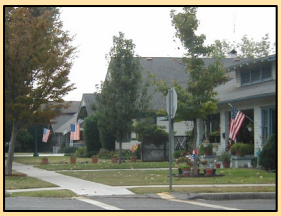
Draft

Climate Action Plan

Tulare County



February 2010

Climate Action Plan

As an implementation measure to the Tulare County General Plan 2030 Update (General Plan Update), the County will consider the adoption of a Climate Action Plan in close proximity and subsequent to the adoption of the General Plan Update. The Tulare County Climate Action Plan (CAP) serves as a guiding document for County actions to reduce greenhouse gas emissions and adapt to the potential effects of climate change. The CAP is an implementation measure of the General Plan Update. An Implementation Measure is a specific action, program, procedure, or technique. Implementation Measures are provided to help ensure that appropriate actions are taken to implement the General Plan. Implementation Measures may be adjusted over time, without amending the General Plan, based on new information, changing circumstances, and evaluation of their effectiveness, so long as they remain consistent with the intent of the General Plan and adopted mitigation measures. The General Plan provides the supporting framework for development in the County to produce fewer greenhouse gas emissions during Plan build out. The CAP builds on the General Plans framework with more specific actions that will be applied to achieve emission reduction targets consistent with California legislation.

February 2010

DRAFT
Tulare County Climate Action Plan
Tulare County, California

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GLOSSARY OF TERMS AND ACRONYMS

AB	Assembly Bill.
AQ	Air Quality Element (in the Tulare County General Plan).
CARB	The California Air Resources Board is 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 CARB 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	The California Environmental Quality Act is a California statute passed in 1970 to institute a Statewide policy of environmental protection.
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.
CO_2e	Carbon Dioxide Equivalent: A carbon dioxide equivalent is the unit used to report greenhouse gas emissions or reductions. Greenhouse gases are converted to CO_2e by multiplying emissions by their respective global warming potential (GWP). The CO_2e allows for reporting of overall greenhouse gas emissions in one standardized value and aids in greenhouse gas emission comparisons.
CAP	Climate Action Plan: A description of the policies and measures that a local government will take to reduce greenhouse gas emissions and achieve its emissions reduction targets. Most plans include a timeline, a description of financing mechanisms, and an assignment of responsibility to departments and staff. In addition to direct greenhouse gas reduction measures, most plans also incorporate public awareness and education efforts. Interchangeable with Greenhouse Gas Reduction Plan.
Climate Change	Climate change refers to a statistically significant variation (not due to chance) either in the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic (man caused) changes in the composition of the atmosphere or in land use.

EPA	United States Environmental Protection Agency. The mission of EPA is to protect human health and to safeguard the natural environment—air, water and land.
ERM	Environmental Resource Management Element (in the Tulare County General Plan.
Greenhouse Gas	A greenhouse gas is 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.
Hamlet	An unincorporated area that shares many of the characteristics of a community but on a smaller scale.
HDB	Hamlet Development Boundary. This is an officially adopted and mapped County line around a hamlet that divides lands suitable for development from lands to be protected for agricultural, natural, or rural uses. Land inside a HDB is appropriate for development and is not subject to the criteria evaluation of development as established in the Rural Valley Lands Plan or Foothill Growth Management Plan [RVLP Policy 1-1].
HS	Health and Safety Element (in the Tulare County General Plan).
LU	Land Use (acronym in the Tulare County General Plan).
Metrics	Metrics are a set of measurements that quantify results. Performance metrics quantify the units of performance. Project metrics tell you whether the project is meeting its goals.
$MMTCO_2e$	Million metric tons of carbon dioxide equivalents is a measure of emissions of greenhouse gases.
NO_x	Nitrogen Oxides (Oxides of Nitrogen). NO_x are compounds including a variety of gases including nitric oxide and nitrogen dioxide. NO_x are primarily created from the combustion process and are a major contributor to smog and acid rain formation and secondary particulate formation.
PG&E	Pacific Gas and Electric Company.
PF	Planning Framework Element (in the Tulare County General Plan).
PFS	Public Facilities and Services Element (in the Tulare County General Plan).

ROG	Reactive Organic Gas. A photochemically reactive chemical gas composed of non-methane hydrocarbons that may contribute to the formation of smog. ROG is sometimes referred to as volatile organic compounds (VOCs).
Statistical Significance	Statistical significance is the likelihood that a finding or a result is caused by something other than just chance.
Sector	A term used by the California Air Resources Board to describe emission inventory source categories for greenhouse gases based on broad economic sectors.
SJVAB	San Joaquin Valley Air Basin. An air basin is a geographic area that exhibits similar meteorological and geographic conditions. California is divided into 15 air basins to assist with the Statewide regional management of air quality issues. The SJVAB extends in the Central Valley from San Joaquin County in the north to the valley portion of Kern County in the south.
SJVAPCD	San Joaquin Valley Air Pollution Control District. The SJVAPCD is the regulatory agency responsible for developing air quality plans, monitoring air quality, and reporting air quality data for the SJVAB.
SB	Senate Bill.
SCE	Southern California Edison.
SL	Scenic Landscapes Element (in the Tulare County General Plan).
TC	Transportation and Circulation Element (in the Tulare County General Plan).
TCAG	Tulare County Association of Governments is responsible for overseeing and planning projects with the county and each of its cities, helping to bring tax money back home to fund bus service, road improvements, projects that will improve our air quality, and more.
UAB	This is an officially adopted and mapped County line around incorporated cities. The hierarchy is as follows: incorporated city limits, Urban Development Boundary (may be coterminous with the Sphere of Influence adopted by LAFCo), and the Urban Area Boundary of an incorporated city. The Urban Area Boundaries establish areas around incorporated cities where the County and cities coordinate plans, policies, and standards relating to street and highway construction, public utility systems, and other closely related infrastructure matters affecting the orderly development of urban fringe areas.

UDB	Urban Development Boundary. For cities, the UDB is an officially adopted and mapped county line delineating the area expected for urban growth over a 20-year period. Land within a city's UDB is assumed appropriate for development and not subject to the Rural Valley Lands Plan or Foothill Growth Management Plan. For communities, hamlets, and planned communities, the UDB is a County-adopted line dividing land to be developed from land to be protected for agricultural, natural, or rural uses. It serves as the official planning area for communities over a 20-year period. Land within a community UDB is assumed appropriate for development and is not subject to the Rural Valley Lands Plan or Foothill Growth Management Plan [RVLP Policy 1-1].
WR	Water Resource Element (in the Tulare County General Plan).

SECTION 1: EXECUTIVE SUMMARY

1.1 - Overview

The Executive Summary provides an overview of the Tulare County Climate Action Plan (CAP). It includes brief discussions of the various CAP components to allow the reader to quickly understand the most important aspects of the CAP including:

- The purpose of the CAP.
- The relationship to other State and regional regulatory and planning efforts.
- Using the CAP for CEQA compliance.
- Tulare County's greenhouse gas inventory.
- Emission reduction targets to demonstrate consistency with AB 32 and the California Air Resources Board (CARB) Scoping Plan.
- The Climate Action Plan strategy for achieving emission reduction targets.
- The plan for tracking and monitoring progress in implementing the CAP.

1.2 - Climate Action Plan Purpose

The Tulare County Climate Action Plan (CAP) serves as a guiding document for County of Tulare ("County") actions to reduce greenhouse gas emissions and adapt to the potential effects of climate change. The CAP is an implementation measure of the 2030 General Plan Update. The General Plan provides the supporting framework for development in the County to produce fewer greenhouse gas emissions during Plan buildout. The CAP builds on the General Plan's framework with more specific actions that will be applied to achieve emission reduction targets consistent with California legislation. The terms Climate Action Plan and Greenhouse Gas Reduction Plan are often used interchangeably. The County has chosen to use Climate Action Plan abbreviated as CAP for this document.

The CAP follows a series of guiding principles to ensure that it is consistent with the County's values, objectives, and economy.

- The CAP will focus on strategies that meet multiple County objectives and enhance the quality of life and well-being of Tulare County residents.
- CAP strategies that provide an economic return will receive a higher priority than strategies that increase costs for the County, or for businesses and residents.

- The CAP will not duplicate strategies and programs that are better handled by other agencies.
- The CAP will recognize that Federal, State, and SJVAPCD requirements set for local government regarding greenhouse gas reductions and climate change are evolving, so strategies and targets must be adaptable to changing conditions.
- CAP implementation and monitoring will use existing data collection and reporting systems to the maximum extent possible.

2030 General Plan Update Principles

Fortunately, many of the County's most important objectives such as farmland protection, preserving open space and natural environments, and improving air quality are consistent with many of the actions needed to reduce greenhouse gases from new development. The Planning Framework Element of the 2030 General Plan Update includes the following principles:

- Principle 1: Provide opportunities for small unincorporated communities to grow or improve quality of life.
- Principle 2: Promote reinvestment in existing communities and hamlets in a way that enhances the quality of life in these locations.
- Principle 3: Protect the County's important agricultural resources and scenic natural lands from urban encroachment.
- Principle 4: Strictly limit rural residential development potential in important agricultural areas outside of communities, hamlets, and cities (i.e., avoid rural residential sprawl).
- Principle 5: Allow existing, outdated agricultural facilities in rural areas to be used for new businesses (including nonagricultural uses) if they provide employment.
- Principle 6: Enhance planning coordination and cooperation with the agencies and organizations with land management responsibilities in and adjacent to Tulare County.

Tulare County's Blueprint Vision

The Tulare County Association of Governments (TCAG) [1]participated in the San Joaquin Valley Blueprint project that developed a vision for development in the San Joaquin Valley to year 2050. TCAG then developed a Regional Blueprint Vision for Tulare County. The vision statement is as follows:

[1] TCAG is a local joint powers authority created by the County of Tulare and the cities within the County. The governing board consist of the five members of the Tulare County Board of Supervisors, a representative from each city, and three public members appointed by the selected members. TCAG is not the governing board of the County of Tulare although the Board of Supervisors sit as members of TCAG. TCAG's actions are advisory to the Tulare County Board of Supervisors and the individual cities and it controls significant transportation funding as a TPA.

> To preserve and enhance the Tulare County region's unique features—its vibrant and culturally diverse communities, its rivers, farmland, mountains, recreational opportunities, natural areas, and national parks. To promote sustainability through a well-trained and educated workforce, and a healthy and diverse economy. To ensure that the urban and rural areas of the County are thriving and residents can enjoy a well-planned, well-designed, and maintained land use structure and transportation system that offers a variety of housing choices, mixed uses, and numerous ways to get from place to place.

Climate Action Plan Description

This CAP follows a four-step process recommended by the Institute for Local Government. First, an inventory of greenhouse gas emission sources was developed for a base year (2007) to identify the most important categories and potential for emission reductions. Second, future year inventories for 2020 and 2030 were projected to illustrate what emissions would be in the future accounting for projected growth, but without controls on the sources. The future year inventory is referred to as a "business-as-usual scenario." The year 2020 projection was used to allow comparison to the State's target year in California Air Resources Board's (CARB) Scoping Plan. The year 2030 projection was used to identify the growth in emissions that would occur by the General Plan planning horizon year. The 2020 inventory was projected by interpolating emissions growth predicted between 2007 and 2030. The third step was to identify and describe policies, regulations, and programs that apply to sources in the County's emission inventories and will achieve reductions by the target years. The policies, regulations, and programs considered in the CAP include those by federal, State, and local governments. These were then quantified to the extent possible using best available methodologies and data to determine the amount of reductions that are needed by the target years from Tulare County to achieve consistency with State targets. The last step was the development of a monitoring program that tracks implementation progress and emission reductions over time and identifies a process for taking corrective actions, if needed.

Tulare County's Role

One of the key issues to resolve in developing a CAP is defining the County's role in reducing emissions from the different source categories. The County's focus is on emission sources within its regulatory authority, which are mainly related to land use and the local transportation system. To some extent, the County can influence activities that provide greenhouse gas reductions such as water conservation and solid waste diversion and recycling. The County also can require feasible mitigation measures for new projects as a Lead Agency under the California Environmental Quality Act (CEQA). The County has land use regulatory authority over the location of agriculture, but very limited authority over the vast majority of agricultural activities that are consistent with agricultural zoning and many agricultural related support activities. Most intensive agricultural activities such as confined animal facilities, including but not limited to, dairies, feedlots, poultry, swine, sheep, horses, rabbits, and other facilities require County land use approvals that are subject to CEQA. These and

other new projects are required to address greenhouse gas and climate impacts under CEQA during the approval process.

Role of State and Regional Agencies

The CARB has the primary responsibility for the State's climate programs and regulations that would apply to mobile and industrial sources of greenhouse gases. The California Energy Commission has primary responsibility for energy efficiency standards related to buildings and certain consumer products. The San Joaquin Valley Air Pollution Control District (SJVAPCD) regulates stationary, areawide, and indirect sources of emissions that impact health. Many SJVAPCD regulations on health-based pollutant emissions also reduce greenhouse gas emissions. The State Legislature provided the SJVAPCD with authority to require permits for agricultural sources of emissions with State Senate Bill 700 (2003 Stats, Ch. 479) in 2003. Since then, the SJVAPCD has implemented a permitting program for large agricultural sources and has implemented a rule requiring controls of reactive organic gases (ROG) that would apply to most dairies and other confined animal facilities in Tulare County. Controls effective for ROG often are also effective at reducing greenhouse gases.

Addressing Climate Change under CEQA

One of the most important uses for a CAP is to establish significance thresholds for reviewing projects under CEQA. Greenhouse gas emissions from an individual project will not result in a perceptible impact on global climate. Impacts to global climate are caused by the cumulative impacts of greenhouse gases emitted anywhere and everywhere on Earth. The Office of Planning and Research CEQA Guidelines encourages use of a plan consistency threshold for cumulative impacts on climate change. Projects that demonstrate consistency with the policies, implementation measures, and emission reduction targets contained in the CAP would have a less than significant impact on climate change.

The emission reduction targets are the critical factor in determining CAP consistency. The CAP target must be set at a level that demonstrates consistency with State targets, but should be feasible for the vast majority of projects to achieve. If the reduction target percentage is set at a level that is infeasible, Environmental Impact Reports could be required for a large number of projects. A statement of overriding consideration would be required and no additional emission reductions would be achieved if feasible emission reductions were not available.

Although it is technologically possible to reduce greenhouse gases if cost is not considered, the potential exists that a locally implemented measure will only serve to relocate the emissions to another place that does not require the new technology. Therefore, even if emission rates are lower in one place, it could have no effect on global climate if the emission-producing activity is shipped out of State or overseas.

Summary of CAP Actions:

- Identifies sources of greenhouse gas emissions caused by activities within the unincorporated areas of Tulare County and estimates how these emissions may change over time.
- Establishes a reduction target of reducing Tulare County's greenhouse gas emissions to demonstrate consistent with AB 32 (2006) and CARB Scoping Plan targets.[2]
- Provides energy use, transportation, land use, water conservation, and solid waste strategies to bring Tulare County's greenhouse gas emissions levels to the reduction target.
- Mitigates the impacts of Tulare County activities on climate change (by reducing greenhouse gas emissions consistent with the direction of the State of California via AB 32, Governor's Order S-03-05, and the 2009 amendments to the CEQA Guidelines to comply with SB 97 (2008). The CEQA Guidelines encourage the adoption of policies or programs as a means of addressing comprehensively the cumulative impacts of projects. (See CEQA Guidelines, Sections 15064(h)(3), 15130(c).)
- Allows the greenhouse gas emissions inventory and CAP to be updated every five years and to respond to changes in science, effectiveness of emission reduction measures and federal, State, regional, or local policies to further strengthen the County's response to the challenges of climate change.
- Provides substantial evidence that the emission reductions estimated in the CAP are feasible.
- Serves as the threshold of significance within the County of Tulare for climate change impacts, by which all applicable developments within the County will be reviewed.
- Proposed development projects that are consistent with the emission reduction and adaptation measures included in the CAP and the programs that are developed as a result of the CAP, would be considered to have a less than significant cumulative impact on climate change and emissions consistent with CEQA Guidelines 15064(h)(3) as amended to comply with SB 97.

1.3 - Climate Change Legislation

The State of California is leading the Country in efforts to reduce greenhouse gases and the impacts on the global climate. The California legislature has passed and the Governor has signed greenhouse gas and climate change legislation, including Assembly Bill (AB) 32—the California Global

[2] See Climate Action Plan Description in section above.

Warming Solutions Act of 2006 (2006 Stats, Ch. 488)—that will have substantial impacts on Tulare County.

State Executive Order S-3-05

In June of 2005, Governor Schwarzenegger issued a landmark Executive Order establishing progressive greenhouse gas emissions targets for the entire State. Executive Order S-3-05 makes the following goals:

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

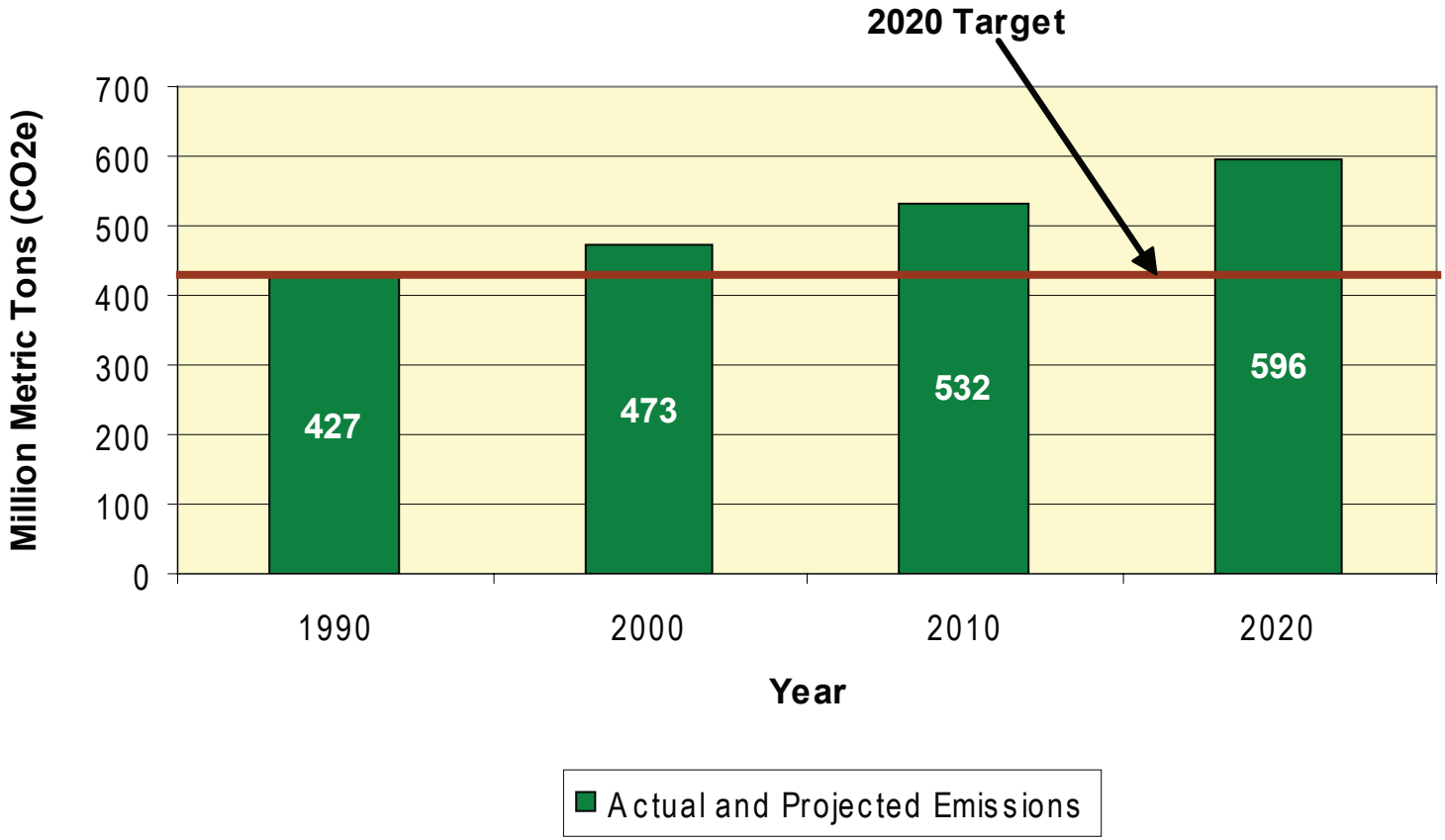
AB 32

To support these reduction targets, the California legislature adopted AB 32 (2006 Stats, Ch. 488, Health & Safety Code § 38500, et seq.). The law requires the CARB to develop regulatory and market mechanisms that will reduce greenhouse gas emissions to 1990 levels by 2020. In December 2008, CARB approved the AB 32 Scoping Plan outlining regulatory and market mechanisms to achieve the goal of AB 32. The plan cites local government action as an integral partner to achieving the State's goals.

Under the current AB 32 "business-as-usual" scenario developed by the CARB, Statewide emissions are increasing at a rate of approximately 1 percent per year as shown in Exhibit 1. The exhibit presents the average Statewide reductions needed from all emission sources (including all existing sources) to reduce greenhouse gas emissions back to 1990 levels. The "business-as-usual" emissions (for 2010 and 2020) and reductions required to reach the State target for 2020 is illustrated in Exhibit 1 below. CARB estimates that "business a usual" or uncontrolled emissions in 2020 would be 596 million metric tons per year (MMT/year). CARB estimated that in 1990 emissions were 427 MMT/year. Therefore, to achieve 1990 emission levels in 2020 will require a reduction of 169 MMT/year. This equates to a 28.3 percent reduction from all sources compared to the 2020 "business as usual" inventory.

Senate Bill 375

Senate Bill (SB) 375 (2008, Stats, Ch. 728) - Steinberg, was signed by the Governor on September 30, 2008. The legislation addresses implementation of AB 32. It requires CARB to set greenhouse gas emission reduction targets for passenger vehicles and light trucks for 2020 and 2035 by September 30, 2010. SB 375 provides relief from CEQA for residential projects that are consistent with the regional plan to achieve greenhouse gas reductions (Public Resources Code § 21159.28). It lays a solid foundation for a comprehensive approach to reducing greenhouse gas emissions from the land use and transportation sector. SB 375 harnesses funding and regulatory incentives, without mandates, to align transportation, housing, and land use planning.



Source: ARB (2008).

Exhibit 1
California Greenhouse Gas Baseline and Target Emissions

Especially important for local government are the Sustainable Communities Strategy and the Alternative Planning Strategy requirements of the legislation (Public Resources Code § 21155, et seq.). CARB must certify that the Sustainable Communities Strategy will achieve the region's greenhouse gas emission reduction targets. Projects outside the approved Sustainable Communities Strategy would not qualify for federal transportation funding. If CARB determines that a region's Sustainable Communities Strategy will not achieve the greenhouse gas emission reduction targets, the Metropolitan Planning Organization must prepare an Alternative Planning Strategy separate from the Regional Transportation Plan, identifying further measures needed to achieve the targets. Although these measures directly impact Regional Transportation Plans prepared by the Tulare County Association of Governments, the success of the Sustainable Communities Strategy and Alternative Planning Strategy, if needed, hinges on the land-use decisions by Tulare County and the other jurisdictions in the County.

Senate Bill 375 enhances CARB's ability to reach AB 32 goals by directing CARB to develop regional greenhouse gas emission reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. CARB appointed a Regional Targets Advisory Committee (RTAC) under Senate Bill 375 that will play a major role in implementing the Scoping Plan by recommending factors and methodologies to CARB to adopt regional greenhouse gas emission allocations. The RTAC completed its work in September 2009. The RTAC provided CARB with the following recommendations:

- Regional targets should be expressed as a percent per-capita greenhouse gas emission reduction from a 2005 base year.
- CARB would use an interactive process with the Metropolitan Planning Organizations (MPOs) to set a single statewide uniform target that could be adjusted up or down to respond to regional differences.
- The Committee supports the use of a list of accepted best management practices, or BMPs for:
    - One of several tools to be used in target setting;
    - Greenhouse gas reduction strategy development;
    - Target compliance demonstration by small MPOs in the first round and as an action plan to supplement model compliance by all MPOs;
    - CARB to use as an accuracy check on each MPO's submittal as part of its strategy approval process;
    - A user-friendly tool to facilitate public review of the greenhouse gas reduction strategy for all MPOs.

CARB will work with California's 18 Metropolitan Planning Organizations and Regional Transportation Planning Agencies (Tulare County Association of Governments in Tulare County) to align their regional transportation, housing, and land-use plans, and to prepare a "sustainable communities strategy" to reduce the amount of vehicle miles traveled in their respective regions and

demonstrate the region's ability to attain its greenhouse gas reduction targets. TCAG is working with CARB to identify an appropriate target for Tulare County that will be incorporated into CARB's decision on regional targets.

