0.014%
Fresno	2035	MH	DSL	35	1053	1173.76	1056.39	0.003%
Fresno	2035	MH	GAS	40	6385	475.23	427.71	0.017%
Fresno	2035	MH	DSL	40	1307	1120.25	1008.22	0.003%
Fresno	2035	MH	GAS	45	5823	452.06	406.85	0.015%
Fresno	2035	MH	DSL	45	1070	1080.53	972.47	0.003%
Fresno	2035	MH	GAS	50	5667	454.32	408.89	0.015%
Fresno	2035	MH	DSL	50	1197	1054.61	949.15	0.003%
Fresno	2035	MH	GAS	55	7412	482.42	434.17	0.020%
Fresno	2035	MH	DSL	55	1755	1042.49	938.24	0.005%
Fresno	2035	MH	GAS	60	8553	541.21	487.09	0.023%
Fresno	2035	MH	DSL	60	2109	1044.17	939.76	0.006%
Fresno	2035	MH	GAS	65	1337	641.50	577.35	0.004%
Fresno	2035	MH	DSL	65	332	1059.66	953.69	0.001%
Fresno	2035	OBUS	GAS	5	301	2513.50	2262.15	0.001%
Fresno	2035	OBUS	DSL	5	246	3000.85	2700.76	0.001%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1513	2036.13	1832.52	0.004%
Fresno	2035	OBUS	DSL	10	1134	2416.38	2174.74	0.003%
Fresno	2035	OBUS	GAS	15	1911	1392.43	1253.19	0.005%
Fresno	2035	OBUS	DSL	15	1492	1966.46	1769.81	0.004%
Fresno	2035	OBUS	GAS	20	1982	1006.07	905.46	0.005%
Fresno	2035	OBUS	DSL	20	1992	1667.58	1500.82	0.005%
Fresno	2035	OBUS	GAS	25	2209	768.01	691.21	0.006%
Fresno	2035	OBUS	DSL	25	2067	1554.30	1398.87	0.005%
Fresno	2035	OBUS	GAS	30	2497	619.43	557.49	0.007%
Fresno	2035	OBUS	DSL	30	2883	1513.47	1362.13	0.008%
Fresno	2035	OBUS	GAS	35	3104	527.85	475.06	0.008%
Fresno	2035	OBUS	DSL	35	4257	1496.24	1346.62	0.011%
Fresno	2035	OBUS	GAS	40	3864	475.23	427.71	0.010%
Fresno	2035	OBUS	DSL	40	4544	1388.02	1249.22	0.012%
Fresno	2035	OBUS	GAS	45	3523	452.06	406.85	0.009%
Fresno	2035	OBUS	DSL	45	5085	1412.70	1271.43	0.013%
Fresno	2035	OBUS	GAS	50	3429	454.32	408.89	0.009%
Fresno	2035	OBUS	DSL	50	5431	1369.39	1232.45	0.014%
Fresno	2035	OBUS	GAS	55	4485	482.42	434.17	0.012%
Fresno	2035	OBUS	DSL	55	7117	1329.59	1196.63	0.019%
Fresno	2035	OBUS	GAS	60	5175	541.21	487.09	0.014%
Fresno	2035	OBUS	DSL	60	4814	1154.53	1039.08	0.013%
Fresno	2035	OBUS	GAS	65	809	641.50	577.35	0.002%
Fresno	2035	OBUS	DSL	65	1253	1334.35	1200.91	0.003%
Fresno	2035	SBUS	GAS	5	78	2513.50	2262.15	0.000%
Fresno	2035	SBUS	DSL	5	153	2617.43	2355.69	0.000%
Fresno	2035	SBUS	GAS	10	273	2036.13	1832.52	0.001%
Fresno	2035	SBUS	DSL	10	537	2162.21	1945.98	0.001%
Fresno	2035	SBUS	GAS	15	546	1392.43	1253.19	0.001%
Fresno	2035	SBUS	DSL	15	1074	1775.36	1597.82	0.003%
Fresno	2035	SBUS	GAS	20	741	1006.07	905.46	0.002%
Fresno	2035	SBUS	DSL	20	1458	1400.58	1260.52	0.004%
Fresno	2035	SBUS	GAS	25	1169	768.01	691.21	0.003%
Fresno	2035	SBUS	DSL	25	2302	1306.77	1176.10	0.006%
Fresno	2035	SBUS	GAS	30	1403	619.43	557.49	0.004%
Fresno	2035	SBUS	DSL	30	2762	1226.60	1103.94	0.007%
Fresno	2035	SBUS	GAS	35	1440	527.85	475.06	0.004%
Fresno	2035	SBUS	DSL	35	2835	1160.07	1044.07	0.007%