1.4 - Tulare County's Greenhouse Gas Sources

Tulare County prepared a greenhouse gas inventory for year 2007 and 2030 as part of the 2030 General Plan Update. To provide a 2020 inventory for the CAP, analysts interpolated data assuming steady growth rates between 2007 and 2030. Countywide data was allocated to the unincorporated areas of Tulare County based on population and jobs projections for the unincorporated areas. The inventory is divided into five source sectors. Electricity emissions are based on the electrical power generation emissions from power consumed in Tulare County from residential and commercial users based on the usage data from the two providers, PG&E and Southern California Edison. Natural gas is from the Gas Company (formerly Southern California Gas) data for residential, commercial, and industrial uses. The mobile source sector includes off-road equipment and on-road vehicles. The off-road portion includes various types of off-road equipment, including agricultural, construction, lawn and garden, and off-road recreation, which includes equipment from hedge trimmers to cranes. On-road vehicles include passenger cars and light trucks, buses, motorcycles, and medium duty and heavy-duty trucks. Solid waste emissions are based on the greenhouse gas emissions from the landfills serving Tulare County. Dairy and feedlot emissions are from the cows themselves and from the decomposition of manure. For the CAP, the emissions are divided into development related emissions and dairy and feedlot emissions. Dairy and feedlots will have their own target set through a separate process. On January 26, 2010, the Tulare County Board of Supervisors approved a General Plan Initiation (GPI10-001) for a general plan amendment to the Animal Confinement Facilities Plan and Program EIR. During this process, a CAP specific to dairies and feedlots will be developed. Other emissions from agriculture are included with other sectors. For example, emissions related to operating tractors and other mobile farm equipment is included in the mobile source sector and electricity used for water pumping is included in the electricity sector.

The emission inventory provides totals for "development related" emissions and a grand total that includes emissions from dairies and feedlots. Development related emissions refer to emissions from energy consumption from the use of electricity, heating and cooling, water use, and mobile sources. This includes construction activities, off-road equipment, buildings, residences, and motor vehicles. These are sources for which the County can influence greenhouse gas emissions through its land use authority and other governmental powers related to development. As stated earlier, dairies and feedlots will be addressed as part of a separate CAP prepared as part of the Animal Confinement Facilities Plan process.

Table 1 shows the emissions for each sector and the relative percentage of the inventory for each sector.

Table 1: Emissions by Sector in 2007

Sector	CO_2e (Metric Tons/Year)	% of Dev. Related	% of Total
Electricity	542,690	28	11
Natural Gas	321,020	17	6
Mobile Sources	822,230	43	16
Solid Waste	227,250	12	4
Subtotal Development Related	1,913,191	**100.0**	37
Dairy/Feedlots	3,294,870	—	63
Total	**5,208,060**	**—**	**100**
Per Capita	**36.1**	**13.3**	**—**

Note:
Emissions rounded to the nearest 10 metric tons/year.
Source: 2030 Tulare County General Plan Update.

The most important source of development related emissions is from mobile sources. Emissions related to the generation of electricity are the next largest source followed by emissions from the combustion of natural gas. Solid waste emissions are the smallest sector in the inventory. Power consumption related to water pumping and sewage treatment is included in the electricity sector. The per capita development related emissions were 13.3 metric tons per year in 2007. The detailed inventory provided in Appendix A provides more detail for each source sector. The relative percentage for each sector changes slightly between 2007 and 2030, reflecting slower growth rates for dairy and feedlot compared to development related sources. Exhibit 2 provides pie charts showing the sector breakdowns for 2007 and 2030.

1.5 - Strategy Overview

Tulare County has selected a CAP strategy that builds on the policies and implementation measures contained in the General Plan combined with existing and planned regulations and programs implementing AB 32. The CAP is consistent with the emission reduction goals in CARB's Scoping Plan. Projects implementing the General Plan that are subject to CEQA will be required to demonstrate consistency with the CAP and achieve emission reductions that will enable the County to meet its greenhouse gas reduction target. The policies focus on the following:

- Land Use and Transportation System Improvements
- Alternative, Non-automotive Travel Modes
- Building Energy Efficiency/Green Building Design
- Water Conservation
- Waste Reduction Program

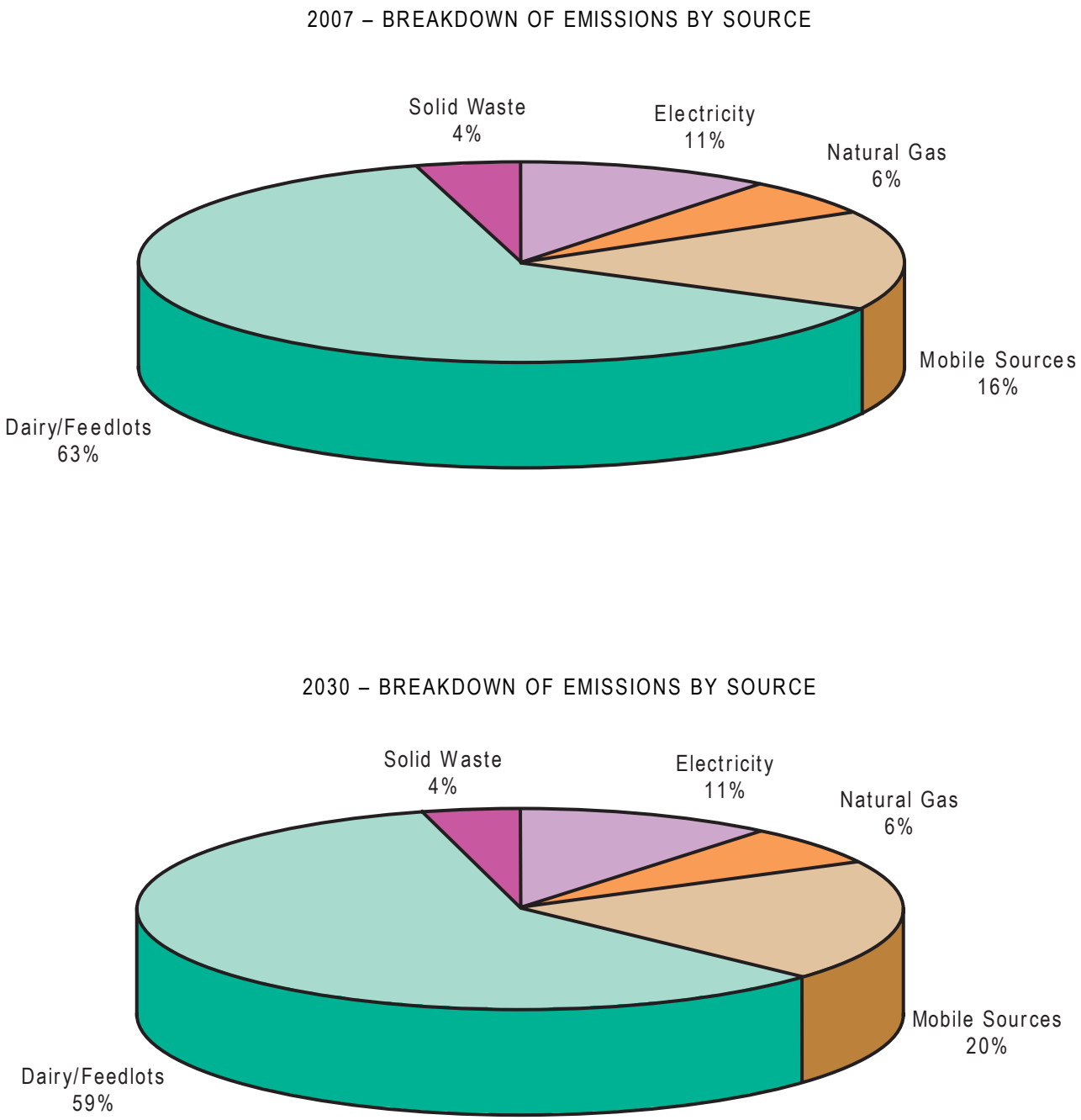
A list of the General Plan policies with sustainability and greenhouse gas benefits is provided in Section 5, General Plan Policies. The complete policies are also provided in that section.

1.6 - Greenhouse Gas Reduction Target

The County examined reduction target approaches being considered by other local agencies and air pollution control districts. The differences in the approaches are how reductions are estimated and the starting point for determining reductions. The basic concept is that a city or county would provide reductions for the source categories it has jurisdiction over that are at least as great as the reductions required to meet the State's goal of reducing emissions to 1990 levels by 2020. The authority to control emissions from many of these sources is shared by multiple jurisdictions. In those cases, it is appropriate to allocate a portion of the reduction target to each jurisdiction. For example, the State's fuel and vehicle efficiency regulations will reduce mobile source emissions, but the County can also provide mobile source reductions through land use patterns and transportation system designs that reduce vehicle trips and miles traveled.

The SJVAPCD has adopted a voluntary guideline document that sets the threshold level at the reduction percentage required by the State to meet the CARB Scoping Plan 2020 target. This would entail projects demonstrating that programs, regulations, and mitigation measures would achieve a 29-percent reduction in greenhouse gas emissions by 2020 compared with "business-as-usual." The Bay Area Air Quality Management District (BAAQMD) has proposed several options, including a 28-percent reduction by 2020 and a 15-percent reduction from current year emissions. The BAAQMD also proposes a 26-percent reduction requirement for CAPs that focus on land use sector emissions. This is the approach that Tulare County has used in this CAP. The CAP needs to provide a strategy that would result in the County achieving a 26-percent reduction in order for it to qualify for use in CEQA consistency findings.

The CARB Scoping Plan states, "The 2020 goal was established to be an aggressive, but achievable, mid-term target, and the 2050 greenhouse gas emissions reduction goal represents the level scientists believe is necessary to reach levels that will stabilize climate" (CARB 2008, page 4). The year 2020 goal of AB 32 corresponds with the mid-term target established by S-3-05, which aims to reduce California's fair-share contribution of greenhouse gases in 2050 to levels that will stabilize the climate. The goal of reducing emissions by 80 percent by the year 2050 is not addressed in this analysis. To obtain the 2050 goal, substantial emission reductions would need to occur in California, such as a conversion to alternative energy generation, conversion to electric and/or zero emission motor vehicles, and substantial changes to land use patterns and transportation. The objective of this CAP is to provide Tulare County's contribution to achieving the initial target and to provide the framework for future reductions as technology advances.



Source: Tulare County 2030 General Plan Update Recirculated EIR.

Exhibit 2
Tulare County Greenhouse Gas Emissions
Baseline (2007) and Future (2030)

The County chose to account for State reductions to demonstrate consistency with CARB Scoping Plan reduction targets. The two largest sources over which the County has jurisdiction, mobile sources and new building construction, will see substantial emission reductions from State regulations on fuel efficiency in motor vehicles and energy efficiency in buildings. If State reductions were not counted, future year emissions would be greatly overstated. The Scoping Plan only calls for an incremental reduction in excess of the actions in the Scoping Plan measures to achieve the 2020 target. The State regulations are projected to achieve a 24.6 percent reduction in emissions from vehicles, fuels, energy efficiency, and landfill methane controls by 2020. Regulations adopted by the San Joaquin Valley Air Pollution Control District on transportation and indirect sources are estimated to reduce emissions by 0.5 percent by 2020. Based on the analysis conducted in preparing the CAP, an overall additional reduction of 1.1 percent from new and existing development is required to show consistency with the Scoping Plan target for development related sources of 26.2 percent. Achieving a 1.1-percent reduction from new development by 2020 will require an average project level reduction of 6 percent. The project reductions may be achieved through land use related measures such as increased density, pedestrian and transit-oriented development, support for alternative transportation modes, and measures that reduce energy consumption through improved energy efficiency in buildings, water conservation, and waste reduction. Voluntary programs will also provide reductions from existing homes and businesses that install energy saving retrofits and solar photovoltaic systems.

No reduction was claimed for voluntary measures. The reductions from State, Air District, and the County are shown in Table 2. Exhibit 3 shows the change in development related emissions between 2007 and 2030.

Table 2: Sources of Reductions to Achieve 2020 Target

Reduction Measures	Percentage Reduction
State Measures (vehicles, fuels, energy efficiency)	24.6
Air District Measures (employer trip reduction/indirect source)	0.5
Reductions required from Tulare County development	1.1 (6% at project level)
Total Reductions from all Sources	**26.2**
Source: CARB 2008.	

An overall 26.2 percent reduction of development related emissions would reduce the Tulare County 2020 business as usual emission inventory from 2,247,177 metric tons per year (MT/year) to 1,658,417 MT/year. Per capita emissions would be reduced from 13.3 MT/year/person in 2007 to 8.8 MT/year in 2020. In other words, Tulare County's 2020 target emissions are 1,658,417 MT/year or 8.8 MT/year/person.

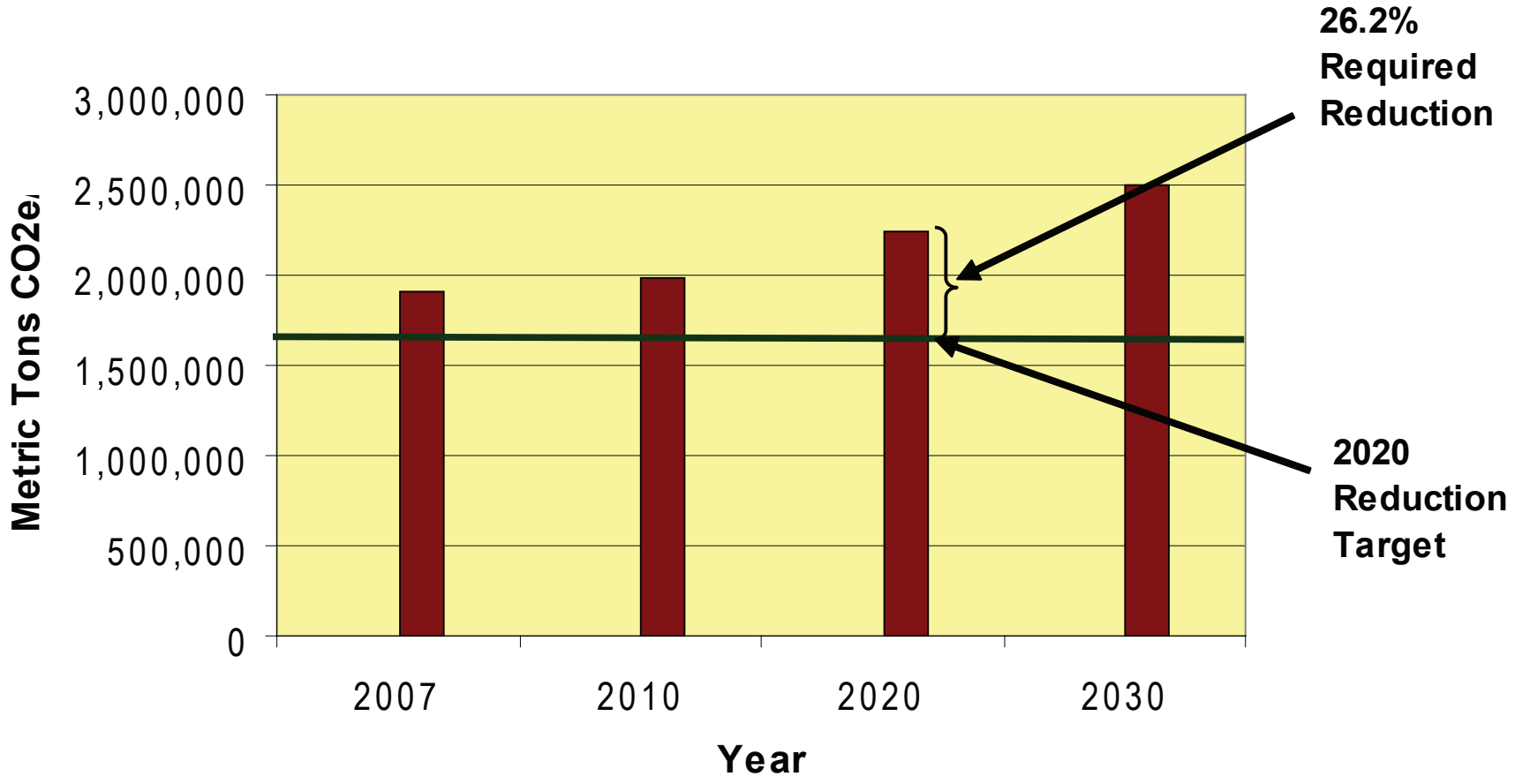
1.7 - Cost of Implementing the Climate Action Plan

Implementation of the CAP reduction strategy will result in both costs and savings. Many of the building-related measures provide savings from reduced energy consumption. Many of the land use and transportation measures have lower infrastructure costs compared with "business-as-usual," which is due to more compact development and less need to expand transportation infrastructure because of the reduced trip generation rates. Some measures require investment in new technologies to achieve the reductions in energy and fuel use. The technology investments, in many cases, will pay for themselves over time with savings in energy costs. Some investments made by developers in energy efficiency and new technology may be difficult to recoup in the sale of the property due to market forces, but the person or business that ultimately pays for the energy use could experience savings.

The County will incur costs in administering the CAP. The County is responsible for implementing the measures included in the CAP and for tracking progress over time. Future updates to the CAP will also require County resources for staff and for technical assistance. To the extent possible, the County intends to incorporate CAP work into other related projects. For example, monitoring progress in implementing the CAP will be accomplished using existing data sources and the General Plan progress report process. Changes in travel characteristics are currently tracked as part of the Regional Transportation Plan maintained by the Tulare County Association of Governments (TCAG). This data can be used to determine the effectiveness of measures designed to reduce trips and vehicle miles traveled.

1.8 - Monitoring and Tracking Progress

As part of the annual report to the Board of Supervisors on progress in implementing the General Plan, staff will report on benchmarks achieved that implement goals, objectives, and policies having air quality benefits. The County will use quantitative measures of progress, sometimes referred to as metrics, for goals, objectives, and policies with quantitative targets whenever possible. For example, if the goal is a 10 percent increase in project level energy efficiency compared to Title 24 requirements, the metric would be percent efficiency in excess of standards reported on Title 24 energy efficiency reports prepared for each project. The County will use its Geographic Information System to provide up to date land use and development data and tracking for other benchmarks or metrics. Section 7, Monitoring Program and Implementation Plan, in this CAP identifies a number of benchmarks and metrics to verify progress. The CAP monitoring program will be adjusted over time to respond to changing conditions and lessons learned.



Source: Tulare County 2030 General Plan Update Recirculated EIR.

Exhibit 3
Tulare County Development Emissions 2007-2030

The County's success in achieving the targets set forth in the CAP is dependent on many factors that are subject to change. The type, mix, and scale of development that will occur by 2020 are dependent on the economy, changes in consumer preferences, and market trends. New technologies that have yet to be imagined may have dramatic effects on how we live and work. For these reasons, a long-range planning effort like the CAP requires monitoring and course corrections to keep up with the world as it is and not how it was predicted to be in 2010.

The County will use the existing General Plan reporting process as the framework for monitoring implementation of the CAP. This is appropriate because most of the CAP measures are closely related to General Plan policies and implementation measures. Transportation related measure data may be collected by the local transit agencies or the Tulare County Association of Governments. An example of an item that will be tracked is building permit data, including Title 24 energy efficiency reports that provide an estimate the percentage reduction achieved in excess of that required by regulation. For more details, see Section 7, Monitoring Program and Implementation Plan.

SECTION 2: CLIMATE CHANGE

2.1 - Climate Change Science

Climate change is a change in the average weather of the earth that may be measured by alterations in wind patterns, storms, precipitation, and temperature. These changes are assessed using historical records of temperature changes occurring in the past, such as during previous ice ages. Many of the concerns regarding climate change use this data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. The Intergovernmental Panel on Climate Change predicted that global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1 degrees Celsius (°C) to 6.4°C. Regardless of analytical methodology, global average temperatures and sea levels are expected to rise under all scenarios (IPCC 2007).

Gases that trap heat in the atmosphere are referred to as greenhouse gases. The effect is analogous to the way a greenhouse retains heat. Natural processes and human activities emit greenhouse gases. The presence of greenhouse gases in the atmosphere affects the earth's temperature. Without the natural heat-trapping effect of greenhouse gas, the earth's surface would be about 34°C cooler (CAT 2006). However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

Climate change is driven by forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. Positive forcing tends to warm the surface while negative forcing tends to cool it. Radiative forcing values are typically expressed in watts per square meter. A feedback is a climate process that can strengthen or weaken a forcing. For example, when ice or snow melts, it reveals darker land underneath which absorbs more radiation and causes more warming. The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere. The global warming potential of a gas is essentially a measurement of the radiative forcing of a greenhouse gas compared with the reference gas, carbon dioxide.

Exhibit 4 provides a visual representation of the greenhouse effect. As is shown in the exhibit, solar radiation (energy) passes through the clear atmosphere. Some of the solar radiation is reflected back into space by the atmosphere and the earth's surface. Some solar radiation is absorbed by the earth's surface and is converted into heat causing the emission of infrared radiation back into the atmosphere. Some of the infrared radiation is absorbed and re-emitted by the greenhouse gas molecules and some exits the atmosphere to space. Individual greenhouse gas compounds have varying global warming potentials and atmospheric lifetimes. Carbon dioxide, the reference gas for global warming

potentials, has a global warming potential of 1. The calculation of the carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent measure. 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.

Greenhouse gases as defined by AB 32 include the following gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Greenhouse gases as defined by AB 32 and sources are summarized in Table 3. Greenhouse gases not defined by AB 32 include water vapor, ozone, and aerosols. Water vapor is an important component of our climate system and is not regulated. Ozone and aerosols are short-lived greenhouse gases; global warming potentials for short-lived greenhouse gases are not defined by the IPCC. Aerosols can remain suspended in the atmosphere for about a week and can warm the atmosphere by absorbing heat and cool the atmosphere by reflecting light. Black carbon is a type of aerosol that can also cause warming from deposition on snow.

Table 3: Greenhouse Gases

Greenhouse Gas	Description and Physical Properties	Sources
Nitrous oxide	Nitrous oxide is also known as laughing gas and is a colorless greenhouse gas. It has a lifetime of 114 years. EPA reported that the concentration of nitrous oxide was 322 parts per billion (ppb) in 2008. Its global warming potential is 310.	Microbial processes in soil and water, fuel combustion, and industrial processes.
Methane	Methane (CH4) is a flammable gas and is the main component of natural gas. It has a lifetime of 12 years. EPA reported that the average methane concentration in 2008 was 2,000 parts per billion (ppb) based on data from a single site Its global warming potential is 21.	Methane is extracted from geological deposits (natural gas fields). Other sources are landfills, fermentation of manure, decay of organic matter, and cattle.
Carbon dioxide	Carbon dioxide (CO_2) is an odorless, colorless, natural greenhouse gas. Carbon dioxide's global warming potential is 1. The average global concentration in 2005 was 379 parts per million (ppm), which is an increase of about 1.4 ppm per year since 1960. The lifetime of CO_2 is about 100 years, but is variable because it depends on processes that may emit and remove CO_2 depending on the environmental conditions. Examples of these processes are atmosphere ocean gas transfer, chemical (e.g., weathering) and biological (e.g., photosynthesis). Carbon dioxide from fossil fuels contributed 81% of greenhouse gas emissions in 2004 in California.	Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human caused) sources are from burning coal, oil, natural gas, and wood.

Table 3 (cont.): Greenhouse Gases

Greenhouse Gas	Description and Physical Properties	Sources
Chloro-fluorocarbons	These are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. They are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). Chlorofluorocarbons have lifetimes ranging from 57 to 333 years. The concentrations of the individual CFCs range from 5 to over 100 parts per trillion (ppt). Global warming potentials range from 3,800 to 8,100.	Chlorofluorocarbons were synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited their world-wide production in 1987. These substances have been replaced primarily with hydrofluorocarbons.
Hydro-fluorocarbons	Hydrofluorocarbons are a group of greenhouse gases containing carbon, chlorine, and at least one hydrogen atom. The lifetime these gases range from 1 year to 260 years. The concentrations of the various hydrofluorocarbons vary from 1 to 10 ppt. Global warming potentials range from 140 to 11,700.	Hydrofluorocarbons are synthetic manmade chemicals used as a substitute for chlorofluorocarbons in applications such as automobile air conditioners and refrigerants.
Per-fluorocarbons	Perfluorocarbons have stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface. Because of this, they have long lifetimes, between 10,000 and 50,000 years. Measurements in 2000 estimate the perfluorocarbon CF_4 global concentrations in the stratosphere at over 70 parts per trillion (ppt). Global warming potentials range from 6,500 to 9,200.	Two main sources of perfluorocarbons are primary aluminum production and semiconductor manufacturing.
Sulfur hexafluoride	Sulfur hexafluoride is an inorganic, odorless, colorless, and nontoxic, nonflammable gas. It has a lifetime of 3,200 years. The concentration of sulfur hexafluoride in the late 1990s was almost 4 ppt. It has a high global warming potential 23,900.	This gas is manmade and used for insulation in electric power transmission equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas.
Notes: Measure of concentrations in atmosphere: ppm = parts per million; ppt = parts per trillion Sources: Compiled from a variety of sources, including International Panel on Climate Change 2007.		

2.2 - Effects of Climate Change

Future climate change conditions have the potential to affect a number of different resources. From a Statewide perspective, climate change could affect California's environmental resources through potential, though uncertain, changes related to future air temperatures and precipitation and resulting impacts on water temperatures, reservoir operations, sea levels, and stream runoff. Such changes could threaten California's economy, public health, and environment.

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

2.2.1 - Impacts to California

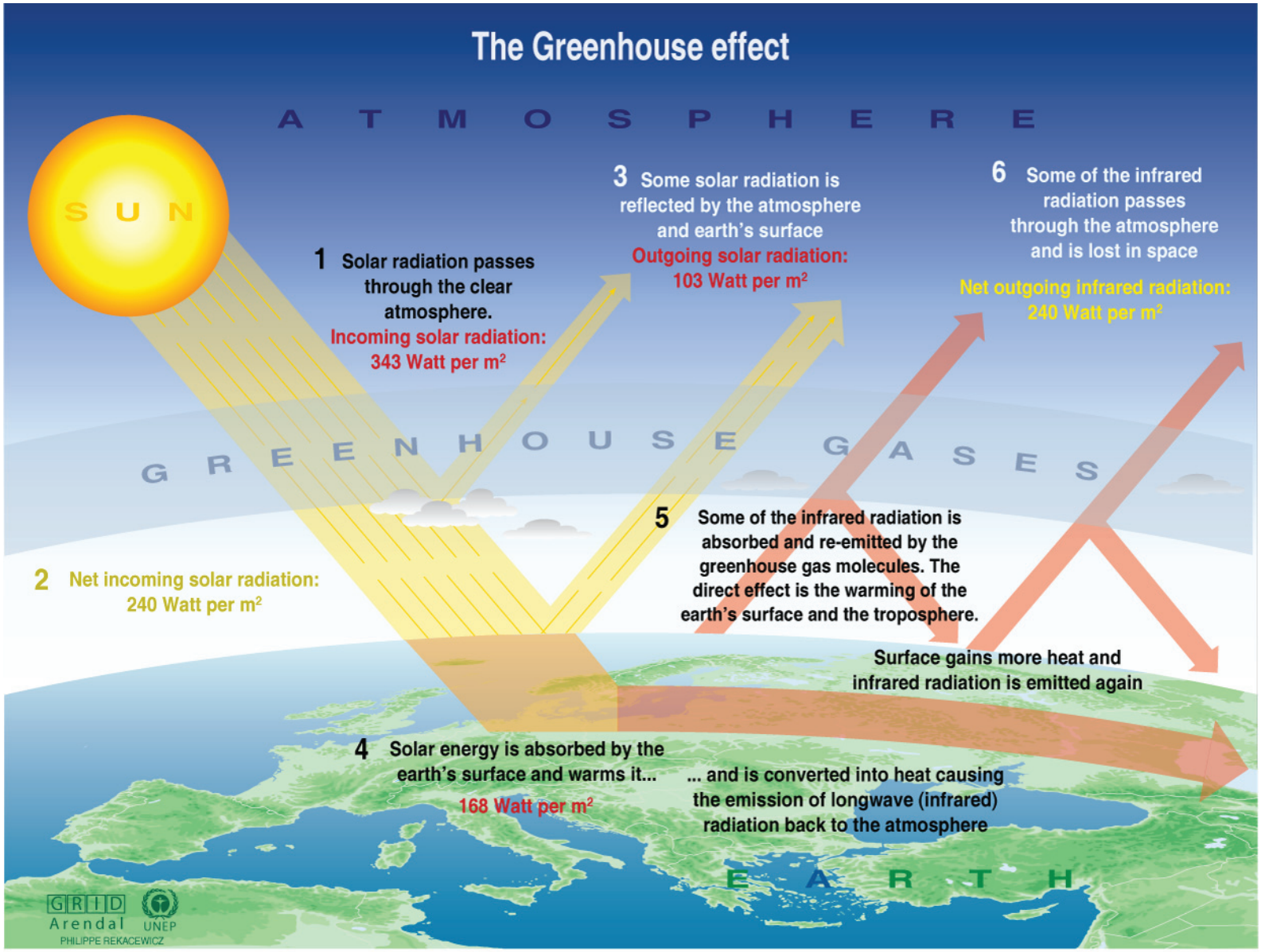
The following is a summary of current scientific literature related to the effects of climate change in California. Much of the information contained below is from the 2009 California Climate Change Adaptation Strategy report (CNRA 2009) and a report prepared by the California Department of Water Resources: Progress in Incorporating Climate Change into Management of California's Water Resources (CDWR 2006).

Water Supply

Section VII of the 2009 California Climate Adaptation Strategy report prepared by the California Natural Resource Agency (CNRA) provides a detailed discussion regarding potential impacts to California's water supply from climate change. Climate change is expected to impact California's water supply through a diminishing Sierra snowpack. The predicted change in rain and snowfall patterns over the 21st century varies by climate scenarios and models; however, most models suggest a 12- to 35-percent overall decrease in precipitation, with more precipitation occurring as rain rather than snow (CNRA 2009). This could lead to water shortages, as communities in California depend on runoff from established snowpack to provide water during the drier months. This problem is exacerbated by higher temperatures, which increase evaporation and snowmelt.

It is expected that increased amounts of winter runoff could be accompanied by increases in flood event severity and warrant additional dedication of wet season storage space for flood control instead of using the water for supply conservation, as is the standard practice. This change in water management could lead, in turn, to more frequent water shortages during periods of high water demand. Many regional studies have shown that only small changes in inflows into reservoirs could result in large changes in the reliability of water yields from those reservoirs (CNRA 2009).

A report prepared by the California Department of Water Resources in response to Executive Order S-3-05 represents the most current complete analysis of changes to State Water Project and Central Valley Project operations that would be likely to occur as a result of climate change. Contained in the report is an analysis of the potential impacts of climate change on State Water Project and Central Valley Project operations and deliveries and on Delta water quality and water levels. Results discussed in the report include projections from 2035 through 2064 under four potential climate change scenarios compared with a baseline scenario that does not assume climate change effects.



Source: UNEP (2002).

Exhibit 4
The Greenhouse Effect

Four potential climate change scenarios were included, based upon modeling output from two separate global climate models. Three of these scenarios included decreased average annual precipitation, while one included increased average annual precipitation. Results from the investigation are considered preliminary, incorporate several assumptions regarding the effects of climate change on California water resources, and reflect a limited number of climate change scenarios. Results from the four modeled scenarios indicated effects to State Water Project and Central Valley Project operations. Due to projections of shifts in seasonal and annual average runoff, the amount of water delivered by the State Water Project and Central Valley Project was reduced considerably. The wetter scenario exhibited increased winter season runoff and decreased April-July runoff, but it resulted in a 3-percent average annual increase in Central Valley Project South of Delta deliveries (CDWR 2006).

Most global climate models project that anthropogenic (human caused) climate change will be a continuous and fairly gradual process through the end of this century. California is expected to be able to adapt to the water supply challenges posed by climate change, even at warmer and dryer projections. Sudden and unexpected changes, however, could leave water managers unprepared, which, in extreme situations could have significant implications for California's water supplies (CDWR 2006).

Surface Water Quality

Water quality is affected by several variables, including runoff volume and timing, the physical characteristics of the watershed and water temperature. A combination of changes to these factors could affect several natural processes that serve to eliminate pollutants in water bodies. For example, an overall decrease in stream flows could concentrate pollutants and prevent contaminants from flushing from point sources (REIR 2010).

Amount of Precipitation

Most precipitation events in California occur during the October through April rainy season with most of California's precipitation, in terms of amount of water, falling during November through March. An investigation completed by the Department of Water Resources indicated a statistically significant increasing trend in total precipitation in northern and central California since the late 1960s. A single investigation by Bardini and others showed a trend of potentially decreasing annual precipitation in California; however, this result is probably related to the specific subset of data that the Bardini study relied upon, wherein extremes at the beginning or end of time series data can substantially impact the identified trend. An investigation of rainfall during November through March from 1930 through 1997 indicated significant increases in California rainfall (CDWR 2006).

There is also evidence that the amount of precipitation that occurs on an annual basis is becoming more variable, that is, periods of both high and low rainfall are becoming more common. Specifically, a study performed by the Department of Water Resources indicates that present-day variability in annual precipitation is about 75 percent greater than that of the early 20th century (CDWR 2006).

Changes in Runoff and Flooding

Annual runoff is measured during the annual water year (October 1 through September 30) and includes river flows derived from precipitation events, snowmelt, and river base flow. Peak runoff is typically measured for individual storm events. Like annual runoff, peak runoff results from precipitation events, snowmelt, and river base flow. Precipitation across California appears to have increased over the past century, and individual water years have become more variable in terms of the amount of precipitation that occurs. It follows, then, that similar variable trends would be seen for runoff (CNRA 2009).

In relation to snowpack, winter storms provide snow to higher elevations that have historically melted from April through July. This process effectively stores water in California's snowpack until the spring snowmelt, when the water flows downstream and into major rivers and reservoirs, providing a significant portion of the water supply for the dry summer and autumn periods. April through July runoff in both the Sacramento and San Joaquin rivers shows a decreasing trend over the last century, indicating that in both watersheds, an increasing percentage of runoff is occurring earlier in the year, when many reservoirs are managed primarily for flood control and not for water supply (CDWR 2006).

Large annual variations in winter rainfall and runoff, which are normal in California, create uncertainty surrounding potential changes in flooding as a result of climate change. Independent climate modeling efforts are predicting that trends towards more variable river flows and more frequent flooding events will continue into the future, as a result of climate change (REIR 2010).

Wildland Fire Hazards

Warmer temperatures, longer dry seasons, reduced winter precipitation, and early snowmelt contribute to the increase in wildfires. Low- to moderate-intensity fires can be beneficial to ecosystems; however, there are no benefits from high-intensity fires (CNRA 2009).

Results of fire modeling conducted for the California Energy Commission found that within California, increases in fire risk in Northern California ranged from 15 to 90 percent, increasing with temperature. In Southern California, the change in fire risks ranged from a decrease of 29 percent to an increase of 28 percent. Temperature increases and lower precipitation in northern California and southern Oregon produced larger fire-risk increases in the western slopes and foothills of the Sierra Nevada and in the Coast and Cascade ranges of northern California and southern Oregon, where forests and woodlands provide a ready source of fuel (CEC 2006).

Negative Impacts to Agriculture and Forestry

Impacts to agricultural and forest resources from wildfires, pests, increased temperatures, water reductions, and flooding may be caused by climate change. Development on productive farmland or forestry reduces land available for adaptation. There could be reductions in the quality and quantity of certain agricultural products such as grapes, fruit, nuts, and milk.

Some temperature warming may be beneficial for agriculture and forestry, but at a certain level, these benefits will deteriorate basic plant functioning. Earlier flowering can be a problem if plants become desynchronized with life cycles of pollinators. A reduction in chill hours can be a problem for fruits and nuts. Warmer temperatures increase the growth rate of pests, weeds, and pathogens. Increased temperatures may reduce the range of forests (KRH 2008).

Extreme events such as heat waves and floods pose significant challenges to this sector, including early flowering, reduced effectiveness of pollination, decreased ability for photosynthesis, decreased yield, and demise of plants requiring long periods of growth. Higher temperatures can reduce cow milk production. A lower temperature-warming scenario shows a 7- to 10-percent reduction in dairy production and 11 to 22 percent reduction for the highest warming scenario (KRH 2008).

Sea Level Rise

A rise in sea levels could result in the displacement of coastal businesses and residences. During the past century, sea levels along California's coast have risen about 7 inches. If heat-trapping emissions continue unabated and temperatures rise into the higher warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century (Moser et al. 2009). Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

Negative Impacts to Public Health

Climate change could cause an increase in infections, disease, asthma, and other health-related problems (CCCC 2006). Heat waves are expected to have a major impact on public health as well as decreasing air quality and an increase in mosquito breeding and mosquito-borne diseases. Vector control districts throughout the State are already evaluating how they will address the expected changes to California's climate.

If temperatures rise to the medium warming range, there could be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if rising temperatures remain in the lower warming range.

Negative Impacts to Wildlife

Increased global temperatures and resource depletion exacerbated by climate change are causing disruptions in animal migration and plant pollination. As temperatures rise, species are moving north in California or to higher elevations. This change in migration disrupts the food chain and prevents some plant species from being pollinated. Water and food supplies are expected to be more variable and to shift as the seasons change on different timeframes. With vegetation, reduction in soil moisture will result in early die-back of many plants, potentially leading to conflicts with animal breeding seasons and other natural processes. Many of the potential effects on wildlife are still being studied, but because of the inability of wildlife to adapt to new climates, the potential for severe species loss is highly probable (CNRA 2009).

2.2.2 - Implications for Tulare County

Increased Flooding

Increasing snowmelt from rising temperatures coupled with increasing precipitation in the form of rain and less falling as snow in the mountains could result in greater flows in mountain streams and rivers. Additionally, increasing variability in storm events could affect flood control measures such as levees and reservoirs (CDWR 2006).

Tulare County contains a number of rivers and waterways. The Kern River flows north to south through the Sierra Nevada Mountains in eastern Tulare County. The headwaters for the Kaweah and Tule Rivers are located in the Sierra Nevada Mountains. These rivers flow west into the Tulare Lake Basin. A number of mountain streams flow into the Kaweah and Tule rivers and their respective reservoirs, Lake Kaweah and Lake Success. Lake Kaweah and Lake Success both serve as flood control structures. The Kaweah and Tule rivers, their tributaries, and Lake Kaweah and Lake Success could be subject to increased frequency or severity of flooding from upstream areas as a result of increased snowmelt and runoff. A number of communities are located near these water bodies, including Three Rivers, Woodlake, Lemoncove, Springville, and Porterville, and could be exposed to increased flooding associated with the effects of climate change (REIR 2010).

Water Supplies

Tulare County receives some of its water supplies from the State Water Project and Central Valley Project. Surface water supplies in Tulare County from the State Water Project and Central Valley Project could potentially be reduced as a result of climate change effects (CDWR 2006).

Few scientific studies have been performed on the effects of climate change on specific groundwater basins, groundwater quality, or groundwater recharge characteristics. Warmer temperatures could lead to higher evaporation or shorter rainfall seasons, which would mean that soil deficits would persist for longer time periods. Reductions in spring runoff and higher evapotranspiration would likely reduce the amount of water available for recharge and can lead to greater pumping of groundwater to make up for losses in surface water (CNRA 2009). Groundwater serves as a major source of water supply in Tulare County, which could result in serious implications for water supply in the County.

Agriculture

Agriculture is important to Tulare County. Climate change may cause negative effects to agriculture. Some crop yields may increase with warming, while others may decrease. Compared with 2005 levels, the following yield changes in 2030 are estimated for Tulare County: almond yield increase by 5 percent; grape yield decrease by 5 percent; berry yield decrease by 5 percent; and cherry yield decrease by more than 15 percent (CNRA 2009). No values were provided in the report for citrus. Changes in precipitation can result in drought, which can have serious impacts on agriculture in the County.

Public Health

The elderly and young, and those vulnerable populations that do not have the resources to deal with the costs and adapt to the changes that are expected to impact the community will need assistance. More days with higher temperatures could increase heat related illnesses, especially in the elderly that may not be able to afford to run their air conditioning system. Increased temperatures may also result in higher ozone concentrations with more violations of the health-based standard. Some vectors such as mosquitoes may expand their range to new areas resulting in increased vector-related illnesses. Warming may also cause increases in allergens. Social equity issues related to the unequal distribution of resources and increased costs to address community-wide health risks will need to be addressed proactively to reduce the potential for financial strain on the County (CNRA 2009).

2.2.3 - Climate Change Adaptation

There are adaptation strategies Tulare County can use that would minimize impacts from climate change to the County. These strategies are incorporated in a variety of policies within the 2030 Tulare County General Plan. The policies will help the County adapt to impacts from climate change.

Water Supply

Water conservation policies in the Tulare County General Plan will help to conserve water for future uses. These water conservation policies are summarized in Section 5.1.3, Water Conservation Energy Savings, of this CAP and include the following:

- WR-1.5 Expand Use of Reclaimed Wastewater
- WR-1.6 Expand Use of Reclaimed Water
- WR-3.5 Use of Native and Drought Tolerant Landscaping
- ERM-1.7 Planting of Native Vegetation

In addition, the Tulare County Redevelopment Agency proposes to implement a Water Conservation Program in the Community of Traver as part of a wastewater treatment plant upgrade project that will reduce water consumption with the benefit of reduction of influent to the wastewater facility by allowing the income-qualified residents to replace inefficient water devices with new low-flow or low-consumption water conserving devices.

AB 1881 (2006) required the State Department of Water Resources to update the Model Water Efficient Landscape Ordinance and required all cities and counties to adopt and implement a water efficient landscape ordinance by January 1, 2010. The ordinance will result in reduced water consumption for landscape watering and so will help Tulare County adapt to potential lower water availability.

Flooding

The General Plan policies that would help to prevent flooding include the following:

- FGMP-8.3 Development in the Floodplain
- HS-1.4 Building and Codes
- HS-1.5 Hazard Awareness and Public Education
- HS-1.11 Site Investigations
- HS-5.1 Development Compliance with Federal, State, and Local Regulations
- HS-5.2 Development in Floodplain Zones
- HS-5.3 Participation in Federal Flood Insurance Program
- HS-5.4 Multi-Purpose Flood Control Measures
- HS-5.5 Development in Dam and Seiche Inundation Zones
- HS-5.6 Impacts to Downstream Properties
- HS-5.7 Mapping of Flood Hazard Areas
- HS-5.8 Road Location
- HS-5.9 Floodplain Development Restrictions
- HS-5.10 Flood Control Design
- HS-5.11 Natural Design
- PFS-4.1 Stormwater Management Plans
- PFS-4.3 Development Requirements
- PFS-4.6 Agency Coordination

Agriculture and Forest

There are several adaptation strategies for the agricultural sector (KRH 2008). These include crop switching, breeding, and improved management practices. As chill hours decline, varieties of fruits and nuts that require less chill time could increase survival rates. Better monitoring of pests, weeds, and diseases could lead to improved control and reduced damages. More efficient water use could reduce farmers' exposure to drought.

Methods to provide greater heat tolerance for cows include introducing shade, "showering," cool drinking water, changing feeding schedules, and adjusting livestock diets to reduce meat. The effectiveness of these methods, however, may decrease at higher temperatures. Additionally, breeding for more heat-resistant livestock may be a longer-term strategy; historically, heat resistance has been sacrificed for greater milk production. Other livestock such as poultry and sheep are also impacted by excessive heat.

Agricultural and forest land preservation and conservation would allow greater room for adaptation. Smart growth policies and urban growth boundaries would help to reduce encroachment onto agricultural and forest lands.

The General Plan policies that would help the County adapt to impacts from climate change on agriculture include the following, as described in Section 5.1, Tulare County General Plan Policies and Measures:

- AQ-3.2 Infill near Employment
- LU-1.4 Compact Development
- LU-1.8 Encourage Infill Development
- LU-3.3 High Density Residential Locations
- LU-2.1 Agricultural Lands
- AG-1.8 Agriculture within Urban Boundaries
- ERM-5.15 Open Space Preservation
- LU IM 3 Encourage Smart Growth Incentives

2.3 - California Regulatory Context

In California, recent legislation has been enacted to reduce Statewide greenhouse gas emissions, reduce transportation related emissions, and reduce energy related emissions.

2.3.1 - Statewide Greenhouse Gas Emissions

Assembly Bill (AB) 32. As discussed briefly in the Executive Summary, the California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006 (2006 Stats. Ch. 488 and Health & Safety Code § 38500, et seq.). AB 32 legislates the reduction of greenhouse gas emissions in California. Greenhouse gases, as defined under AB 32, include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. CARB is the State agency charged with monitoring and regulating sources of emissions of greenhouse gases that cause global warming in order to reduce emissions of greenhouse gases.

AB 32 states the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the State from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

The CARB Board approved the 1990 greenhouse gas emissions level of 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) on December 6, 2007 (CARB 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$.

The CARB Board approved the Climate Change Scoping Plan in December 2008. The Plan "proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health" (CARB 2008).

The Scoping Plan identifies recommended measures for multiple greenhouse gas emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. See Table 8 for development related measures from the Scoping Plan. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 greenhouse gas target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a Statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets (SB 375);
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

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

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 2050 reduction goal represents what scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be an aggressive, but achievable, mid-term target.

2.3.2 - Transportation

AB 1493. California AB 1493 (Pavley), enacted on July 22, 2002, requires the CARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. The regulation was stalled by automaker lawsuits and by a denial of an implementation waiver made by the United States Environmental Protection Agency (EPA). On January 21, 2009, CARB requested that EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed that EPA assess whether the denial of the waiver was appropriate. On June 30, 2009, EPA granted the waiver request, which begins with motor vehicles in the 2009 model year.

Executive Order S-01-07. The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a Statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. It also requires that a Low Carbon Fuel Standard for transportation fuels be established for California. The Standard will be measured on a lifecycle basis to include emissions from fuel consumption and production. The Standard will require that the fuel sold in California meet, on average, a declining standard for greenhouse gas emissions measured in a carbon dioxide equivalent gram per unit of fuel energy sold.

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

2.3.3 - Energy

SB 1078, SB 107, and Executive Order S-14-08. On September 12, 2002, Governor Gray Davis signed a bill (SB 1078) requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107, signed by the Governor on September 26, 2006 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020.

SB 1368. In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for greenhouse gas emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will

effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California's energy demand, as it will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the performance standard for greenhouse gas emissions required by SB 1368.

The California utilities are investing in a variety of alternative technologies to meet current and future power needs to comply with these mandates. The most cost effective and widely adopted is wind energy generation. In 2004, California produced 4,258 million kilowatt-hours of electricity with wind generation, which comprised 1.5 percent of the State's total electricity. With current wind research and development efforts, the California Energy Commission estimates that newer technologies can reduce the cost of wind energy to 3.5 cents per kilowatt-hour, which is competitive with most fossil fuel powered facilities (CEC 2009). Large-scale solar power generation with both photovoltaic and thermal solar systems is proposed in the San Joaquin Valley and in the Mojave Desert. Costs for thermal solar projects are projected to drop from $0.13 per kilowatt-hour to as low as $0.06 per kilowatt-hour by 2020. Costs per kilowatt of photovoltaic capacity are higher with a 2003 range of $0.25-0.40 per kilowatt-hour, but with projected 2020 costs declining to $.08-0.10 per kilowatt-hour (CEC 2005). Nuclear power is another option, but is not currently possible because State law prohibits the licensing of new nuclear facilities until a solution for long-term storage of nuclear waste has been implemented. Increased use of hydroelectric can be cost-effective, but constructing new dams will require clearance of significant environmental hurdles. Use of biofuels such as methane produced by landfills, sewage treatment plants, and anaerobic digestion of manure is another option that may be pursued on a larger scale in the future, as technological and cost issues are addressed. In 2007, the CEC reported that 11 dairies statewide had installed biogas digesters generating a total of 3.3 megawatts of electricity (CEC 2007).

SECTION 3: EMISSION INVENTORY SUMMARY

3.1 - Emission Inventory Overview

Greenhouse gas inventories consider a wide range of human activities. Estimating the amount of greenhouse gases generated by these activities requires using a multiplicity of data sources and a diverse set of methodologies. Emission inventories are, by nature, the reflection of the best available data and the most applicable methods at the time of their compilation. As data grows and understanding develops, the inventory can be updated and improved.

Emissions inventories are organized by source categories or sectors. The State of California organizes its emission inventory by the following sectors: transportation, electricity, commercial and residential, industry, recycling and waste, high global warming potential gases, and agriculture. The inventory is based on the emissions of a number of greenhouse gases. Although carbon dioxide is the largest contributor to climate change, AB 32 also defines the following as "greenhouse gases": methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. The emissions of each gas are standardized by the global warming potential in comparison to CO_2 and is referred to as CO_2 equivalent or CO_2e.