Fresno	2035	SBUS	GAS	40	972	475.23	427.71	0.003%
Fresno	2035	SBUS	DSL	40	1913	1107.18	996.46	0.005%
Fresno	2035	SBUS	GAS	45	466	452.06	406.85	0.001%
Fresno	2035	SBUS	DSL	45	918	1067.93	961.14	0.002%
Fresno	2035	SBUS	GAS	50	234	454.32	408.89	0.001%
Fresno	2035	SBUS	DSL	50	460	1042.31	938.08	0.001%
Fresno	2035	SBUS	GAS	55	348	482.42	434.17	0.001%
Fresno	2035	SBUS	DSL	55	684	1030.34	927.31	0.002%
Fresno	2035	SBUS	GAS	60	193	541.21	487.09	0.001%
Fresno	2035	SBUS	DSL	60	381	1032.00	928.80	0.001%
Fresno	2035	T6	GAS	5	974	2513.50	2262.15	0.003%
Fresno	2035	T6	DSL	5	5138	2559.93	2303.94	0.014%
Fresno	2035	T6	GAS	10	4894	2036.13	1832.52	0.013%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25573	2114.70	1903.23	0.068%
Fresno	2035	T6	GAS	15	6182	1392.43	1253.19	0.016%
Fresno	2035	T6	DSL	15	34514	1736.36	1562.72	0.091%
Fresno	2035	T6	GAS	20	6412	1006.07	905.46	0.017%
Fresno	2035	T6	DSL	20	36603	1369.81	1232.83	0.097%
Fresno	2035	T6	GAS	25	7145	768.01	691.21	0.019%
Fresno	2035	T6	DSL	25	38121	1278.07	1150.26	0.101%
Fresno	2035	T6	GAS	30	8078	619.43	557.49	0.021%
Fresno	2035	T6	DSL	30	45837	1199.66	1079.69	0.121%
Fresno	2035	T6	GAS	35	10040	527.85	475.06	0.027%
Fresno	2035	T6	DSL	35	54048	1134.59	1021.13	0.143%
Fresno	2035	T6	GAS	40	12498	475.23	427.71	0.033%
Fresno	2035	T6	DSL	40	67093	1082.86	974.57	0.177%
Fresno	2035	T6	GAS	45	11398	452.06	406.85	0.030%
Fresno	2035	T6	DSL	45	54940	1044.47	940.02	0.145%
Fresno	2035	T6	GAS	50	11092	454.32	408.89	0.029%
Fresno	2035	T6	DSL	50	61487	1019.42	917.48	0.162%
Fresno	2035	T6	GAS	55	14508	482.42	434.17	0.038%
Fresno	2035	T6	DSL	55	90103	1007.70	906.93	0.238%
Fresno	2035	T6	GAS	60	16741	541.21	487.09	0.044%
Fresno	2035	T6	DSL	60	108274	1009.33	908.40	0.286%
Fresno	2035	T6	GAS	65	2616	641.50	577.35	0.007%
Fresno	2035	T6	DSL	65	17039	1024.30	921.87	0.045%
Fresno	2035	T7	GAS	5	47	2513.50	2262.15	0.000%
Fresno	2035	T7	DSL	5	11173	3956.49	3560.84	0.030%
Fresno	2035	T7	GAS	10	230	2036.13	1832.52	0.001%
Fresno	2035	T7	DSL	10	42683	3268.37	2941.53	0.113%
Fresno	2035	T7	GAS	15	251	1392.43	1253.19	0.001%
Fresno	2035	T7	DSL	15	52201	2683.61	2415.25	0.138%
Fresno	2035	T7	GAS	20	429	1006.07	905.46	0.001%
Fresno	2035	T7	DSL	20	128970	2117.10	1905.39	0.341%
Fresno	2035	T7	GAS	25	560	768.01	691.21	0.001%
Fresno	2035	T7	DSL	25	117904	1975.31	1777.78	0.311%
Fresno	2035	T7	GAS	30	1023	619.43	557.49	0.003%
Fresno	2035	T7	DSL	30	199056	1854.12	1668.71	0.526%
Fresno	2035	T7	GAS	35	1819	527.85	475.06	0.005%
Fresno	2035	T7	DSL	35	358106	1753.56	1578.20	0.946%
Fresno	2035	T7	GAS	40	1585	475.23	427.71	0.004%
Fresno	2035	T7	DSL	40	337948	1673.61	1506.25	0.893%
Fresno	2035	T7	GAS	45	1678	452.06	406.85	0.004%
Fresno	2035	T7	DSL	45	473149	1614.27	1452.85	1.250%