3.1.1 - California Emission Inventory

A comparison of major sources of greenhouse gas emissions at the State and county levels illustrates the scale of emissions. The most current year available was used for each inventory summary. A summary of California's greenhouse gas inventory for 2006 is provided in Table 4.

Table 4: California Greenhouse Gas Emissions Inventory in 2006 by Sector

Scoping Plan Sector	2006 Emission (Millions of Metric Tons of CO_2 Equivalent/Year)	Percentage of Inventory
Transportation	185.77	38.4
Electric Power	105.92	21.9
Commercial and Residential Fuel Use	44.37	9.2
Industrial Fuel Use	96.05	19.9
Recycling and Waste	6.31	1.3
High Global Warming Potential Gases	15.15	3.1
Agriculture	30.13	6.2
Forestry	0.19	0.0
Total Emissions	**483.87**	**100.0**

Notes:
Sequestration of emissions from forestry activities is not included. Emission categories are as defined in the CARB Scoping Plan.
Source: California Greenhouse Gas Inventory for 2000-2006 by Category as Defined in the Scoping Plan (CARB 2009)

3.1.2 - Tulare County Inventory

This assessment presents the estimated greenhouse gas emissions generated in the unincorporated areas of Tulare County (Tulare County) for calendar year 2007, as well as the projected unincorporated Tulare County emissions for calendar year 2030 assuming adoption of the Tulare County General Plan 2030 Update. The inventory for the year 2020 is based on an interpolation of 2030 data assuming steady growth each year. See Appendix A for a detailed discussion of the Tulare County inventory and supporting documentation.

Summary of Emissions

Greenhouse gas emissions produced within Tulare County in 2007 were estimated to be 5.2 million metric tons of CO_2 equivalent. Projected emissions for 2030 are 6.1 million metric tons of CO_2e. The 2007 emissions are considered the baseline inventory year. The 2030 emissions are considered a future year "business as usual" inventory that accounts for growth but not planned regulations and mitigation measures that may be applied in the future. In both 2007 and 2030, dairies/feedlots accounted for the largest portion of total emissions, making up 63 percent and 59 percent of total emissions, respectively. Mobile sources (on- and off-road) accounted for the second largest portion of emissions, contributing 16 percent in 2007 and 20 percent in 2030. When normalized by population, total annual emissions equate to 36 metric tons of CO_2e per resident in 2007, and 27 metric tons of CO_2e per resident in 2030. Emissions for the year 2020 were estimated by interpolating the growth between 2007 and 2030 using a straight-line projection. The inventory also identifies separate totals for development related emissions not including dairies and feedlots. The per capita development related emissions in 2007 were 13.3 metric tons per year and decline to 12.0 metric tons per year in 2020, and 11.3 metric tons per year in 2030.

Methods

This assessment includes emissions attributable to all unincorporated land within Tulare County. It does not include emissions associated with incorporated cities within Tulare County. Therefore, unincorporated Tulare County is considered to be the organizational boundary for the assessment. The assessment includes emission inventories for five main sectors of emission sources: electricity, natural gas, solid waste, mobile sources, and dairy/feedlot. Therefore, these sectors are considered to be the operational boundary for the assessment.

The emission inventory for the CAP includes agricultural emissions for dairies and feedlots only. Other livestock categories are less than 5 percent of the livestock emission category. Other agricultural categories for farming operations such as fuel consumption, fertilizer application, and soil management have not been included because the County does not have authority to regulate those activities.

Emissions in 2007 were calculated using data from calendar year 2007, when available. When data from 2007 was unavailable, data from 2006 were used as a proxy. Year 2030 projections assume that overall build-out outlined in the Tulare County General Plan 2030 Update would occur. Year 2030

projections also assume a "business-as-usual" trajectory for generation and emission of greenhouse gases in the County. Dairy emissions were based on projections from the Tulare County Phase I Animal Confinement Plan Draft Supplemental EIR (Tulare County 2006).

General Procedure

This greenhouse gas inventory used protocols established by the California Climate Action Registry (CCAR 2008), and by the Greenhouse Gas Protocol Initiative (WRI 2008). Using protocol guidelines, the process used to perform this greenhouse gas inventory is as follows:

1. Set organizational boundaries
2. Set operational boundaries
3. Identify sources of emissions
4. Collect data on emissions for a representative period of time
5. Calculate greenhouse gas emissions from data using data-specific emission factors
6. Create an inventory of CO_2e emissions that is complete and transparent

The organizational boundary for the emission inventory is the unincorporated portions of Tulare County.

Exhibit 5 displays the regional location and Tulare County boundary. Exhibit 6 shows the location of the cities, tribal lands and federal lands that are the responsibility of other jurisdictions in greater detail.

The emissions by sector for the years 2007, 2020, and 2030 are presented in Table 5, Table 6, and Table 7, respectively.

Table 5: Emissions by Sector in 2007

Sector	CO_2e (metric tons/year)	% of Dev. Related	% of Total
Electricity	542,690	28	11
Natural Gas	321,020	17	6
Mobile Sources	822,230	43	16
Solid Waste	227,250	12	4
Subtotal Development Related	1,913,190	100	37
Dairy/Feedlots	3,294,870	—	63
Total	**5,208,060**	**—**	**100**
Per Capita	**36.1**	**13.3**	**—**

Notes:
% of Dev. Related = fraction of inventory subject to Tulare County policies, programs, and measures in the CAP.
Source: Tulare County 2030 General Plan Update.

Table 6: Emissions by Sector in 2020

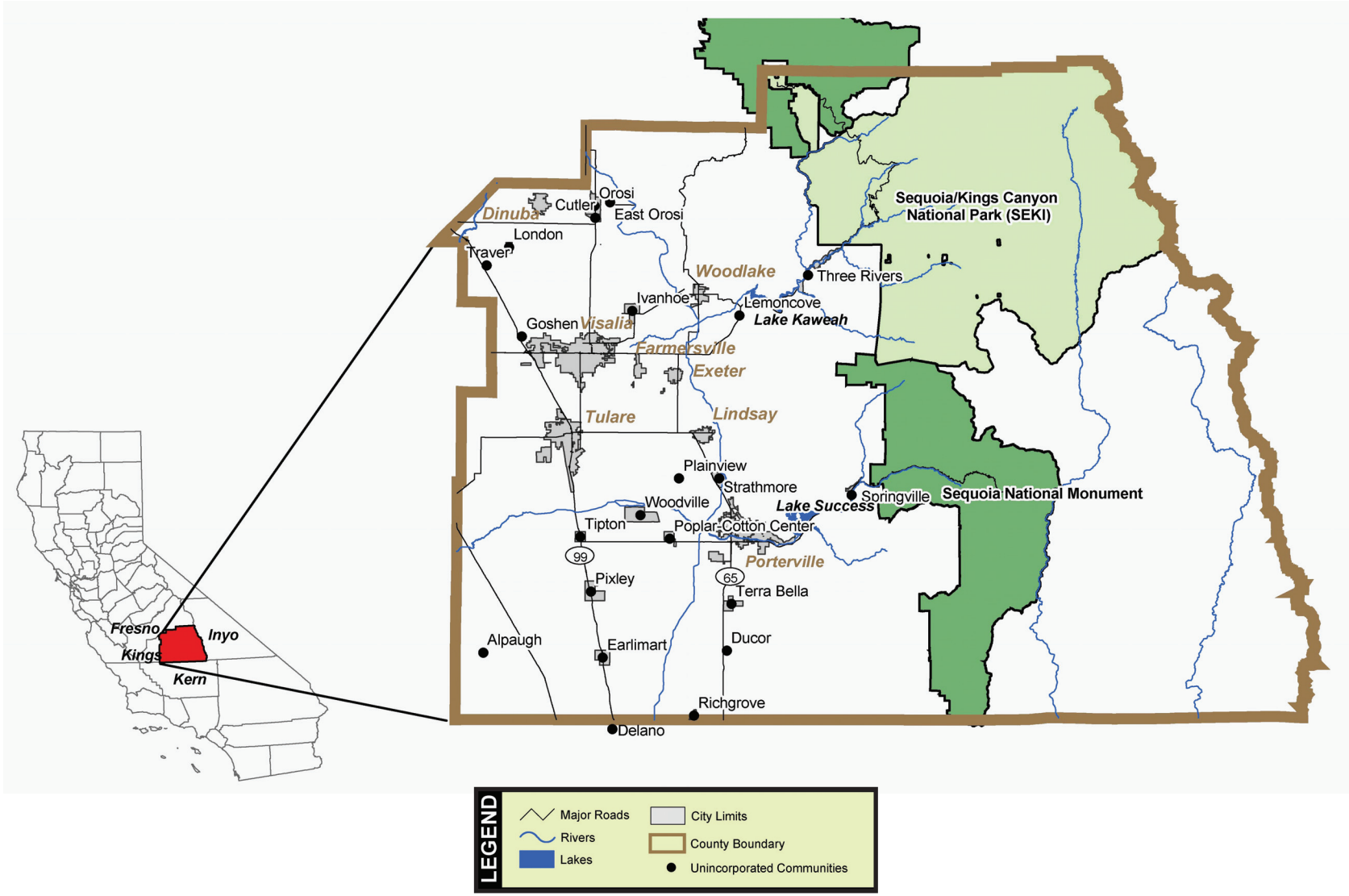
Sector	CO_2e (metric tons/year)	% of Dev. Related	% of Total
Electricity	609,312	27	11
Natural Gas	356,849	16	6
Mobile Sources	1,042,744	46	18
Solid Waste	238,272	12	4
Subtotal Development Related	2,247,177	100	39
Dairy/Feedlots	3,468,120	—	61
Total	5,715,297	**—**	**100**
Per Capita	**30.5**	**12.0**	**—**

Notes:
% of Dev. Related = fraction of inventory subject to Tulare County policies, programs, and measures in the CAP.
Source: Tulare County 2030 General Plan Update.

Table 7: Emissions by Sector in 2030

Sector	CO_2e (metric tons/year)	% of Dev. Related	% of Total
Electricity	660,560	26	11
Natural Gas	384,410	15	6
Mobile Sources	1,212,370	48	20
Solid Waste	246,750	10	4
Subtotal Development Related	2,504,090	100	41
Dairy/Feedlots	3,601,390	—	59
Total	**6,105,480**	**—**	**100**
Per Capita	**27.4**	**11.3**	**—**

Notes:
% of Dev. Related = fraction of inventory subject to Tulare County policies, programs, and measures in the CAP.
Emissions are rounded to the nearest 10 metric tons/year.
Source: Tulare County 2030 General Plan Update.

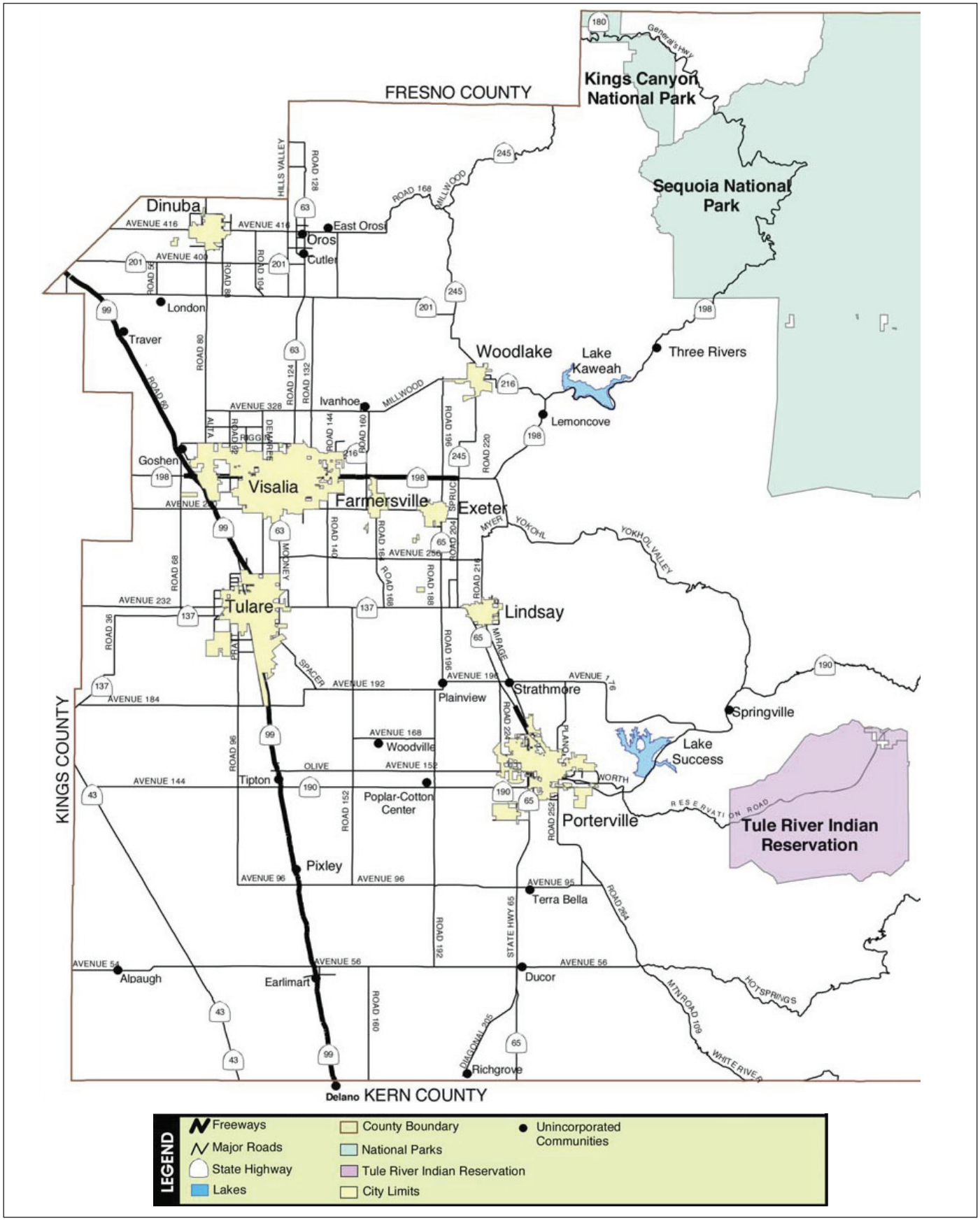


Source: Tulare County General Plan 2030 Update Background Report (2007).

NORTH

28 14 0 28 Miles

Exhibit 5
Regional Location



Source: Tulare County General Plan 2030 Update Background Report (2007).

NORTH

8 4 0 8 Miles

Exhibit 6
Tulare County Organizational Boundary

SECTION 4: EMISSION REDUCTION TARGET AND JUSTIFICATION

4.1 - Basis and Assumptions

The CAP provides an emission reduction target for sources under the jurisdiction and influence of Tulare County. The target is based on forecasts of development activity from the Tulare County 2030 General Plan Update. The reductions are based on the development being consistent with the goals, policies, and implementation measures in the General Plan, and the TCAG Blueprint Vision.

Tulare County Emission Reduction Target:

- 26.2 percent reduction in County development related emissions
- 6 percent average project reduction required from new development beyond that required by regulation

The analysis is based on the following general assumptions:

- New development will be targeted in existing cities and rural communities.
- Large lot rural estate subdivisions and ranchettes on important farmlands will be discouraged.
- New residential development in rural communities will increase development density by 25 percent compared with current averages.
- A significant amount of development in the unincorporated County areas will occur on existing lots that are not subject to any additional County discretionary approvals.
- Any new town, planned community area, or corridor developments in Tulare County will be environmental showcases for technology and innovation that go well beyond standards for energy efficiency, water conservation, and alternative transportation.

A critical issue in identifying a workable reduction target is differences in effectiveness of transportation measures based on project type and setting. Rural communities would not be expected to have the population needed to support frequent transit service in the year 2020 and 2030 planning timeframes. However, rural communities are very amenable to improved pedestrian and bicycle access and to programs such as ridesharing and vanpools. A substantial portion of County residents live and work on farms. Farms may also be dependent on seasonal labor that may only reside temporarily in Tulare County or that work on multiple farms throughout the year. Farmworker transportation is an important concern in Tulare County.

The emission reductions presented in this section were compiled from several sources. Emission reductions from State sources are from CARB estimates of the reductions anticipated from implementing the Scoping Plan measures and adjusted to show their effect on Tulare County source categories. Reductions from SJVAPCD regulations, programs, and reduction measures are from

SJVAPCD staff reports prepared for adoption of the regulations and programs. The amount of reduction required is based on the gap between reductions achieved by State and regional measures and the Scoping Plan 2020 target of 26.2-percent reduction for land-use-related sectors compared with business as usual. The gap is filled with reductions from local measures and programs.

The emission inventory and forecasts for 2020 and 2030 indicate that greenhouse gas emissions from dairies and feedlots are a significant source of emissions in Tulare County. Although Tulare County has land use authority over the siting of new and expanding dairies, the projects must also comply with regulations and permits from the SJVAPCD and the Regional Water Quality Control Board. Regulations adopted by the SJVAPCD to control the ozone precursor reactive organic gases (ROG) are also expected to reduce greenhouse gas emissions. In addition, the SJVAPCD will require best performance standards for new and modified dairies when it is a Lead or Responsible Agency for the project. The best performance standards have not been finalized, but they have the potential to result in substantial emission reductions from dairies. The CAP does not currently propose a reduction target for dairies. The County will continue to apply SJVAPCD rules and to identify any additional feasible greenhouse gas mitigation measures for dairies and feedlots through the project approval process and CEQA and will identify a reduction target for this source through a separate CAP process as part of amendments to the Animal Confinement Facilities Plan and Program EIR.

4.1.1 - California's Strategy for Achieving the 2020 Target

Key elements of California's strategy for reducing its greenhouse gas emissions to 1990 levels by 2020 include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a Statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets (SB 375);
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

The CARB Scoping Plan (CARB 2008) identifies measures designed to reach the State's 2020 target and provides emission reduction estimates for each measure. The following describes the primary statewide measures that apply to development related emissions in Tulare County:

- **Motor Vehicles - Pavley Standards:** The EPA recently granted the waiver for California for its greenhouse gas emission standards for motor vehicles. The Pavley I (AB 1493) regulation, which has already been adopted by CARB, requires GHG emission reductions from passenger cars and light trucks up to the 2016 model year. This regulation is expected to provide 27.7 $MMTCO_2e$ of emission reductions in 2020. The Pavley I standards are expected to reduce total emissions for automobiles and light trucks by 17.2 percent relative to the scenario without Pavley or corporate average fuel economy by the year 2020. CARB is currently developing standards for passenger vehicles model year 2017 and later that is being referred to as Pavley II. That regulation will also provide reductions by 2020. The new standards will follow up on the existing standards that reach maximum stringency in 2016. The Scoping Plan indicates that the Pavley II standards will achieve additional emission reductions of 4.1 $MMTCO_2e$ by 2020. The Pavley I and II standards are expected to reduce total emissions for automobiles and light trucks by 19.7 percent relative to the scenario without Pavley or corporate average fuel economy by the year 2020.
- **Motor Vehicles - Low Carbon Fuel Standard (LCFS):** CARB adopted a new regulation in December 2009 to implement the California Low Carbon Fuel Standard (LCFS). The regulation is a discrete early action measure under AB 32 and implements Governor Schwarzenegger's Executive Order S-01-07. The regulation will reduce greenhouse gas) emissions by reducing the carbon intensity of transportation fuels used in California by an average of 10 percent by the year 2020. The CARB Scoping Plan estimates this regulation will provide 15 $MMTCO_2e$ of emission reductions in 2020. The LCFS is expected to reduce total emissions from passenger vehicles and heavy-duty trucks by 7.2 percent. A 7.2 percent reduction from business as usual emissions for passenger vehicles and heavy-duty trucks is taken for this regulation.
- **Motor Vehicles - Passenger Vehicle Efficiency**: CARB identified several measures that would further reduce tailpipe greenhouse gas emissions from passenger vehicles by increasing vehicle efficiency. These measures include ensuring proper tire inflation and using solar-reflective automotive paint and window glazing (cool car standards). The CARB Scoping Plan estimates these regulations will provide 1.44 $MMTCO_2e$ of emission reductions in 2020. These measures are expected to reduce total emissions from passenger vehicles by 2.8 percent. Details regarding the current status of these initiatives is provided below:

    - CARB approved a regulation that requires California's automotive maintenance industry to check the tire pressure of every vehicle they service in March 2009. A properly inflated tire helps to reduce fuel greenhouse gas emissions by reducing tire-rolling resistance.
    - In June 2009, CARB approved the cool car standards, which cut greenhouse gases by reducing heat gain in automobile interiors. The cool car standards begin phasing in with the 2012 model year. The regulation requires that passenger cars, pickup trucks and sport utility vehicles be equipped with windows that reduce the amount of heat that

enters the vehicle from solar radiation. Less heat inside the vehicle will allow air conditioning units to be downsized or used less, thereby increasing fuel economy and reducing the amount of greenhouse gases emitted by the vehicle when it is in use.

- Additional measures that would further reduce tailpipe greenhouse gas emissions from passenger vehicles by increasing vehicle efficiency include low friction oil and a tire tread program. The CARB Scoping Plan estimates these regulations will provide 3.1 $MMTCO_2e$ of emission reductions in 2020. The combined benefit of these measures is expected to reduce total emissions from passenger vehicles by 2.8 percent.

- **Motor Vehicles, Heavy Duty Truck Vehicle Efficiency (Aerodynamic Efficiency)**: CARB approved this regulation in December 2008. This measure requires existing trucks/trailers to be retrofitted with the best available technology and/or CARB approved technology. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. The requirements apply to California and out-of-state registered trucks that travel to California. The 2020 estimated greenhouse gas emission reductions could be up to 6.4 $MMTCO_2e$ nationwide, of which about 0.93 $MMTCO_2e$ would occur within California. This regulation is expected to reduce total emissions from heavy-duty trucks by 2.9 percent.

- **Natural Gas Energy Efficiency**: The CARB Scoping Plan Energy Efficiency measure includes a number of actions that reduce energy consumption of both natural gas and electricity through improvements in building and appliance efficiency and through efficiency in combustion of the natural gas. Example efficiency improvements include the use of condensing heaters, tankless gas-fired on-demand heaters and other super efficient gas-fired heating appliances that will replace less efficient water and space heaters by attrition as they fail. The 2020 emission reductions from this measure are 4.3 $MMTCO_2e$ or 9.4 percent of the inventory for this source category.

- Renewable Energy Portfolio Standard: CEC estimates that about 12 percent of California's retail electric load is currently met with renewable resources. Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas. California's current Renewables Portfolio Standard (RPS) was intended to increase that share to 20 percent by 2010. Increased use of renewables will decrease California's reliance on fossil fuels, thus reducing emissions of greenhouse gases from the Electricity sector. Based on Governor Schwarzenegger's call for a statewide 33 percent RPS, the Scoping Plan anticipates that California will have 33 percent of its electricity provided by renewable resources by 2020, and includes the reduction of greenhouse gas emissions based on this level. Tulare County is served by Southern California Edison (SCE) and Pacific Gas and Electric (PG&E). Based on the 2007 renewables portfolio for the two utilities, reaching the 33 percent target would result in an 18.4 percent reduction by 2020 in Tulare County.

- Electrical Efficiency: the Scoping Plan lists twelve strategies to maximize energy efficiency that are expected to achieve up to 40,000 gigawatt hours of electricity savings by 2020. The

Scoping Plan estimates reductions from electrical efficiency measures would reduce emissions from this source category by 15.2 MMTCO2e by 2020. With the implementation of the strategies, emission reductions of 15.7 percent would be achieved from this source category.

- Cross Cutting Strategy for Buildings:
  - "Zero Net Energy" buildings
- Standards Strategies
  - More stringent building codes and appliance standards
  - Broader standards for new types of appliances and for water efficiency
  - Improved compliance and enforcement for existing standards
  - Voluntary efficiency and green building targets beyond mandatory codes for Existing Buildings
  - Voluntary and mandatory whole-building retrofits for existing buildings
  - Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation
  - Improved Utility Program Strategies
  - More aggressive utility programs to achieve long-term savings
- Other Needed Strategies
  - Water system and water use efficiency and conservation measures
  - Local government programs that lead by example and tap local authority planning, development, and code compliance
  - Additional industrial and agricultural efficiency efforts
- Providing real time energy information to help consumers conserve and optimize energy performance

- Million Solar Roofs: As part of Governor Arnold Schwarzenegger's Million Solar Roofs Program, California has set a goal to install 3,000 megawatts of new, solar capacity by 2017 - moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. The Million Solar Roofs Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. Created under Senate Bill 1 (Murray, Chapter 132, Statutes of 2006), Million Solar Roofs builds on previous ratepayer-funded programs and provides up to $3.3 billion in financial incentives that decline over time.

- Waste - Landfill Methane: The proposed CARB Regulation to Reduce Methane Emissions From Municipal Solid Waste Landfills, which is due to be adopted in early 2010, will enhance capture and control of methane from municipal waste landfills. CARB estimates that the regulation will reduce methane emissions at existing landfills with methane capture systems and combustion by an additional 14.2 percent.

Table 8 describes the emission reductions that CARB predicts for State regulations that implement AB 32 along with the scaled reductions that will apply to sources in Tulare County.

Table 8: 2020 Land Use Sector Greenhouse Gas Emission Reductions from State Regulations and AB 32 Measures

Affected Emission Sources	California Regulations and Measures	% Reduction from 2020 GHG Inventory	End Use Sector (Percentage of Tulare County Inventory)	Scaled Emission Reduction Credit
Mobile	AB 1493 Pavley	19.7	On-road passenger/light truck transportation (38.7)	7.62
	LCFS	7.2	On-road passenger/light truck transportation (38.7)	2.79
	LCFS	7.2	On-road heavy/medium duty transportation (6.7)	0.48
	Heavy Duty Efficiency	2.9	On-road heavy duty transportation (1.3)	0.04
	Passenger Vehicle Efficiency	2.8	On-road passenger/light truck transportation (37.9)	1.08
Area	Energy Efficiency Measures	9.5	Natural gas (residential) (3.9)	0.37
			Natural gas (non-residential) (12.0)	1.13
Indirect	Renewable Portfolio Standard	18.3	Electricity (excluding cogeneration) (27.1)	4.96
	Energy Efficiency Measures	15.7	Electricity (27.1)	4.25
	Solar Roofs	1.5	Electricity (excluding cogeneration) (27.1)	0.41
	Waste - Landfill Methane	14.2	Solid Waste (10.2)	1.51
Total Reductions from Statewide Measures in Tulare County				**24.63**

Notes:
AB = Assembly Bill; LCFS = Low Carbon Fuel Standard; GHG = greenhouse gas
Source: Bay Area Air Quality Management District. California Environmental Quality Act Guidelines Update, Proposed Thresholds of Significance; December 7, 2009. CARB Scoping Plan, 2008.

4.1.2 - Emission Reductions from Implementing the Tulare County Blueprint

The TCAG Blueprint (Blueprint) examined four land use scenarios and identified a preferred scenario. The "Status Quo Scenario" described the effect of continued development at current average densities and mix of housing types. The Status Quo Scenario can also be considered the "Business as Usual Scenario" used to calculate greenhouse gas reduction targets. The preferred scenario identified during the process was the "25% Density Increase Scenario." This scenario increased residential density by 25 percent and shifted the housing types to medium and high densities (TCAG 2008). The two scenarios are compared in Table 9.

Table 9: Blueprint Scenario Comparison

Item	Status Quo Scenario	25% Density Increase Scenario
Definition	Future development same as today Single-family homes the norm No new transit	Status quo densities are increased by 25% Increase in medium and high density housing Light rail between cities Highway 65 extended throughout the entire eastern portion of the County
Density	4.3 dwelling units per acre	5.3 dwelling units per acre
Housing Mix	12.6% low density 61.1% medium density 25.3% high density	8.7% low density 49.8% medium density 41.5% high density
Residential Footprint	43,811 acres	35,421 acres
Notes: Density estimates for Tulare County from San Joaquin Valley Blueprint April 2009 Update. Source: San Joaquin Valley Blueprint Draft Tulare County Local Blueprint July 2008		

TCAG has approved the 25% Density Increase Scenario as the preferred scenario for the County. Implementation of the 25% Density Increase Scenario would result in fewer vehicle trips and miles traveled compared with the Status Quo Scenario. The difference in trip generation is reflected in the rates in the Institute of Transportation Engineers Trip Generation Manual and that are used in the URBEMIS 2007 land use emission model used to quantify emissions from development projects. At the status quo density of three dwelling units per acre for single-family development, the average trip generation rate is 9.57 trips per dwelling unit. When single-family density is increase by 25 percent, the trip generation rate is 9.14 trips per dwelling unit. This equates to a 4.5-percent reduction in trip generation and a similar reduction in emissions. The Blueprint is expected to provide a significant part of the SB 375 regional targets reductions for Tulare County. SB 375 provides incentives that will help to ensure that the County implements the Blueprint scenario.

4.1.3 - Air District Reductions

The SJVAPCD recently adopted a new rule that helps reduce development-related emissions. Rule 9410 - Employer Based Trip Reduction 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 vehicle miles traveled by increasing transit use, carpooling, vanpooling, bicycling, or other measures to reduce trips. The SJVAPCD estimates that the rule will reduce mobile source criteria pollutants by approximately 1.6 percent by 2023 (SJVAPCD 2009). Since the rule reduces trips and vehicle miles traveled, it would produce similar reductions in greenhouse gases. Light-duty passenger cars and truck trips that would be affected by the rule comprise 39 percent of development-related emissions in Tulare County in 2020. Therefore, this measure will reduce overall development related greenhouse gas emissions by approximately 0.6 percent by 2020.

Another SJVAPCD rule that will provide greenhouse gas emission reductions from new development is Rule 9510 - Indirect Source Review. The rule requires development projects subject to the rule to reduce operational NO_x emissions by 33 percent and operational PM_{10} emissions by 50 percent. The rule allows credits for land use and transportation measures that provide an air quality benefit to the site and requires payment of a mitigation fee that is used to fund offsite emission reduction projects if the reduction target is not achieved with onsite measures. The onsite measures and offsite projects funded may provide greenhouse gas reductions in excess of those required by other regulations. Projects accomplish onsite reductions primarily with measures that reduce vehicle travel, provide clean fleet vehicles, and improve energy efficiency. Offsite reductions are achieved with projects in the SJVAPCD's Heavy-Duty Engine Program, and other grant and incentive programs that reduce mobile source emissions. Engines replaced by the Heavy Duty Engine Program are typically more fuel-efficient that the current engine. Replacing diesel engines with electric motors is an option that produces substantial greenhouse gas reductions. The exact mix of projects funded by Rule 9510 cannot be predetermined since the SJVAPCD operates the program on a first come, first served basis. Based on these factors, it is reasonable to conclude that Rule 9510 will provide greenhouse gas reductions in Tulare County. Approximately 85 percent of discretionary development projects in the San Joaquin Valley are subject to Rule 9510 (SJVAPCD 2005). Assuming 65 percent of development projects in Tulare County will require a discretionary approval, 55 percent (0.65 x 0.85) of development would generate reductions from this rule. Of the 33-percent reduction in mobile and area sources of NO_x required by the rule, it is reasonable to assume that at least 0.5 percent will be reductions in greenhouse gases not accounted for elsewhere. For the purpose of developing a target, the reduction was conservatively estimated as 0.5 percent of the mobile and area source inventory-related inventory. When Rule 9410 and Rule 9510 reductions are combined, they result in a reduction of 1.1 percent in mobile and area sources or 0.5 percent overall reduction in development related emissions.

4.1.4 - Project Level Reductions

The SJVAPCD prepared emission reduction estimates for a variety of different land use and transportation measures that will provide additional reductions beyond those anticipated by increasing development densities consistent with the preferred Blueprint scenario described above. Table 10 lists the measure titles and a percentage reduction for each measure. For more complete measure descriptions see Appendix B (SJVAPCD 2009b). These measures are available for development projects in Tulare County and are capable of achieving emission reductions similar to those shown in the table. The effectiveness of the measures depends on land use pattern and transportation infrastructure in the vicinity of the project. The preferred Blueprint development scenario as supported by the General Plan will help to maximize the effectiveness of the measures.

Table 10: SJVAPCD Suggested Land Use and Transportation Measures

Measure	Percentage Reduction
Bicycle/Pedestrian/Transit Measures	
1. Bike Parking Measure - Commercial, Mixed-Use	0.625
2. End of Trip Facilities Measure - Commercial, Mixed-Use	0.625
3. Bike Parking at Multi-Unit Residential Measure - Residential	0.625
4. Proximity to Bike Path/Bike Lanes Measure - Commercial, Mixed-Use, Residential	0.625
5. Pedestrian Network Measure - Commercial, Mixed-Use, Residential	Between 0.5 and 1.0
6. Pedestrian Barriers Minimized - Commercial, Mixed-Use, Residential	1.0
7. Bus Shelter for "existing" Transit Service Measure - Commercial, Mixed-Use, Residential	0.5
8. Bus Shelter for "planned" Transit Service - Commercial, Mixed-Use, Residential	0.25
9. Traffic Calming Measure - Commercial, Mixed-Use, Residential	Between 0.25 and 1.0
Parking Measures	
10. Paid Parking - Commercial, Mixed-Use, Residential	
10.1 Paid Parking: Urban Site within ¼ mile from transit stop-	5.0
10.2 Paid Parking: Urban Site greater than ¼ mile from transit stop-	1.5
10.3 Paid Parking: Suburban site within 1/4 mile of transit stop	2.0
10.4 Paid Parking: Suburban site greater than 1/4 mile from transit stop	1.0
11. Parking Cash Out Measure - Commercial, Mixed-Use	0.6
12. Minimum Parking - Commercial, Mixed-Use, Residential	3.0
13. Parking Reduction Beyond Code Measure - Commercial, Mixed-Use, Residential	6.0
14. Pedestrian Pathway through Parking Measure - Commercial, Mixed-Use, Residential	0.5
15. Off Street Parking Measure - Commercial, Mixed-Use, Residential	Between 0.1 and 1.5
Site Design Measures	
16. Office/Mixed-Use Proximate to Transit Measure - Commercial, Mixed-Use	Between 0.2 and 1.5
17. Orientation toward "existing" transit, bikeway, or pedestrian corridor - Commercial, Mixed- Use, Residential	0.50
18. Orientation toward "planned" transit, bikeway, or pedestrian corridor - Commercial, Mixed-Use	0.25
19. Residential Density Measure - Residential	Between 0.2 and 1.5
20. Street Grid Measure - Commercial, Mixed-Use, Residential	1.0
21. Neighborhood Electric Vehicle Access - Commercial, Mixed-Use, Residential	Between 0.5 and 1.5
22. Affordable Housing Component Measure - Residential	Between 0.6 and 4.0

Table 10 (cont.): SJVAPCD Suggested Land Use and Transportation Measures

Measure	Percentage Reduction
Mixed-Use Measures	
23. Urban Mixed-Use Measure - Mixed Use	Between 3.0 and 9.0.
24. Suburban Mixed-Use Measure - Commercial, Mixed-Use, Residential	3.0
25. Other Mixed-Use Measure - Mixed-Use, Residential	1.0
Building Component Measures	
26. Energy Star Roof Measure - Commercial, Mixed-Use, Residential	0.5
27. Onsite Renewable Energy System Measure - Commercial, Mixed- Use, Residential	1.0
28. Exceed Title 24 Measure - Commercial, Mixed-Use, Residential	1.0
29. Solar Orientation Measure - Residential	0.5
30. Non Roof Surfaces Measure - Commercial, Mixed-Use Residential	1.0
31. Green Roof Measure - Commercial, Mixed-Use, Residential	0.5
Transportation Demand Measures (TDM) and Miscellaneous Measures	
33. Electric Lawnmower Measure - Residential	1.0
Source: SJVAPCD 2009.	

4.1.5 - Emission Reductions Summary

Establishing an emission reduction target requires consideration of the potential sources subject to control during the planning timeframes and the mix of measures most likely to be implemented for the various project types. The Tulare County 2030 General Plan Update forecasts a population increase in the unincorporated area of the County of 78,490 people between 2007 and 2030. Based on the average household size in Tulare County of 3.382 persons per dwelling unit, this increase would require the construction of 23,208 dwelling units. The number of dwelling units required by 2020 was estimated by assuming a steady annual growth rate through 2030 and interpolating the 2020 amount. Approximately 13,118 dwelling units will be required by 2020. This means that 31 percent of the housing in Tulare County will be subject to actions that reduce emissions through the development process. No statistics on the square feet of commercial space that will be constructed were available; however, it would be expected to grow at rates that would support the increase in population. The General Plan uses a forecast of 10.5 percent employment growth by 2030 in unincorporated areas of Tulare County. The employment growth reflects Blueprint and General Plan policies to focus development in cities and existing rural communities.

The County has already planned a substantial number of lots for development. Development of some of these lots will be limited by various factors such as water supply, sewer/septic capability, road capacity, etc. that cannot be addressed during the planning horizon due to lack of resources. This means that the County expects that new development proposals will be received that are more likely

to develop before existing lots are developed because the rural community, landowner, or developer has the resources to provide all improvements and services required for the site. As a rough estimate, this analysis assumes that 40 percent of the development will occur on existing lots and 60 percent will occur in new developments. Development occurring on existing lots will be subject to existing conditions of the approved subdivision and zoning standards. Development occurring in new subdivisions and projects would be subject to additional measures required to mitigate significant impacts. The County will encourage developers of existing lots to implement measures that reduce greenhouse gas emissions, but it has no authority to require additional reductions beyond those required by State regulation, the building code, and local ordinance.

Commercial and industrial development in Tulare County during the 2020 and 2030 planning timeframes will be subject to conditions of approval and mitigation measures that will reduce greenhouse gas emissions beyond State regulations in most projects. For industrial projects where the SJVAPCD is a Responsible Agency, the project will be expected to implement Best Performance Standards included in the SJVAPCD Guidelines for Addressing Greenhouse Gas Emissions on the processes and stationary equipment that emit greenhouse gases to levels that meet or exceed State targets.

On average, all Tulare County existing and new development will produce 24.4 percent fewer emissions by 2020, due to the benefits of State regulations described in the CARB Scoping Plan. Regulations and measures implemented by the SJVAPCD are expected to provide an additional 0.5-percent reduction through Rule 9410 - Employee Commute Reductions, Rule 9510 - Indirect Source Review, from grant and incentive programs with funding from other sources. An average reduction of 6 percent for projects subject to a discretionary review and CEQA is required for the County to demonstrate an overall reduction consistent with the reductions in the CARB Scoping Plan.

A summary of the emission reductions in Tulare County is shown in Table 11.

Table 11: Tulare County Greenhouse Gas Emissions Reductions Summary

Measures	Percent Reduction
Existing Development in 2020	
Reductions from State Measures	24.6
Reductions from Air District Measures	0.5
Total Reductions from State and Air District Measures	25.1
New Development Between 2007 and 2020 with CEQA	
Reductions Required from New Development Subject to CEQA	1.1 (6.0 at project level)
Total Reductions from All Measures	26.2

Projects that occur in new towns or in large, multi-use developments in existing communities would be able to achieve reductions greater than 6.0 percent, due to opportunities to design land use pattern and transportation infrastructure to support walking, bicycling, and transit use. Larger structures and office developments have more opportunity for employee commute programs, carpooling, and transit service. New developments in low-income communities with affordable housing receive credits for generating fewer vehicle trips. The 25 percent increase in average development density that would be achieved by meeting Blueprint goals is also expected to result in lower trip generation. Energy efficiency in homes and buildings can achieve reductions in excess of Title 24 in most cases. Solar generation can provide additional energy reductions for some projects where the economics are favorable. Projects that exceed the standards will provide additional reductions that can be used as a contingency amount available in the event that other measures are less effective than predicted. The percentage required can be adjusted in the future, if needed to meet the County's emission target or to address changes in regulatory measures.

To demonstrate consistency with the CARB Scoping Plan 2020 target of 26.2 percent reduction in land use related sectors compared with business as usual, new development in the County subject to discretionary approval would need to provide an overall reduction of 6 percent beyond that provided by State and SJVAPCD regulation. Based on this analysis, implementation of the policies contained in the General Plan 2030 Update and available project specific measures can achieve an overall reduction of 6 percent of development-related greenhouse gas emissions under Tulare County jurisdiction. When reductions from regulations and programs are included, new development would produce approximately 31 percent fewer greenhouse gas emissions compared with the 2020 business as usual scenario.

4.1.6 - Other Potential Reductions

Several other measures may result in additional reductions that have not been included in the emission target, due to uncertainty in implementation timeframes and required funding. The Blueprint assumes that the County's transportation system will be improved over time in ways that reduce trips and vehicle miles traveled, by increasing transit use and other alternative travel modes. For example, the preferred Blueprint scenario (the 25 percent Density Increase Scenario) assumes that light rail service will be provided between Tulare and Visalia. Improvements in the regional bus service are also anticipated. The Blueprint has also been adopted by the Tulare County Association of Governments. The County is incorporating the principles of TCAG's Tulare County Regional Blueprint (Blueprint) in the 2030 General Plan Update. The development in the cities consistent with the Blueprint will have a synergistic effect on trips originating in the County but ending in the cities for jobs and commercial services. Mobile sources are 46.4 percent of the 2020 greenhouse gas emissions. A 2-percent reduction in vehicle miles traveled from all systemwide transportation measures would produce a 0.9 percent overall greenhouse gas reduction.

Voluntary measures implemented by residents and businesses for projects not subject to a discretionary approval and voluntary retrofits of existing structures with energy saving features may provide additional reductions. The potential success of voluntary actions has not been estimated.

4.2 - Process for Determining CEQA Project Level Consistency with the CAP

One of the primary purposes of the CAP is to provide a solid approach for determining significance for project cumulative impacts on climate change. Tulare County proposes that projects on average achieve a reduction that is 6 percent in excess of the reductions stated in the CARB Scoping Plan and by regional regulations and programs. When combined with reductions anticipated from the CARB Scoping Plan measures and regional regulations and programs, Tulare County emissions would be 26.2 percent below 2020 business-as-usual levels for development related sources, which is the amount needed for the State to reduce emissions to 1990 levels.

Projects subject to SJVAPCD Rule 9510 that are 50 dwelling units and larger or emitting approximately 2.0 tons per year of oxides of nitrogen (NO_x) are required to quantify project emissions and to pay emission fees if emissions exceed 2.0 tons per year. This provides a logical cutoff point to require quantification of project greenhouse gas emissions and reductions expected from measures included in the project, since most of the modeling using URBEMIS 2007 that is already required by Rule 9510 can also be used to quantify greenhouse gas emissions and reductions. Residential projects smaller than 50 dwelling units would be required to include feasible measures as part of the project that would provide the same reductions. The SJVAPCD is developing a point system that will enable the smaller projects to identify measures that will achieve the required reductions without modeling.

As stated earlier, the feasibility of achieving emission reductions related to travel varies by project type, location, and surrounding development. Projects in some of the smaller rural communities and hamlets may have a more difficult time demonstrating a 6-percent reduction than projects in the larger rural communities and new towns, but are in great need of new development to help with infrastructure, jobs, and commercial opportunities. As the County reviews development proposals, it can determine if a separate reduction target for small rural communities and hamlets is warranted.

The County wants to encourage development that is consistent with the Blueprint and General Plan Policies that promote greenhouse gas reductions and protects agricultural and natural resources. The CAP targets for development provide an incentive for developers to propose projects that meet or exceed the targets. Projects will continue to be required to meet the checklist criteria for development within the Rural Valley Lands Plan Area.

The following example project is provided to illustrate the feasibility of achieving a project-level reduction that would meet the County's emission reduction target. Table 12 provides an emission reduction scenario for a residential project in a rural community demonstrating the mix of measures that would exceed the 6-percent project target. The emission reductions are SJVAPCD estimates provided for measures in Table 9 above and includes reductions for meeting the higher development

density (5.3 dwelling units per acre) goals of the Blueprint. Some of the measures have a range of effectiveness that could result in greater or lesser reductions for different projects. Projects proposing to build at current average densities of 4.3 dwelling units per acre would require additional measures to achieve a 6 percent project emission reduction. Applicants could choose other measures if these particular measures are not feasible for their project.

Table 12: Rural Community Project Reduction Example

Measure	Percent Reduction
Density Consistent with Blueprint goals (5.3 du/ac single family)	4.5
Pedestrian Network	0.5
Street Grid Measure	1.0
Proximity to Bike Path/Bike Lanes Measure	0.6
Affordable Housing	1.0
Pedestrian Barriers Minimized	0.5
Exceed Title 24 Measure - Commercial, Mixed-Use, Residential	1.0
Solar Orientation Measure - Residential	0.5
Total Reductions	9.6
Note: du/ac = dwelling units per acre Source: SJVAPCD 2009.	

Table 13: CEQA Project Requirements for Consistency with CAP

Item	Required
Percent reduction in greenhouse gas emissions (see Table 12 for sample emission reduction possibilities)	6%
Consistency with General Plan policies	Yes
Consistency with Rural Valley Land Plans or Foothill Growth Management Plan development criteria	Yes
Consistency with Urban Growth Boundary expansion criteria	Yes
Consistency for development within Rural Community Urban Development Boundaries and Hamlet Development Boundaries	Yes

Dairy and Feedlot Emissions

Dairy and feedlot emissions are the largest source of greenhouse gas emission in the Tulare County emissions inventory. Other types of livestock produce insignificant amounts of greenhouse gases due to their limited numbers and lower manure production. Dairies and feedlots are responsible for over 95 percent the State livestock greenhouse gas inventory. The primary avenue of reducing emissions from this source is through SJVAPCD regulations. The SJVAPCD Rule 4570, Confined Animal Facilities, requires dairies to implement practices that reduce reactive organic gases (ROG) from

manure handling and disposal. Measures that reduce ROG also tend to reduce the formation of the greenhouse gas, methane. The CARB Scoping Plan measure for livestock emphasizes voluntary incentive programs to install anaerobic digesters at dairies to capture the methane and use it as a carbon neutral biofuel. These regulations and programs will reduce emissions from existing and new facilities. Several dairies have installed anaerobic digesters in recent years, but they have tended to require subsidies to make them feasible. Facilities that use engines to generate electricity must install expensive controls to reduce hydrogen sulfide from the fuel and controls on the engines to reduce oxides of nitrogen (NO_x). New technologies like microturbines and fuel cells have not been proven technologically feasible for biogas or are too costly to install. This could change if the cost of these technologies is reduced or other new technologies are introduced.

The County requires new and expanding dairies and feedlots to go through the CEQA process, at which time greenhouse gas reduction measures can be identified that are appropriate for the circumstances of the individual facility. The SJVAPCD is a Responsible Agency for these projects and will recommend mitigation measures to reduce air quality impacts. The SJVAPCD recently adopted CEQA Guidelines for addressing greenhouse gases at development projects and proposes that projects implement Best Performance Standards to reduce impacts. For dairies, the SJVAPCD identified the use of feed supplements, frequent manure removal, and anaerobic digesters as measures to reduce greenhouse gas emissions. The feed supplements are believed to reduce greenhouse gases by at least 12 percent. Frequent manure removal is estimated to reduce emissions by about 7 percent. Anaerobic digesters reduce methane emissions by 63.5 percent. The SJVAPCD is commencing a process to finalize the Best Performance Standards. Until that occurs, the measures should only be considered informational. Most dairies are required to perform frequent manure removal to comply with Rule 4570. It remains to be seen if the feed supplement measure will prove feasible for some or all dairies, due to potential costs and unknown quality impacts. However, if these new supplements prove effective and replace feed supplements of similar cost, it could produce large reductions not only in Tulare County but with all dairies. The County believes that anaerobic digesters have not been demonstrated as a feasible mitigation measure, but it will track this technology as more are installed around the San Joaquin Valley.

The County plans to develop emission reduction targets for dairies and feedlots through a separate process as part of the update of the ACFP. In the interim, compliance with SJVAPCD regulations and project-by-project CEQA compliance will be used to mitigate impacts of this source on climate change.

4.3 - Targets After 2020

The State has not set an emission reduction target beyond year 2020, although it has a long-term goal of reducing emissions to 80 percent below 1990 emissions by 2050. Reaching that emission level will require the implementation of technologies and measures that have yet to be identified. For the CAP, Tulare County assumes that the percentage reduction required from new projects will remain constant through 2030. The State is expected to introduce additional regulations that will result in

substantially greater reductions from sources subject to State regulation. Tulare County will revise the CAP to refine later target years when the State sets updated targets.

4.4 - Control Costs

Implementation of the CAP reduction strategy will result in both costs and savings. Many of the building related measures provide savings from reduced energy consumption. Many of the land use and transportation measures have lower infrastructure costs compared with business as usual, resulting in more compact development and less need to expand transportation infrastructure because of the reduced trip generation rates. Some measures require investment in new technologies to achieve the reductions in energy and fuel use. The technology investments, in many cases, will pay for themselves over time with savings in energy costs. Some investments made by developers in energy efficiency and new technology may be difficult to recoup in the sale of the property because of market forces, but the person or business that ultimately pays for the energy use could experience savings.