Fresno	2035	T7	GAS	50	1755	454.32	408.89	0.005%
Fresno	2035	T7	DSL	50	492063	1575.55	1418.00	1.300%
Fresno	2035	T7	GAS	55	2576	482.42	434.17	0.007%
Fresno	2035	T7	DSL	55	600041	1557.45	1401.71	1.585%
Fresno	2035	T7	GAS	60	636	541.21	487.09	0.002%
Fresno	2035	T7	DSL	60	182794	1559.97	1403.97	0.483%
Fresno	2035	T7	GAS	65	341	641.50	577.35	0.001%
Fresno	2035	T7	DSL	65	100120	1583.10	1424.79	0.264%
Fresno	2035	UBUS	GAS	5	191	2513.50	2262.15	0.001%
Fresno	2035	UBUS	DSL	5	471	2299.61	2069.65	0.001%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686	2036.13	1832.52	0.002%
Fresno	2035	UBUS	DSL	10	1691	2299.61	2069.65	0.004%
Fresno	2035	UBUS	GAS	15	1372	1392.43	1253.19	0.004%
Fresno	2035	UBUS	DSL	15	3383	2299.61	2069.65	0.009%
Fresno	2035	UBUS	GAS	20	1811	1006.07	905.46	0.005%
Fresno	2035	UBUS	DSL	20	4464	2299.61	2069.65	0.012%
Fresno	2035	UBUS	GAS	25	2727	768.01	691.21	0.007%
Fresno	2035	UBUS	DSL	25	6723	2299.61	2069.65	0.018%
Fresno	2035	UBUS	GAS	30	3414	619.43	557.49	0.009%
Fresno	2035	UBUS	DSL	30	8415	2299.61	2069.65	0.022%
Fresno	2035	UBUS	GAS	35	3345	527.85	475.06	0.009%
Fresno	2035	UBUS	DSL	35	8247	2299.61	2069.65	0.022%
Fresno	2035	UBUS	GAS	40	2412	475.23	427.71	0.006%
Fresno	2035	UBUS	DSL	40	5945	2299.61	2069.65	0.016%
Fresno	2035	UBUS	GAS	45	1051	452.06	406.85	0.003%
Fresno	2035	UBUS	DSL	45	2592	2299.61	2069.65	0.007%
Fresno	2035	UBUS	GAS	50	534	454.32	408.89	0.001%
Fresno	2035	UBUS	DSL	50	1317	2299.61	2069.65	0.003%
Fresno	2035	UBUS	GAS	55	662	482.42	434.17	0.002%
Fresno	2035	UBUS	DSL	55	1632	2299.61	2069.65	0.004%
Fresno	2035	UBUS	GAS	60	1084	541.21	487.09	0.003%
Fresno	2035	UBUS	DSL	60	2672	2299.61	2069.65	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,531,700,000	2,610	367097	39.2	13.9	337,694
Commercial	2,950,179,600	7,503	427776	45.7	16.2	393,513
Industrial	0		0	0.0	0.0	0
Total	**5,481,879,600**		**794,873**	**85.0**	**30.2**	**731,206**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	133,860,000	138	783,081	73.6	1.5	712,228
Commercial	158,459,600	403	926,989	87.2	1.7	843,115
Industrial	0		0	0.0	0.0	0
Total	**292,319,600**		**1,710,070**	**160.8**	**3.2**	**1,555,342**

Notes and Sources:

*Used the 2020 emission factor.

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

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

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

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population in 2035

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

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2056
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	970,000
	Emissions (MTCO2e per person)	863,300
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.