The County will incur costs in administering the CAP. The County is responsible for implementing the measures included in the CAP and for tracking progress over time. Future updates to the CAP will also require County resources for staff and for technical assistance. To the extent possible, the County intends to incorporate CAP work into other related projects. For example, progress in implementing the CAP will be reviewed using existing data sources and the General Plan progress report process. Changes in travel characteristics are currently tracked as part of the Regional Transportation Plan maintained by the Tulare County Association of Governments (TCAG). This data can be used to determine the effectiveness of measures designed to reduce trips and vehicle miles traveled.

Emission control costs are usually calculated in dollars per metric ton of CO_2e reduced to allow for the comparison of relative costs of different controls. This is referred to as cost-effectiveness. Cost per metric ton is also used in exchanges that facilitate buying and selling carbon credits on the open market such as the Chicago Climate Exchange.

A number of studies have been prepared that estimate the control costs and savings for different measures. The California Air Pollution Control Officers Association report, CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, published in January 2008, includes percentage reductions and cost estimates for many measures (CAPCOA 2008). The report does not calculate cost-effectiveness for each measure, since that would vary by the amount of emissions at the source being controlled. The report is useful for identifying the capital costs of the measures, but it would require a project specific emission reduction estimate to calculate cost-effectiveness. The California Air Pollution Control Officers Association is in the process of updating this report with new emission reduction and cost estimates.

A 2007 report in the McKinsey Quarterly (Enkvist et al. 2007) presented the cost-effectiveness for a large number of measures. The cost savings for the most effective measure exceeded $200 per metric ton of CO_2e. Other measures provided emission reductions at a cost of less than $60 per metric ton of CO_2e. Measures that provide cost savings include the following in order of cost savings:

- Building insulation
- Fuel efficiency in commercial vehicles
- Lighting systems
- Air Conditioning
- Water Heating
- Fuel efficiency in vehicles

Table 14 lists the estimated cost or the range in cost per metric ton of CO_2e for a variety of measures. The measures are not specific to Tulare County and are provided for illustrative purposes only. The cost-effectiveness can be part of a decision process for identifying appropriate measures for the County or for individual projects.

Table 14: Cost-Effectiveness Estimates

No.	Measures	Cost per Metric Ton (CO_2e)
1	Expand energy saving opportunities to businesses	$0.18-$0.38
2	Improve residential energy efficiency	Negligible
3	Encourage development that is mixed-use, infill, and higher density	$0.81-$1.62
4	Increase housing density near transit	$4.54-$9.08
5	Actively promote walking and biking as safe modes of local travel, particularly for children attending local schools	$923.52
6	Create travel routes that ensure that destinations may be reached conveniently by public transit, bicycling and walking	Negligible
7	Convert more vehicles to hybrid, electric, alternative fuel, or smaller vehicles	$6,537-$7,027
9	Adopt a green building standard for all new development and major remodels	Negligible
10	Create water and waste efficient landscapes.	$24.74-$28.87
11	Identify opportunities for onsite renewable energy generation on County and privately owned property	$1,282-$1,320
12	Implement reduction strategies included in the energy audit of County facilities and continue to monitor County facility performance	N/A
13	Provide for increased albedo (reflectivity) of all urban surfaces including roads, driveways, sidewalks, and roofs in order to minimize the urban heat island effect	Negligible
14	Encourage tree planting	$35.96-$71.91

Table 14 (cont.): Cost-Effectiveness Estimates

No.	Measures	Cost per Metric Ton (CO_2e)
15	Address and minimize vegetation that degrades access along public rights of way	N/A
16	Increase bike parking	$6-$12
17	Price on-street parking in high-traffic areas in order to alleviate congestion, increase motorist convenience, reduce vehicle miles traveled, and create a new revenue stream for the County	$50.26
18	Support zero waste	Negligible
19	Increase recycling and composting at public events	Negligible
20	Establish an environmentally preferable purchasing program (EPP) for government operations	$17.42
21	Provide for a shuttle service in order to increase transit ridership	$1.15-$2.30
22	Promote car sharing programs	$1.55 - $3.11
23	Increase accommodation and promotion of fueled vehicles and hybrid vehicles alternatively	$200
Source: City of San Carlos 2009.		

SECTION 5: GENERAL PLAN POLICIES

5.1 - Tulare County General Plan Policies and Measures

The Tulare County General Plan 2030 Update fulfills many sustainability and greenhouse gas reduction objectives at the program level. Individual projects that will implement the General Plan will comply with these policies resulting in long-term benefits to air quality and greenhouse gas reductions that will help Tulare County achieve the CAP reduction targets. Table 15 lists the policies from the various General Plan elements that promote more efficient development, and reduce travel and energy consumption.

Table 15: General Plan Policies Having Greenhouse Gas Emission Reductions

Sustainability and Greenhouse Gas Emissions	
PF-1.1 Maintain Urban Edges PF-1.2 Location of Urban Development PF-1.3 Land Uses in UDBs/HDBs PF-1.4 Available Infrastructure AG-1.7 Conservation Easements AG-1.8 Agriculture Within Urban Boundaries AG-1.11 Agricultural Buffers AG-1.14 Right to Farm Noticing AG-2.11 Energy Production AG-2.6 Biotechnology and Biofuels AQ-1.6 Purchase of Low Emission/Alternative Fuel Vehicles, AQ-1.7 Support Statewide Global Warming Solutions, AQ-1.8 Greenhouse Gas Emissions Reduction Plan AQ-2.1 Transportation Demand Management Programs, AQ-2.3 Transportation and Air Quality AQ-2.4 Transportation Management Associations, AQ-2.5 Ridesharing, AQ-3.1 Location of Support Services AQ-3.2 Infill Near Employment AQ-3.3 Street Design AQ-3.5 Alternative Energy Design AQ-3.6 Mixed Use Development LU-1.1 Smart Growth and Healthy Communities LU-1.2 Innovative Development LU-1.3 Prevent Incompatible Uses LU-1.4 Compact Development LU-1.8 Encourage Infill Development LU-2.1 Agricultural Lands LU-3.2 Cluster Development LU-3.3 High-Density Residential Locations LU-4.1 Neighborhood Commercial Uses LU-7.1 Distinctive Neighborhoods LU-7.2 Integrate Natural Features LU-7.3 Friendly Streets LU-7.15 Energy Conservation	ERM-1.2 Development in Environmentally Sensitive Areas ERM-1.3 Encourage Cluster Development ERM-1.4 Protect Riparian Management Plans and Mining Reclamation Plans ERM-1.6 Management of Wetlands ERM-1.7 Planting of Native Vegetation ERM-1.8 Open Space Buffers ERM-1.14 Mitigation and Conservation Banking Program ERM-4.1 Energy Conservation and Efficiency Measures ERM-4.2 Streetscape and Parking Area Improvements for Energy Conservation ERM-4.3 Local and State Programs ERM-4.4 Promote Energy Conservation Awareness ERM-4.6 Renewable Energy ERM-5.1 Parks as Community Focal Points ERM-5.6 Location and Size Criteria for Parks ERM-5.15 Open Space Preservation HS-1.4 Building and Codes Chapter 11: Water Resources TC-2.1 Rail Service TC-2.4 High Speed Rail (HSR) TC-4.4 Nodal Land Use Patterns that Support Public Transit TC-5.1 Bicycle/Pedestrian Trail System TC-5.2 Consider Non-Motorized Modes in Planning and Development TC-5.3 Provisions for Bicycle Use TC-5.4 Design Standards for Bicycle Routes TC-5.5 Facilities TC-5.6 Regional Bicycle Plan TC-5.7 Designated Bike Paths TC-5.8 Multi-Use Trails PFS-1.3 Impact Mitigation PFS-1.15 Efficient Expansion

Table 15 (cont.): General Plan Policies Having Greenhouse Gas Emission Reductions

Sustainability and Greenhouse Gas Emissions	
ED-2.3 New Industries ED-2.8 Jobs/Housing Ratio ED-5.9 Bikeways ED-6.1 Revitalization of Community Centers ED-6.2 Comprehensive Redevelopment Plan ED-6.3 Entertainment Venues ED-6.4 Culturally Diverse Business ED-6.5 Intermodal Hubs for Community and Hamlet Core Areas ED-6.7 Existing Commercial Centers SL-3.1 Community Centers and Neighborhoods ERM-1.1 Protection of Rare and Endangered Species	PFS-2.1 Water Supply PFS-2.2 Adequate Systems PFS-3.3 New Development Requirements PFS-5.3 Solid Waste Reduction PFS-5.4 County Usage of Recycled Materials and Products PFS-5.5 Private Use of Recycled Products PFS-8.3 Location of School Sites PFS-8.5 Government Facilities and Services Part II, Chapter 1: Rural Valley Lands Plan WR-1.5 Expand Use of Reclaimed Wastewater WR-1.6 Expand Use of Reclaimed Water WR-3.5 Use of Native and Drought Tolerant Landscaping
Source: Tulare County General Plan 2030 Update.	

The complete policies listed in Table 15 have been organized into several sections that help to identify common themes: Land Use and Transportation Strategies; Building Energy Efficiency; Water Conservation Energy Savings; Solid Waste Reduction and Recycling; and, Agricultural Programs and Initiatives.

5.1.1 - Land Use and Transportation Strategies

The County's authority over land use provides its most important contribution to efforts to reduce greenhouse gas emissions related to new development. In addition, as new development is constructed consistent with the General Plan and the Blueprint, even existing development will see benefits from infill and better transportation options.

Compact Development Summary

- Higher development densities to shorten travel distances and increase the feasibility of frequent transit service
- Incremental development and infill that minimizes travel distances and allows for efficient expansion of pedestrian and bicycle infrastructure, transit services and road improvements
- Farmland and Open Space preservation to focus development in existing communities and hamlets that are more walkable and better served by transit

PF-1.1 Maintain Urban Edges. The County shall strive to maintain distinct urban edges for all unincorporated communities within the valley region, while creating a transition between urban uses and agriculture and open space.

PF-1.3 Land Uses in Urban Development Boundaries (UDBs)/Hamlet Development Boundaries (HDBs). The County shall encourage those types of urban land uses that benefit from urban services to develop within UDBs, urban area boundaries, and HDBs. Permanent uses which do not benefit from urban services shall be discouraged within these areas. This shall not apply to agricultural or agricultural support uses, provided that such accessory uses are time-limited through special use permit

AQ-3.2 Infill Near Employment. The County shall identify opportunities for infill development projects near employment areas within all unincorporated communities to reduce vehicle trips.

LU-1.4 Compact Development. The County shall actively support the development of compact mixed use projects that reduce travel distances.

LU-1.8 Encourage Infill Development. The County shall encourage and provide incentives for infill development to occur in communities, and hamlets within or adjacent to existing development in order to maximize the use of land within existing urban areas, minimize the conversion of existing agricultural land, and minimize environmental concerns associated with new development.

LU-3.2 Cluster Development. The County shall encourage proposed residential development to be clustered onto portions of the site that are more suitable to accommodating the development, and shall require access either directly onto a public road or via a privately maintained road designed to meet County road standards.

LU-3.3 High-Density Residential Locations. The County shall encourage high-density residential development (greater than 16.1 dwelling units per gross acre) to locate along collector roadways and transit routes, and near public facilities (e.g., schools, parks), shopping, recreation, and entertainment.

ERM-1.3 Encourage Cluster Development. When reviewing development proposals, the County shall encourage cluster development in areas with moderate to high potential for sensitive habitat.

PFS-1.15 Efficient Expansion The County shall provide incentives for infill projects where an efficient expansion of the infrastructure delivery system is fully funded.

LU-2.1 Agricultural Lands. The County shall maintain agriculturally designated areas for agriculture use and shall direct urban development away from valuable agricultural lands to cities, unincorporated communities, and hamlets where public facilities and infrastructure are available.

AG-1.8 Agriculture Within Urban Boundaries. The County shall not approve applications for preserves or regular Williamson Act contracts on lands located within a UDB unless it is demonstrated that the restriction of such land will not detrimentally affect the growth of the community involved for the succeeding 10 years, or that the property in question has special public values for open space, conservation, etc., or that the contract is consistent with the publicly desirable

future use and control of the land in question. If proposed within a UDB of an incorporated city, the County shall give written notice to the affected city pursuant Government Code §51233.

AG-1.11 Agricultural Buffers. The County shall examine the feasibility of employing agricultural buffers between agricultural and non-agricultural uses, and along the edges of UDBs, HDBs considering factors including the type of operation and chemicals used for spraying, building orientation, planting of trees for screening, location of existing and future rights-of-way (roads, railroads, canals, powerlines, etc.), and unique site conditions.

ERM-1.8 Open Space Buffers. The County shall require buffer areas between development projects and significant watercourses, riparian vegetation, wetlands, and other sensitive habitats and natural communities. These buffers should be sufficient to assure the continued existence of the waterways and riparian habitat in their natural state.

ERM-5.15 Open Space Preservation. The County shall preserve natural open space resources through the concentration of development in existing communities, use of cluster development techniques, maintaining large lot sizes in agricultural areas, avoiding conversion of lands currently used for agricultural production, limiting development in areas constrained by natural hazards, and encouraging agricultural and ranching interests to maintain natural habitat in open space areas where the terrain or soil is not conducive to agricultural production.

LU IM 3. During preparation of the Zoning Ordinance and Land Development Regulations, the County shall consider appropriate incentives to encourage smart growth implementation, including but not limited to such factors as infill, densification, transportation alternatives, provision of public amenities, and commercial standards.

LU IM 4. During the review of all discretionary permit applications, the County shall ensure that smart growth and other urban design principles set forth in this Land Use Element are incorporated as conditions of project approval, as appropriate.

LU IM 7. The County shall develop a set of criteria to determine whether proposed projects are infill developments and develop a set of incentive programs for infill projects located within UDBs.

LU IM 8. The County shall develop and maintain a Geographic Information System based database of infill sites and encourage new development to occur on the identified sites.

LU IM 9. The County shall create a program to consolidate infill sites when permits are sought for development and shall require access to public roads be present prior to development. [New Program]

LU IM 10. The County shall require identification of infill sites in all new community plan updates, hamlet plans and redevelopment project area plans as they are prepared over time.

LU IM 19. The County shall prepare a cluster development ordinance, defining the process, incentives and standards. The means of consultation and contents will be developed later, after further research.

LU IM 24. The County shall review LEED and LEED-ND certification requirements and develop an implementation program.

Transit and Pedestrian Oriented and Traditional Neighborhood Design Overview (AQ-3.1-PFS-8.3)

- Locate high-density development close to commercial and service destinations that are within walking distance
- Provide direct pedestrian connections between uses to minimize walking distances
- Locate transit stops and infrastructure near to high-density development to maximize the number of people within walking distance
- Provide transit infrastructure such as benches and shelters at locations that maximize accessibility
- Construct narrow streets to slow traffic and allow room for pedestrian infrastructure
- Traffic calming measures such as roundabouts, and pedestrian bulb outs to improve flow and enhance pedestrian safety
- Use a grid street system to provide direct routes to many destinations
- Require tree-lined streets with drought tolerant trees to shade pedestrian routes
- Storefronts near the street to create an interesting pedestrian orientation
- Provide parking lots in the back or in public lots to minimize separation of compatible uses
- Allow second story residential mixed use in downtown commercial areas and large mixed-use projects to create a more active pedestrian environment after normal business hours

AQ-3.1 Location of Support Services. The County shall encourage the location of ancillary employee services (including, but not limited to, child care, restaurants, banking facilities, convenience markets) near major employment centers for the purpose of reducing midday vehicle trips

AQ-3.2 Infill Near Employment. The County shall identify opportunities for infill development projects near employment areas within all unincorporated communities to reduce vehicle trips

AQ-3.3 Street Design. The County shall promote street design that provides an environment which encourages transit use, biking, and pedestrian movements.

AQ-3.6 Mixed Use Development. The County shall encourage the mixing of land uses that generate high trip volumes, especially when such uses can be mixed with support services and where they can be served by public transportation.

LU-1.1 Smart Growth and Healthy Communities. The County shall promote the principles of smartgrowth and healthy communities UDBs and HDBs, including:

- Creating walkable neighborhoods,
- Providing a mix of residential densities,
- Creating a strong sense of place
- Mixing land uses,
- Directing growth toward existing communities,
- Building compactly,
- Discouraging sprawl,
- Encouraging infill,
- Preserving open space,
- Creating a range of housing opportunities and choices,
- Utilizing planned community zoning to provide for the orderly pre-planning and long term development of large tracks of land which may contain a variety of land uses, but are under unified ownership or development control, and
- Encouraging connectivity between new and existing development

LU-1.2 Innovative Development. The County shall promote flexibility and innovation through the use of planned unit developments, development agreements, specific plans, mixed-use projects, and other innovative development and planning techniques.

LU-3.2 Cluster Development. The County shall encourage proposed residential development to be clustered onto portions of the site that are more suitable to accommodating the development, and shall require access either directly onto a public road or via a privately maintained road designed to meet County road standards.

LU-4.1 Neighborhood Commercial Uses. The County shall encourage the development of small neighborhood convenience and grocery facilities to meet the everyday shopping and personal needs of immediately surrounding residential land uses in communities and hamlets.

LU-7.1 Distinctive Neighborhoods. The County shall encourage development of diverse and distinctive neighborhoods that build on the patterns of the natural landscape and are responsive in their location and context and to the lifecycle needs of the residents.

LU-7.3 Friendly Streets. The County shall encourage new streets within UDBs to be designed and constructed to not only accommodate traffic, but also serve as comfortable pedestrian and cyclist environments. These should include, but not be limited to:

- Street tree planting adjacent to curbs and between the street and sidewalk to provide a buffer between pedestrians and automobiles, where appropriate,
- Minimize curb cuts along streets,
- Sidewalks on both sides of streets, where feasible,
- Bike lanes and walking paths, where feasible on collectors and arterials, and
- Traffic calming devices such as roundabouts, bulb-outs at intersections, traffic tables, etc.

ED-6.1 Revitalization of Community Centers. The County, through public and private collaboration, shall strive to strengthen the core areas of communities to serve as the center for public, financial, entertainment, and commercial activities.

ED-6.3 Entertainment Venues. The County shall encourage the establishment of community and regional entertainment venues within community core areas.

ED-6.5 Intermodal Hubs for Community and Hamlet Core Areas. The County shall work with communities and transit providers to develop intermodal hubs that focus on both local and regional bus service.

ED-6.7 Existing Commercial Centers. The County shall help protect the viability of community retail centers by promoting a business mix that responds to changing economic conditions and provides needed services to surrounding neighborhoods.

SL-3.1 Community Centers and Neighborhoods. The County shall support investments in unincorporated communities and hamlets to improve the image, quality of urban infrastructure, amenities, and visual character by:

- Encouraging restoration of existing historic buildings and developing new buildings that reflect the local culture and climate,
- Creating or enhancing overall community design frameworks with a hierarchy of connected block and street patterns, open spaces, town centers, neighborhoods, and civic facilities,
- Reducing the need for sound-walls and gated neighborhoods by having residential and nonresidential uses interface along streets and open spaces (not adjoining property lines) and locating residential uses on local-serving streets,
- Planning residential development as interconnected neighborhoods with definable social and physical centers that incorporate parks, schools and commercial services,
- Enhancing the comfort and scenic experience of transit riders, cyclists, and pedestrians, and

- Developing open spaces, streets and pedestrian facilities that include landscaping and streetscaping that improve the image of the community and make it a more comfortable pedestrian environment.

ERM-5.1 Parks as Community Focal Points. The County shall strengthen the role of County parks as community focal points by providing community center/recreation buildings to new and existing parks, where feasible.

TC-4.4 Nodal Land Use Patterns that Support Public Transit. The County shall encourage land uses that generate higher ridership including; high density residential, employment centers, schools, personal services, administrative and professional offices, and social/recreational centers, to be clustered within a convenient walking distance of one another.

PFS-8.3 Location of School Sites. The County shall work with school districts and land developers to locate school sites consistent with current and future land uses. The County shall also encourage siting new schools near the residential areas that they serve and with access to safe pedestrian paths to school.

Pedestrian and Bicycle Infrastructure Summary

- Provide sidewalks and pedestrian paths that connect uses that would attract walkers
- Provide safe, well-connected bicycle paths and lanes that encourage bicycle travel
- Secure bicycle parking for employment sites to increase convenience for cyclists
- Bike racks for commercial development to provide security for bikes during shopping trips.

ED-5.9 Bikeways. The County shall support the enhancement of the County's recreational bikeways and promote the bikeway network a component of the County's tourism program.

TC-5.1 Bicycle/Pedestrian Trail System. The County shall coordinate with TCAG and other agencies to develop a Countywide integrated multi-purpose trail system that provides a linked network with access to recreational, cultural, and employment facilities, as well as offering a recreational experience apart from that available at neighborhood and community parks.

TC-5.2 Consider Non-Motorized Modes in Planning and Development. The County shall consider incorporating facilities for non-motorized users, such as bike routes, sidewalks, and trails when constructing or improving transportation facilities and when reviewing new development proposals. For developments with 50 or more dwelling units or non-residential projects with an equivalent travel demand, the feasibility of such facilities shall be evaluated

TC-5.3 Provisions for Bicycle Use. The County shall work with TCAG to encourage local government agencies and businesses to consider including bicycle access and provide safe bicycle parking facilities at office buildings, schools, shopping centers, and parks.

TC-5.4 Design Standards for Bicycle Routes. The County shall utilize the design standards adopted by Caltrans and as required by the Streets and Highway Code for the development, maintenance, and improvement of bicycle routes

TC-5.5 Facilities. The County shall require the inclusion of bicycle support facilities, such as bike racks, for new major commercial or employment locations.

TC-5.6 Regional Bicycle Plan. The County shall identify Countywide recreational and commuter bicycle routes and update the Tulare County Regional Bicycle Plan as appropriate.

TC-5.7 Designated Bike Paths. The County shall support the creation and development of designated bike paths adjacent to or separate from commute corridors.

TC-5.8 Multi-Use Trails. The County shall encourage the development of multi-use corridors (such as hiking, equestrian, and mountain biking) in open space areas, along power line transmission corridors, utility easements, rivers, creeks, abandoned railways, and irrigation canals

TC-5.9 Existing Facilities. The County shall support the maintenance of existing bicycle and pedestrian facilities.

Transit Infrastructure and Support Policies and Measures Summary

- Provide a wide variety public transportation options that reduce vehicle trips and miles traveled such as transit and rail service
- Coordinate transit service provided by various transit agencies in the County to make service as convenient as possible for potential riders
- Provide quality transit and rail facilities and equipment that will provide system users with reasonable travel times and comfort
- Support a variety of rail options including existing Amtrak services and potential high speed rail that will provide competitive travel times and costs compared to flying and driving
- Preserve rail corridors for future use as light rail or trail corridors

TC-4.1 Transportation Programs. The County shall support the continued coordination of transportation programs provided by social service agencies, particularly those serving elderly and/or handicapped

TC-4.2 Determine Transit Needs. The County will continue to work with TCAG, cities, and communities in the County to evaluate and respond to public transportation needs.

TC-4.3 Support Tulare County Area Transit. The County shall request the support of TCAG for development of transit services outlined in the County's Transit Development Plan. Efforts to expand Tulare County Area Transit should be directed toward:

- Encouraging new and improving existing transportation services for the elderly and disabled,
- Providing intercommunity services between unincorporated communities and cities.

TC 4.5 Transit Coordination. The County shall encourage regional coordination to facilitate improved connectivity between County and city operated transit systems and other transportation modes.

TC-2.1 Rail Service. The County shall support improvements to freight and expanding passenger rail service throughout the County.

TC 2.2 Rail Improvements. The County shall work with cities to support improvement, development, and expansion of passenger rail service in Tulare County.

TC-2.3 Amtrak Service. The County shall encourage Amtrak to add passenger service to the Union Pacific corridor in the County.

TC-2.4 High Speed Rail. The County shall coordinate with TCAG and the California High Speed Rail Authority in efforts to locate the HSR corridor with a passenger stop and maintenance facility in Tulare County.

TC-2.5 Railroad Corridor Preservation. The County shall work with other agencies to plan railroad corridors to facilitate the preservation of important railroad rights-of-way for future rail expansion or other appropriate transportation facilities.

TC-2.6 Rail Abandonment. The County shall coordinate with the Public Utilities Commission and TCAG to evaluate possible impacts of rail line abandonment proposals and consider alternatives uses for abandoned facilities, such as light rail, bike trails, utility corridors, or transit facilities.

AQ-2.3 Transportation and Air Quality. When developing the regional transportation system, the County shall work with TCAG to comprehensively study methods of transportation, which may contribute to a reduction in air pollution in Tulare County. Some possible alternatives that should be studied are:

- Commuter trains (Light Rail, Amtrak, or High Speed Rail) connecting with Sacramento, Los Angeles, and San Francisco, with attractive services scheduled up and down the Valley,
- Public transportation such as buses and light rail, to serve between communities of the Valley, publicly subsidized if feasible,
- Intermodal public transit such as buses provided with bicycle racks, bicycle parking at bus stations, bus service to train stations and airports, and park and ride facilities, and

- Community transportation systems supportive of alternative transportation modes, such as cycling or walking trails, with particular attention to high-density areas.

ED IM 3. The County shall commit staff resources to engage in regional transportation initiatives, such as the Regional Blueprint and San Joaquin Partnership that encourage regional planning and economic development.

Transportation Management Programs Summary

- Transportation Demand Management programs encourage employees to use alternative modes of transportation for commute trips through incentives and information exchange regarding available options
- Transportation Management Associations provide transportation services and expertise to multiple employers that may be too small individually to provide effective services.
- Ridesharing and matching programs help increase carpool participation by identifying and coordinating potential participants

AQ-2.1 Transportation Demand Management Programs. The County shall coordinate and provide support for County Transportation Demand Management programs with other public and private agencies, including programs developed by the TCAG and the SJVAPCD [New Policy].

AQ-2.4 Transportation Management Associations. The County shall encourage commercial, retail, and residential developments to participate in or create Transportation Management Associations that can assist in the reduction of pollutants through provisions to support carpooling, alternative transportation, etc.

AQ-2.5 Ridesharing. The County shall continue to encourage ridesharing programs such as employer-based rideshare programs.

5.1.2 - Building Energy Efficiency

Energy consumption from buildings through electricity and natural gas usage is one of the largest sources of greenhouse gases. Policies that encourage the installation of the most energy efficient technologies can substantially reduce energy use and related emissions.

Building Energy Efficiency Measures Summary

- New buildings to provide energy conserving features such as increased insulation in walls and roofs, cool light colored roofs, high efficiency window
- Use high efficiency heating, ventilation, and cooling equipment in buildings
- Use passive solar designs and day-lighting to reduce heating and lighting demands
- Landscaping the shades buildings or parking lots to reduce ambient temperatures around buildings
- Provide solar ready roofs that provide adequate area to install photovoltaic panels and avoid shading of panels with roof structures and landscaping
- Install solar water heating systems
- Promote retrofits of older less efficient buildings with energy conserving devices

AQ-3.5 Alternative Energy Design. The County shall encourage all new development, including rehabilitation, renovation, and redevelopment, to incorporate energy conservation and green building practices to maximum extent feasible. Such practices include, but are not limited to: building orientation and shading, landscaping, and the use of active and passive solar heating and water systems.

LU-7.15 Energy Conservation. The County shall encourage the use of solar power and energy conservation building techniques in all new development.

ERM-4.1 Energy Conservation and Efficiency Measures. The County shall encourage the use of solar energy, solar hot water panels, and other energy conservation and efficiency features in new construction and renovation of existing structures in accordance with State law.

ERM-4.2 Streetscape and Parking Area Improvements for Energy Conservation. The County shall promote the planting and maintenance of shade trees along streets and within parking areas of new urban development to reduce radiation heating.

ERM-4.3 Local and State Programs. The County shall participate, to the extent feasible, in local and State programs that strive to reduce the consumption of natural or man-made energy sources.

ERM-4.4 Promote Energy Conservation Awareness. The County should coordinate with local utility providers to provide public education on energy conservation programs.

HS-1.4 Building and Codes. Except as otherwise allowed by State law, the County shall ensure that all new buildings intended for human habitation are designed in compliance with the latest edition of

the California Building Code, California Fire Code, and other adopted standards based on risk (e.g., seismic hazards, flooding), type of occupancy, and location (e.g., floodplain, fault).

ERM-4.6 Renewable Energy. The County shall support efforts, when appropriately sited, for the development and use of alternative energy resources, including renewable energy such as wind and solar, biofuels and co-generation.

ERM-4.7 Reduce Energy Use in County Facilities. Continue to integrate energy efficiency and conservation into all County functions.

ERM-4.8 Energy Efficiency Standards. The County shall encourage renovations and new development to incorporate energy efficiency and conservation measures that exceed State Title 24 standards. When feasible, the County shall offer incentives for use of energy reduction measures such as expedited permit processing, reduced fees, and technical assistance

5.1.3 - Water Conservation Energy Savings

Water conservation saves energy required to pump and treat water for use and reduces energy required for wastewater treatment. Specific measures to conserve water include:

Water Conservation Measures Summary

- Expand groundwater recharge to capture runoff and water available during wet years.
- Use reclaimed water from tertiary plants for irrigation in appropriate locations.
- Use native and drought tolerant landscaping.
- Require the installation of low-flow fixtures.
- Smart irrigation technologies that apply water based on plant requirements and that direct water flow only where needed.

WR-1.5 Expand Use of Reclaimed Wastewater. To augment groundwater supplies and to conserve potable water for domestic purposes, the County shall seek opportunities to expand groundwater recharge efforts.

WR-1.6 Expand Use of Reclaimed Water. The County shall encourage the use of tertiary treated wastewater and household gray water for irrigation of agricultural lands, recreation and open space areas, and large landscaped areas as a means of reducing demand for groundwater resources.

WR-3.5 Use of Native and Drought Tolerant Landscaping. The County shall encourage the use of low water consuming, drought-tolerant and native landscaping and emphasize the importance of utilizing water conserving techniques, such as night watering, mulching, and drip irrigation.

ERM-1.7 Planting of Native Vegetation. The County shall encourage the planting of native trees, shrubs, and grasslands in order to preserve the visual integrity of the landscape, provide habitat

conditions suitable for native vegetation and wildlife, and ensure that a maximum number and variety of well-adapted plants are maintained.

5.1.4 - Solid Waste Reduction and Recycling

Recycled materials typically require a fraction of the energy to produce compared to those using virgin materials. Programs to avoid use of excessive packaging reduce energy used in production and eliminates the transfer of material to a landfill. Landfills produce methane gas from the decomposition of the organic matter in the waste stream. Programs to encourage composting and use of the biomass for energy production provide renewable energy and reduce greenhouse gas emissions.

Solid Waste Reduction and Recycling Measures Summary

- Encourage the use of recycled materials in its own operations and purchases.
- Provide sites and publicity for recycling events.
- Work with recycling contractors on innovative programs to encourage residents and businesses to take advantage of recycling services.

PFS-5.3 Solid Waste Reduction. The County shall provide notification to proposed development within one-mile of a solid waste facility of the existence of the solid waste facility and any proposed changes to the facility.

PFS-5.4 County Usage of Recycled Materials and Products. The County shall encourage all industries and government agencies in the County to use recycled materials and products where economically feasible.

PFS-5.5 Private Use of Recycled Products. The County shall work with recycling contractors to encourage businesses to use recycled products and encourage consumers to purchase recycled products.

5.1.5 - Agricultural Programs and Initiatives

Agriculture offers opportunities for projects that generate greenhouse gas credits related to biofuels and other alternative energy sources and that may provide additional income to farming operations.

Agricultural Measures Summary

- Encourage energy production and alternative energy projects with assistance in identifying appropriate sites and with the permit process.
- Build on its advanced agricultural technology base to provide conditions supportive for developing a strong biotech and biofuels industry.

AG-2.11 Energy Production. The County shall encourage and support the development of new agricultural related industries featuring alternative energy (e.g., ethanol), utilization of agricultural waste, and solar or wind farms.

AG-2.6 Biotechnology and Biofuels. The County shall encourage the location of industrial and research oriented businesses specializing in biotechnologies and biofuels that can enhance agricultural productivity, enhance food processing activities in the County, provide for new agriculturally related products and markets, or otherwise enhance the agricultural sector in the County.

AQ-1.10 Support Agriculture Initiatives to Improve Air Quality and Reduce Greenhouse Gas Emissions. Actively work with and support agricultural organizations to develop, implement and find funding sources for programs and initiatives that improve air quality, reduce greenhouse gases and particulate matter.

SECTION 6: OTHER VOLUNTARY PROGRAMS

The following voluntary programs help to achieve the CAP targets through knowledge sharing of practices that save energy and reduce greenhouse gases and with financial assistance and services that are available to assist in implementing energy saving measures.

6.1 - Agriculture

Agriculture is Tulare County's number one industry and plays an important role in improving our air quality. Farming competes in a global marketplace and must constantly improve efficiency and reduce costs in order to remain competitive. Fortunately, measures that improve efficiency also often have air quality benefits through reduced fuel use, power consumption, and dust generation. Protecting farmland provides air quality benefits by focusing development in cities and rural communities where transportation options such as walking, bicycling, and transit are more feasible and travel distances are less. Farmland can be protected from premature development by focusing development in the existing urban areas at higher densities than were constructed in the past, and as identified in the TCAG Blueprint Preferred Growth Scenario. Improved efficiency and farmland conservation go hand in hand to keep farmland in production and economically viable.

The agricultural industry, in cooperation with government agencies and universities, is producing many advances in agricultural practices that provide energy and air quality benefits. Example projects and initiatives include:

- Water well efficiency upgrades.
- Conversion from diesel engines to electric motors for water pumping.
- Precision irrigation.
- Drip and micro sprinkler systems.
- Precision pesticide and fertilizer application.
- Chemigation (application of fertilizers and pesticides with irrigation water).
- Conservation tillage—low till and no till.
- Reduce passes by using larger equipment.
- Install dairy digesters to produce biogas.
- Cogeneration projects at food processing plants.
- Reduced agricultural burning through cogeneration and composting.

6.2 - Water Conservation

Tulare County Redevelopment Agency Water Conservation Program. The Redevelopment Agency proposes to implement a Water Conservation Program for the Community of Traver as part of a wastewater treatment facility upgrade that will reduce water consumption with the benefit of reduction of influent to the wastewater facility by allowing the income-qualified residents to replace

inefficient water devices with new low flow or low consumption water conserving devices. This can provide a model for other Tulare County communities to follow.

6.3 - Energy Conservation

6.3.1 - Southern California Edison Programs

Southern California Edison offers programs and rebates similar to those of PG&E. The following describes Southern California Edison's self-generation program.

Southern California Edison customers can generate their own power to supplement the electricity purchased from Southern California Edison. "Self-generation," also called "distributed generation," can serve various purposes that include:

- "Back-up" or emergency generation designed to be used during utility power outages.
- "Cogeneration," or combined heat and power applications, used by customers that have consistently high need for steam or another form of thermal energy.
- Generation to be used during "peak demand," when it may be less costly to operate a generator than to buy power from Southern California Edison "Environmentally friendly" generation used by customers who want to reduce pollution.
- Generation to be used to improve reliability or power quality when operational needs exceed the level of service that Southern California Edison can provide. Note: Self-generation does not include "merchant generation" intended for sale in California's wholesale electricity market.

6.3.2 - PG&E Rebate Programs

- A cool roof reflects and emits the sun's heat back to the sky instead of transferring it to the building below. This helps keep roofs cooler and reduces the cooling load and air conditioning needs. PG&E is offering a rebate of up to $0.20 per square foot, so on a 1,000-square-foot roof, PG&E will pay residential customers up to $200.
- Energy losses through ceiling and walls of homes are a major expense. Insulating attics and walls makes homes more comfortable and reduces energy bills. PG&E pays up to $150 per 1,000 square feet for home insulation projects.
- PG&E provides cash rebates and incentives for replacing existing equipment with new energy-efficient technologies or purchasing new equipment. In addition to cash incentives, PG&E provides design assistance for a new facility and system processes.

PG&E account representatives can conduct an onsite energy audit to help business customers identify potential steps they can take to save energy and money. PG&E provides a customized report tailored to each business that describes energy-saving tips and identifies rebates and incentives from PG&E.

PG&E can identify specific strategies and technologies that can deliver immediate energy savings for a facility. During these targeted energy audits, a PG&E technical consultant works with the business customers to identify projects that have the potential to save the most energy. The consultant also makes recommendations on investments in energy-efficient equipment and provides information on rebate and incentive programs to help offset the initial costs. Targeted energy audits focus on specific end uses of energy, such as the facility's heating and cooling system, and industrial process improvements.

PG&E's Self Generation Incentive Program provides financial incentives for the installation of new, qualifying wind or fuel cell self-generation equipment. Solar rebates are currently administered under PG&E's California Solar Initiative. While residential customers are not excluded from the program, the minimum 30-kilowatt system size for renewable technologies generally limits most applications to non-residential energy consumers (PG&E 2009).

PG&E's Schedule NEM—Net Energy Metering Service provides solar customers with the option to offset the cost of their electricity usage with energy that their solar generating system exports to the grid. A "net meter" is installed to measure the difference between electricity supplied to the customer by PG&E and electricity the customer exports to the grid, over a billing month. The corresponding charges and credits are reconciled after 12-monthly billing periods of the system's interconnection. Typically, solar systems export more energy during the summer months, generating credits for customers to use during the winter months when the system does not meet their energy needs.

SECTION 7: MONITORING PROGRAM AND IMPLEMENTATION PLAN

7.1 - Monitoring Program

As part of the annual report to the Board of Supervisors 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 County 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. Appropriate benchmarks and the means to track them will be developed within 12 months of adoption of the CAP and will be adjusted over time to respond to changing conditions and lessons learned. The following benchmarks are proposed:

Land Use Benchmarks

- Summary of building permits for new construction issued during the previous year.
- The amount of residential development approved in new subdivisions and parcel maps in Rural Interface areas and Rural Communities.
- The average density of new development approved during the previous year.
- Progress in improving the jobs/housing balance in Rural Communities and Cities within Tulare County, and neighboring counties.
- Acres of farmland classified as prime, or of Statewide importance, approved for development in Tulare County.
- Inventory of vacant land in Tulare County cities, Rural Communities, and Hamlets by designation including change from previous year.

Conservation Benchmarks

- Compile results of Title 24 Compliance Reports to show amount achieved over standards.
- Status report on achieving landfill recycling and diversion targets.
- Progress achieved on landfill methane capture projects.
- Progress achieved on water conservation programs and projects.
- Progress achieved on water reuse projects.
- Progress achieved on wastewater treatment plant methane capture projects.
- Progress achieved on dairy digester methane projects.

Transportation and Circulation Benchmarks

- TCAG Tulare County Regional Blueprint implementation status report.
- Transit ridership statistics.
- Transit route expansions and changes to service frequency.
- New lane miles of roads built by functional classification.
- Progress in implementing congestion relief projects.

- Updates in vehicle miles traveled used by TCAG in making Transportation Conformity findings for transportation plans.

7.2 - Climate Action Plan Implementation

The CAP will require County staff to take a series of actions to ensure that the policies and implementation measures are accomplished in a timely manner. The following actions should be initiated within the first year after adoption of the CAP:

First Year Actions:

- Assign a CAP Coordinator.
- Set up a CAP Implementation Committee to assign Department responsibilities for providing specific information under their purview:
  - Building Department - building statistics, energy reports.
  - Planning Department - subdivision data.
  - Fleet Manager - low emission vehicle purchases.
  - Administration - capital improvements/energy retrofits/budget.
  - Geographic Information Systems - tracking and mapping land use changes/prepare new reports as needed.
  - Solid Waste - recycling and waste diversion statistics.
  - Redevelopment Agency - Low-income energy conservation program.
  - Other - to be determined.
- Participate in SB 375 Regional Targets process with TCAG.
- Develop a LEED/LEED ND Implementation Program.
- Coordinate with transit agencies on transit issues.
- Compile first progress report as a section/chapter of the Annual General Plan Implementation Report.
- Identify program improvements and new programs that the County can pursue.
- Obtain technical assistance from the Air District to assist Tulare County in developing uniform monitoring and reporting procedures.
- Development of a fee/cost recovery program to implement the monitoring and reporting.

Long-Term Actions:

Long-term milestones (approximately every 5 years) include the following actions:

- Review land use and transportation data collected from the previous 5 years for comparison to goals for TCAG Blueprint (multiple years of data is needed to account for market fluctuations).

- Analyze completed projects to determine if the CAP targets are being achieved and propose revisions or additional programs if needed.
- Update the CAP to reflect changes in State regulations and CAP programs.

SECTION 8: REFERENCES

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Appendix A:
Detailed Emission Inventory

APPENDIX E
Greenhouse Gas Inventory

Summary of Findings

Introduction

This assessment presents the estimated greenhouse gas (GHG) emissions generated in the unincorporated areas of Tulare County (Tulare County) for calendar year 2007, as well as the projected emissions for calendar year 2030 that would be generated in Tulare County assuming adoption of the Tulare County General Plan 2030 Update.

Summary of Emissions

GHG emissions produced within Tulare County in 2007 were estimated to be 5.2 million metric tons of CO_2 equivalent (tonnes of CO_2e).[1] Projected emissions for 2030 are 6.1 million tonnes of CO_2e. In both 2007 and 2030, dairies/feedlots accounted for the largest portion of total emissions, making up 63 percent and 59 percent of total emissions, respectively. Mobile sources (on and off-road) accounted for the second largest portion of emissions, contributing 16 percent in 2007 and 20 percent in 2030. When normalized by population, total annual emissions equate to 36 tonnes of CO_2e per resident in 2007, and 27 tonnes of CO_2e per resident in 2030.

Methods

This assessment includes emissions attributable to all unincorporated land within Tulare County. It does not include emissions associated with incorporated cities within Tulare County. Therefore, unincorporated Tulare County is considered to be the organizational boundary for the assessment. The assessment includes emission inventories for five main sectors of emission sources, including: electricity; natural gas; solid waste; mobile sources; and dairy/feedlot. Therefore, these sectors are considered to be the operational boundary for the assessment.

2007 emissions were calculated using data from calendar year 2007, when available. When data from 2007 was unavailable, data from 2006 were used as a proxy. 2030 projections assume that overall build-out outlined in the Tulare County General Plan 2030 Update would occur. 2030 projections also assume a 'business-as-usual' trajectory for generation and emission of greenhouse gases in the County.

[1] For the purposes of this assessment, carbon dioxide equivalent (CO2e) includes emissions of carbon dioxide, methane and nitrous oxide.

Setting

Climate Change

The scientific community has reached a consensus that climate change is occurring. According to the International Panel on Climate Change (IPCC), "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" (IPCC, 2007a). Regional climate changes, particularly temperature increases and changing precipitation patterns, will affect natural systems world wide, with impacts on food production, ecosystem biodiversity, and human health.

According to the IPCC, it is very likely that human-generated greenhouse gas (GHG) emissions, which have increased considerably since the mid-20th century, are a primary cause of climate change. Human activities have created marked increases in atmospheric concentrations of CO_2, methane, and nitrous oxide since 1750, levels of which now far exceed atmospheric concentrations from the past several thousand years. Land use changes, burning of fossil fuels, and agricultural practices all contribute to these increasing concentrations.

Public Policy

Policies to address climate change have been implemented at global and local levels. On December 11, 1997, the Kyoto Protocol was adopted at the third Conference of the Parties to the United Nations Framework Convention on Climate Change. In recognition of the looming dangers of climate change, the protocol represents a binding commitment by signatory countries to reduce their GHG emissions below specified levels between 2008 and 2012 (UNFCCC, 2008a). To accomplish such targets, countries would need to spur businesses, communities, and individuals to action. As of October 23, 2007, 181 countries have ratified, approved, accepted, or accessed the protocol, representing 63.7 percent of global GHG emitters (UNFCCC, 2008b).

In California, Governor Schwarzenegger signed Executive Order S-3005 in 2005, establishing the following timeline for GHG emissions reductions:

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

To support the proposed GHG reductions timeline, the California State Legislature passed AB 32, the California Global Warming Solutions Act, in 2006. This Act requires the California Air Resources Board (CARB) to design and implement GHG emission limits, regulations, and other measures to achieve a statewide goal of reducing emissions to 1990 levels by 2020 (a 25 percent reduction of emissions). Consequently, in anticipation of regulations, local governments across the State have begun taking steps to determine their own GHG emissions and develop strategies to reduce them.

The inclusion of a GHG inventory as part of a general plan update has been a recent issue with the California Attorney General's office. In 2007, Attorney General Brown sued San Bernardino County for failing to consider the impact of GHG emissions in its general plan update. A settlement was reached in August of 2007 by the Superior Court of the State of California for the County of San Bernardino, in which San Bernardino County agreed to add a policy to its general plan "that describes the County's goal of reducing those greenhouse gas emissions reasonably attributable to the County's discretionary land use decisions and the County's internal government operations, and calls for adoption of a Greenhouse Gas Reduction Plan" (State of California, 2007). According to the settlement, the GHG Emission Reduction Plan must include an inventory of all known, or reasonably discoverable, sources of GHGs that currently exist in the County. The settlement also requires that GHG estimates be supported by substantial evidence (State of California, 2007).

More recently, Senate Bill 375 was signed by Governor Schwarzenegger in September of 2008. The bill attempts to reduce GHG emissions by preventing urban sprawl. It provides emissions-reducing goals so that regions can integrate disjointed planning activities, and it provides incentives for local governments and developers to follow new conscientiously-planned growth patterns. SB 375 also enhances CARB's ability to reach AB 32 goals (State of California, 2008).

Tulare County

Tulare County contains more than 4,840 square miles (3,097,600 acres) and can be divided into the following three general topographical zones: a valley region; a foothill region east of the valley area; and a mountain region just east of the foothills. Geographically, nearly 4,790 square miles of this area is unincorporated (97 percent) (TCAG, 2007b).

In 2007, the population in unincorporated areas of Tulare County was estimated to be 144,090 (TCAG, 2008a). This represents 34 percent of the total population within Tulare County. The General Plan Update assumes that a majority of the future population growth in the County will occur within the incorporated cities (established Urban Development Boundaries). To a lesser degree, there will also be projected population growth in the unincorporated communities and hamlets. Using population projections provided by the Tulare County Association of Governments (TCAG) and the State Department of Finance, the County estimates that by 2030, the population in unincorporated areas of Tulare County is expected to reach 222,580 (30 percent of the total county population). The proposed 2030 population split is based on demographic research conducted as part of the alternatives phase of the proposed project and direction provided by the Tulare County Board of Supervisors. Table 1 outlines the expected population growth in Tulare County and the percentages of population growth expected to occur between the incorporated and unincorporated areas of the county.

TABLE 1
POPULATION IN TULARE COUNTY, 2007 AND 2030

Tulare County	2007	% of total--2007	2030	% of total--2030
Unincorporated	144,090	34%	222,580	30%
Incorporated	284,910	66%	520,390	70%
County Total	429,000	100%	742,970	100%

Source: TCAG, 2008a and County of Tulare

TCAG also predicts that jobs in unincorporated Tulare County will grow from 48,807 in 2005, to 49,529 in 2010, and to 54,351 in 2030 (TCAG, 2008b).

Methods

General Procedure

This GHG inventory has been performed using protocols established by the California Climate Action Registry (CCAR, 2008), and by the GHG Protocol Initiative (GHG Protocol, 2008). In keeping with protocol guidelines, the process used to perform this GHG inventory is as follows:

1. Set organizational boundaries.
2. Set operational boundaries.
3. Identify sources of emissions.
4. Collect data on emissions for a representative period of time.
5. Calculate GHG emissions from data using data-specific emission factors.
6. Create an inventory of CO_2e emissions that is complete and transparent.

Greenhouse Gases

The Kyoto Protocol covers six GHGs, including: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Table 2 shows the Kyoto GHGs, their chemical formulas, the lifetime of the compounds, and their global warming potential (GWP). GWP is a measure of a GHG's capacity to trap heat in the atmosphere, relative to CO_2; consequently, gases with a high GWP can have a very large impact, even when only a small amount is generated.

TABLE 2
GREENHOUSE GASES COVERED BY THE KYOTO PROTOCOL

GHG	Chemical Formula	Lifetime (years)	Global Warming Potential for 100-year horizon
Carbon Dioxide	CO_2		1
Methane	CH_4	12	25
Nitrous Oxide	N_20	114	298
Sulfur Hexafluoride	SF_6	3,200	22,800
Hydrofluorocarbons	HFCs	1.4–270	77–14,400
Perfluorocarbons	PFCs	1,000 - 50,000	7,390-22,800

Source: IPCC, 2007b

Typical sources of the six GHGs listed above include (CCAR, 2008):

- CO_2: fossil fuel combustion, including that associated with energy production, use of natural gas, and fuel for vehicles;
- CH_4: anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production, distribution, and use of natural gas and petroleum, coal production and use, and incomplete fossil fuel combustion;

- N_20: soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning;
- SF_6: leaks from electrical transmission and distribution systems;
- HFCs: refrigerant leaks; and
- PFCs: by-products of industrial and manufacturing processes.

This assessment includes: CO_2 from production of electricity, use of natural gas, and operation of mobile sources; CH_4 from production of electricity, use of natural gas, decomposition of solid waste, operation of mobile sources, and operation of dairy/feedlots; and N_20 from production of electricity, use of natural gas, and operation of mobile sources. This assessment does not include emissions of SF_6, HFCs, or PFCs, which were not expected to be significant contributors to the total GHG inventory in Tulare County.[2]

Organizational Boundaries

The organizational boundary for this assessment was established using the GHG Protocol's *control approach*. Under this approach, an entity (in this case, Tulare County) accounts for all of the GHG emissions generated by operations over which it has control. For Tulare County, this includes the emissions generated from activities occurring in unincorporated county land. Incorporated cities that are not a part of this inventory include: Dinuba; Exeter; Farmersville; Lindsay; Porterville; Tulare; Visalia and Woodlake.

This approach is consistent with the ruling in *The People of the State of California, ex rel. Attorney General Edmund G. Brown Jr. v. County of San Bernardino, San Bernardino County Board of Supervisors*, filed August 28, 2007. As described above, that settlement agreement set a precedent requiring that county general plan GHG inventories must include "greenhouse gas emissions reasonably attributable to the County's discretionary land use decisions and the County's internal government operations." Because Tulare County has the authority to make discretionary land use decisions in unincorporated areas, this inventory includes all reasonably discoverable emissions generated within that geographic boundary, generated by both public and private sources.

Operational Boundaries

Operational boundaries are defined as "[t]he boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company. This assessment allows a company to establish which operations and sources cause direct and indirect emissions, and to decide which indirect emissions to include that are a consequence of its operations" (GHG Protocol, 2008).

This inventory includes direct and indirect emissions resulting from the energy (electricity and natural gas), mobile source (on- and off-road), agriculture (dairy/feedlots), and solid waste (landfills) sectors in Tulare County. Table 3 identifies all sources of emissions included in the inventory, as well as information on where data for each source were obtained.

[2] The 1990 GHG Inventory for the State of California found that less than 2 percent of gross CO_2e emissions were in the form of SF_6 and halogenated gas.

TABLE 3
OPERATIONAL BOUNDARIES OF GREENHOUSE GAS INVENTORY

Sector	Source of Emissions	Data Source
Mobile Sources	On-Road	Tulare County Association of Governments (TCAG), EMFAC Model
	Off-Road	OFFROAD2007 Model, CARB
Solid Waste	Trash	LandGEM Model, Tulare County Resource Management Agency
Natural Gas	Residential	The Gas Company
	Commercial	The Gas Company
	Industrial	The Gas Company
Dairy/Feedlot	Dairy/Feedlot	Jones and Stokes, 2006; EPA
Electricity	Residential	PG&E, Southern California Edison (SCE)
	Commercial	PG&E, SCE
	Industrial	PG&E, SCE

Data

Data Sources and Quality

Data collection for the electricity and natural gas inventory was conducted by Tulare County staff and ESA analysts. Data collection for solid waste, mobile sources, and dairy/feedlot was conducted by ESA analysts. Appendix A (of this report) contains the data, sources of information, calculations, and assumptions used to estimate the GHG emissions for all sectors. Underlying all calculations is the basic assumption that the data provided by utility service providers, TCAG, and Jones and Stokes are accurate and complete. Specific assumptions for each source are located in Appendix A (of this report).

Electricity

2007 Emissions

PG&E provided data for 2007 electricity consumption in unincorporated Tulare County in kilowatt-hours (kWh), separated by residential, commercial, and industrial usage. PG&E also provided PG&E-specific CO_2 emission rates (emission factors) for electricity for 2007. (See Appendix A for a list of emission factors used). Of note, PG&E provided its ClimateSmart[3] emission rate, which is a multi-year average, as a proxy for its 2007 emission rate. The actual 2007 emission rate has not yet been verified at the time that this report was prepared.

SCE provided data for electricity consumption in unincorporated Tulare County in kWh, separated by residential, commercial/industrial, agricultural, and street lighting usage. Data was provided for December 1, 2005 to November 30, 2006. This analysis assumes that electricity use during this period is similar to electricity use in 2007. SCE did not provide an SCE-specific emission

[3] PG&E's ClimateSmart™ program provides a voluntary option for PG&E customers to calculate their monthly GHG emissions from electricity use, and to offset those emissions by funding GHG emissions reduction projects.

factor; therefore, this analysis uses a regional emission factor from the California Climate Action Registry (CCAR).

Neither utility provide utility-specific emission factors for N_20 or CH_4. Therefore, this analysis uses a regional emission factor from CCAR for N_20 and CH_4 estimates.

2030 Emissions

Residential and street light electricity consumption in 2030 was estimated using the predicted population growth rate. This analysis assumes that, under a business-as-usual trajectory, residential electricity consumption will grow at the same rate as the population—approximately 54 percent from 2007 to 2030.

Commercial, industrial, and agricultural electricity consumption was assumed to increase commensurate with job growth. The Tulare County Association of Governments predicts that the number of jobs in unincorporated Tulare County will increase by approximately 11 percent between 2007 and 2030.

Natural Gas

2007 Emissions

The Gas Company (formerly Southern California Gas) provided data for calendar year 2007 in million cubic feet (Mcf), for residential, commercial, and industrial usage. The Gas Company also provided a company-specific emission factor for CO_2, but not for N_20 or CH_4. Therefore, this analysis uses a U.S. average emission factor from CCAR for N_20 and CH_4 estimates.

2030 Emissions

Residential natural gas consumption in 2030 was estimated using the predicted population growth rate. Commercial and industrial consumption were assumed to increase commensurate with job growth. See Appendix A (of this report) for all calculations.

Solid Waste

2007 Emissions

Annual generation of methane emissions were calculated using the USEPA's LandGEM model (USEPA, 2008). The model uses as inputs the amount of waste placed in the landfill annually; a factor (Lo) for the *potential methane generation capacity*, which depends on the type and composition of waste placed in the landfill; and a factor (k) for the *methane generation rate*, which determines the rate of methane generation for the mass of waste in the landfill, and which is related to environmental conditions within the landfill – primarily the amount of moisture.

Tulare County Resource Management Agency (RMA) provided data for the three active landfills in Tulare County: Visalia Disposal Site, Woodville Disposal Site and Teapot Dome Disposal Site. Because the landfills are owned, operated and managed by the County, landfill emissions are included as direct emissions by the County. RMA provided data for total tonnage of the waste in place as of 2007 and the annual tonnage reports for 1996-2007, as well as information about which landfills

flare methane emissions and which use generators. ESA ran the LandGem model using the default values for the potential methane generation capacity (Lo) and methane generation rate (k). See Appendix A (of this report) for calculations, additional assumptions and emission factors.

2030 Emissions

Total production of solid waste in 2030 was projected using the predicted population growth rate. Also, according to RMA, Teapot Dome Disposal Site will reach its permitted capacity within the next calendar year if the current disposal rate continues. Consequently, emission calculations assume that future waste generation for Teapot Dome Disposal Site will be redirected to Woodville Disposal Site.

Mobile Sources

2007 Emissions

Off-road emissions were calculated using CARB's OFFROAD2007 Model (CARB, 2008a), and represent 2007 emissions. The off-road model captures emissions from various types of off-road equipment, including agricultural, construction, lawn and garden and off-road recreation, which includes equipment from hedge trimmers to cranes. Using the off-road model, ESA analysts generated a tons-per-day average for all off-road equipment, using a "Monday-Sunday" averaging period and "Annual" as the month or season. To obtain an annual estimate for 2007, this number was multiplied by 365. The model estimates emissions for all off-road mobile sources in Tulare County, including unincorporated and incorporated areas. Because the scope of this analysis includes unincorporated areas only, total county emissions were allocated to unincorporated Tulare County based on the percent of the population that lived in unincorporated Tulare County in 2007 (34 percent).

On-road emissions were derived using vehicle miles traveled (VMT) data from the Tulare County Association of Governments (TCAG, 2007), and emission factors from CARB's EMFAC2007 model. This model is used to calculate emission rates from all motor vehicle classifications, from passenger cars to heavy-duty trucks, operating on highways, freeways, and local roads in California (CARB, 2008b). Because VMT data was for all of Tulare County, including incorporated cities, total County emissions were allocated to unincorporated Tulare County based on the percent of the population that lived in unincorporated Tulare County in 2007 (i.e., 34 percent) and 2030 (i.e., 30 percent).

2030 Emissions

Year 2030 off-road emissions were calculated using TCAG's predicted job growth rate. This analysis assumes that, under a business-as-usual trajectory, off-road equipment usage will grow at the same rate as employment, approximately 11 percent from 2007 to 2030. See Appendix A (of this report) for calculations.

Year 2030 on-road emissions were calculated using TCAG's VMT estimates for 2030. See Appendix A (of this report) for calculations.

Dairy/Feedlot

2007 and 2030 Emissions

Dairy and feedlot operational emissions were estimated in the *Tulare County Draft Phase I Animal Confinement Facilities Plan Supplemental Program EIR* (Jones and Stokes, 2006). Total dairy and feedlot emissions of methane are derived using emission rates associated with manure decomposition and enteric digestion. The analysis calculates methane emissions under existing conditions (2006), and complete build-out conditions (2020). This analysis assumes that emissions in 2006 emissions are similar to emissions in 2007, and that emissions in 2030 will be similar to those in 2020.

Results

In 2007, Tulare County generated approximately 5.2 million tonnes of CO_2e. The largest portion of these emissions (63 percent) is attributed to dairies/feedlots, while the second largest portion (16 percent) is from mobile sources. See Table 4 and Figure 1 for annual emissions per sector.

TABLE 4
EMISSIONS BY SECTOR IN 2007

Sector	CO2e (tonnes/year)	% of Total
Electricity	542,690	11%
Natural Gas	321,020	6%
Mobile Sources	822,230	16%
Dairy/Feedlots	3,294,870	63%
Solid Waste	227,250	4%
Total	**5,208,060**	**100%**
Per Capita	**36.1**	

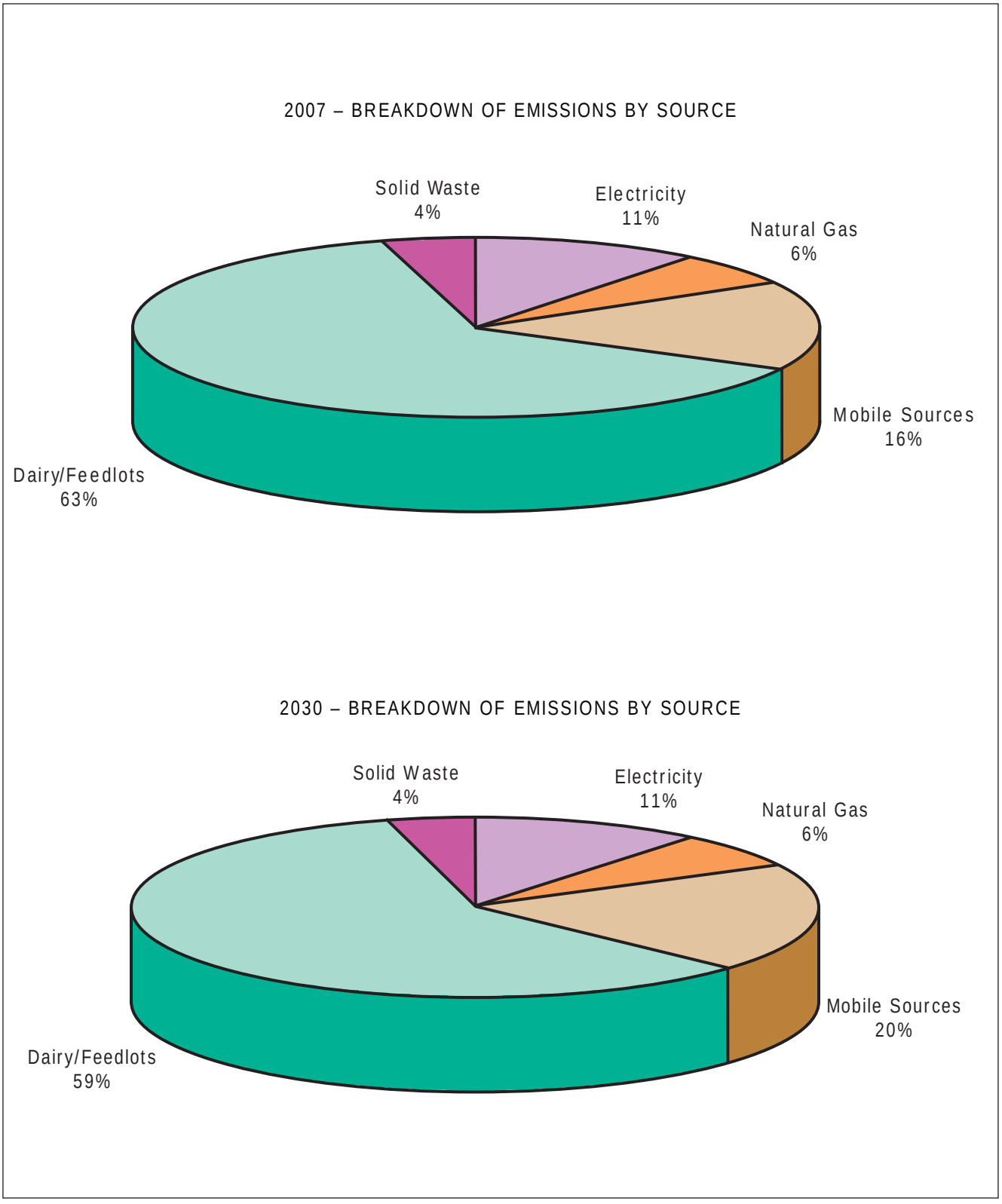
Per capita emissions in 2007 were approximately 36 tonnes of CO_2e per resident.

In 2030, Tulare County is forecast to generate approximately 6.1 million tonnes of CO_2e. The largest portion of these emissions (59 percent) is attributed to dairies/feedlots, while the second largest portion (20 percent) is from mobile sources. See Table 5 and Figure 1 for annual emissions per sector.

TABLE 5
EMISSIONS BY SECTOR IN 2030

Sector	CO2e (tonnes/year)	% of Total
Electricity	660,560	11%
Natural Gas	384,410	6%
Mobile Sources	1,212,370	20%
Dairy/Feedlots	3,601,390	59%
Solid Waste	246,750	4%
Total	**6,105,480**	**100%**
Per capita	**27.4**	

Per capita emissions in 2030 are projected to be approximately 27 tonnes of CO_2e per resident.



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SOURCE: ESA, 2010

Figure 1
Breakdown of Emissions by Source – 2007 and 2030

Future Inventories

By including emissions associated with mobile sources, use of natural gas, production of electricity, decay of solid waste, and dairy/feedlot operations, this inventory was designed to capture the major sources of emissions in Tulare County in 2007 and 2030. However, if Tulare County wishes to expand upon this inventory in future years, it may consider including the following sources of emissions:

- Aircraft
- Sewage
- Rail
- Wildfires
- Fertilizer

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Appendix A: Calculations and Assumptions

ELECTRICITY

2007		Total Usage (kWh)	CO2 emissions (tonnes/yr)	CH4 emissions (tonnes/yr)	N20 emissions (tonnes/yr)	CO2e emissions (tonnes/year)
PG&E	Residential	*73,395,636*	17,445	0.22	0.12	17,487
	Commercial	*275,430,673*	65,466	0.84	0.46	65,624
	Industrial	*0*	0	0	0	0
SCE	Residential	*295,063,091*	117,645	0.90	0.50	117,815
	Commercial/Industrial	*452,885,586*	180,571	1.38	0.76	180,832
	Street Lighting	*6,982,029*	2,784	0.02	0.01	2,788
	Agricultural	*396,066,698*	157,916	1.20	0.66	158,145
Total		1,499,823,713	541,827	4.56	2.52	**542,691**

2030		Total Usage (kWh)	CO2 emissions (tonnes/yr)	CH4 emissions (tonnes/yr)	N20 emissions (tonnes/yr)	CO2e emissions (tonnes/year)
PG&E	Residential	113,376,367	26,948	0.34	0.19	27,013
	Commercial	304,464,947	72,367	0.93	0.51	72,542
	Industrial	0	0	0	0	0
SCE	Residential	455,792,510	181,730	1.39	0.76	181,992
	Commercial/Industrial	500,626,108	199,606	1.52	0.84	199,894
	Street Lighting	10,785,343	4,300	0.03	0.02	4,306
	Agricultural	437,817,709	174,563	1.33	0.73	174,815
Total		1,822,862,983	659,513	5.54	3.06	**660,563**

Data collection period *PG&E--2007 Calendar Year*
SCE--December 1, 2005-November 30, 2006

Figures in italics provided by utility

Assumptions

- 2030 Residential and Street Lighting total usage will increase proportionate to population growth (~54.5%)
- 2030 Commercial, Industrial, and Agricultural total usage will increase proportionate to job growth (~10.5%)

• Baseline Population and job growth projections provided by the Tulare County Association of Governments

Emission Factors		Used For	Source
0.879	CO2 (lb/kWh)	SCE	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; CAMX eGRID subregion
0.524	CO2 (lb/kWh)	PG&E	PG&E (http://www.pge.com/mybusiness/environment/calculator/assumptions.shtml)
6.7E-06	CH4 (lbs/kWh)	SCE and PG&E	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; CA average
3.7E-06	N20 (lbs/kWh)	SCE and PG&E	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; CA average

NATURAL GAS

		Total Usage (Mcf/yr)	CO2 emissions (tonnes/yr)	CH4 emissions (tonnes/yr)	N20 emissions (tonnes/yr)	CO2e emissions (tonnes/year)
2007	Residential	*1,239,323*	67,087	7.46	0.01	67,276
	Commercial	*2,059,449*	111,483	12.39	0.01	111,796
	Industrial	*2,614,877*	141,549	15.74	0.01	141,947
	Total	*5,913,648*	320,119	35.59	0.03	**321,019**
2030	Residential	1,914,418	103,632	11.52	0.01	103,923
	Commercial	2,276,543	123,234	13.70	0.01	123,581
	Industrial	2,890,521	156,470	17.40	0.02	156,910
	Total	7,081,483	383,337	42.62	0.04	**384,414**

Data collection period: *2007 Calendar Year*

Figures in italics provided by utility

Assumptions

- 2030 Residential will increase proportionate to population growth (~54.5%)
- 2030 Commercial and Industrial will increase proportionate to job growth (~10.5%)
- Population and job growth projections provided by the Tulare County Association of Governments

Emission Factors		**Source**
11.7	CO2 (lbs/therm)	The Gas Company: Gail Henry, Tulare County Utility Coordinator
0.0059	CH4 (kg/MMBtu)	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; weighted U.S. average
0.0001	N20 (kg/MMBtu)	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; weighted U.S. average

Natural Gas Conversion Factors

1	cubic foot	1050	Btu
1	therm	100,000	Btu
1	Mcf	10.2	therms

1	MMBtu	10	therms

Source: The Gas Company. http://www.socalgas.com/residential/billing/meter.html

MOBILE SOURCES

OFF-ROAD EMISSIONS			CO2 emissions	CH4 emissions	N20 emissions	CO2 equivalent (Total emissions)
2007	Total County	tonnes/day	1,047	0.32	0.05	1,070
	Total County	tonnes/year	381,981	116.25	18.66	390,449
	Unincorporated County	**tonnes/year**	**128,298**	**39.05**	**6.27**	**131,142**
2030	**Unincorporated County**	**tonnes/year**	**141,822**	**43.16**	**6.93**	**144,966**

Data Source	OFFROAD2007 Model, California Environmental Protection Agency, Air Resources Board (CARB)
Data Collection Period	*Calendar Year 2007*

Assumptions

- Total County emissions are allocated to unincorporated areas on a per capita basis (using % population residing in unincorporated areas).
- 2030 emissions will increase proportionate to job growth (~10.5%)
- Population and job growth projections provided by the Tulare County Association of Governments (TCAG, 2008)

ON-ROAD EMISSIONS			CO2 emissions	CH4 emissions	N20 emissions	CO2 equivalent (Total emissions)
2007	Total County	lbs/day	12,062,280	1,058	1,138	12,427,774
	Total County	tonnes/year	1,997,046	175	188	2,057,558
	Unincorporated County	**tonnes/year**	**670,756**	**59**	**63**	**691,081**
2030	Total County	lbs/day	20,819,696	1,810	1,946	21,444,823
	Total County	tonnes/year	3,446,934	300	322	3,550,432

	Unincorporated County	**tonnes/year**	**1,032,637**	**101**	**108**	**1,067,400**	

Data Source	CO2 Emission Factors: EMFAC2007 Vehicle Miles Traveled: Tulare County Association of Governments (TCAG)
Data Collection Period	Calendary Year 2007

Assumptions

• Total County emissions are allocated to unincorporated areas on a per capita basis (using % population residing in unincorporated areas).

• VMT: Assuming 20% @ 35mph, 60% @ 55mph, 20% @ 65mph

• Population projections provided by the Tulare County Association of Governments (TCAG, 2008)

2030 Trip Percentages by Category (from URBEMIS defaults)

Type	Percent	# VMT
LDA	49.90%	8,808,893
LDT	33.60%	5,931,439
MDT	7.80%	1,376,941
HDT	2.70%	476,633
BUS	4.00%	706,124
MCY	2.00%	353,062
Total	100.00%	17,653,092

2007 Trip Percentages by Category (from URBEMIS defaults)

Type	Percent	# VMT
LDA	49.90%	5,150,316
LDT	33.60%	3,467,948
MDT	7.80%	805,059
HDT	2.70%	278,674
BUS	4.00%	412,851
MCY	2.00%	206,425
Total	100.00%	10,321,274

		LDA	**LDT**	**MDT**	**HDT**	**BUS**	**MCY**
CO2 Emission Factors		(g CO2/mi)	(g CO2/mi)	(g CO2/mi)	(g CO2/mi)	(g CO2/mi)	(g CO2/mi)
2007	35mph	390.436	466.381	619.381	1669.4	1530.9	112.7

	55mph	397.093	473.709	629.43	1547.7	1536.0	99.2
	65 mph	485.447	577.422	771.999	1599.4	1638.5	104.3
2030	35mph	385.552	482.063	621.818	1659.5	1527.2	139.9
	55mph	392.544	490.472	632.365	1541.0	1531.8	171.4
	65 mph	479.469	599.307	781.252	1592.6	1626.3	235.8

Source: EMFAC 2007

CH4 emission factor	0.0465	grams/mile
N20 emission factor	0.05	grams/mile

Source: Calif. Climate Action Registry (CCAR) Protocol ver 3.0; rate in grams/mile; asumes 60% cars, 35% light trucks, 5% heavy diesel trucks & older vehicles.

DAIRY / FEEDLOT

	Methane	Methane	CO2 equivalent
	(tons/yr)	(tonnes/year)	(tonnes/year)
Existing (2006)	145,279	131,795	3,294,872
Future (2020)	158,794	144,055	3,601,387

Data Source	*Jones and Stokes, 2006: Tulare County Draft Phase I Animal Confinement Facilities Plan Supplemental Program EIR*
Data Collection Period	*2006*

Assumptions

- 2006 emissions are similar to 2007 emissions
- 2020 emissions are similar to 2030 emissions

Emission Factors		**Used For**
112.56	CH4 (lbs/head/yr)	Manure Decomposition -Dairy and Feed Lot
320.56	CH4 (lbs/head/yr)	Enteric Digestion -Dairy
215.65	CH4 (lbs/head/yr)	Enteric Digestion -Feed Lots

Sources

Jones and Stokes, 2006, *Tulare County Draft Phase I Animal Confinement Facilities Plan Supplemental Program EIR*

WASTE

2007	**Waste in Landfill** (tons)	**Annual Fugitive Emissions** (tonnes CH4/yr)	**Total equiv. CO2** (tonnes/yr)
Teapot Disposal Site	*2,421,480*	2,256	56,395
Woodville Disposal Site	*2,396,736*	2,441	61,015
Visalia Disposal Site	*4,612,704*	4,393	109,837
Total	**9,430,920**	**9,090**	**227,247**

2030	**Waste in Landfill** (tons)	**Annual Fugitive Emissions** (tonnes CH4/yr)	**Total equiv. CO2** (tonnes/yr)
Teapot Disposal Site	2,496,245	467	11,679
Woodville Disposal Site	4,775,118	3,863	96,573
Visalia Disposal Site	7,805,844	5,540	138,497
Total	**15,077,207**	**9,870**	**246,749**

Data Source *LandGem Model, United States Environmental Protection Agency (USEPA)*
Tulare County Resource Management Agency (RMA)

Data Collection Period *Calendar Year 2007*

Figures in italics provided by RMA

Assumptions

• 2030 total solid waste generation will increase proportionate to population growth

• LandGem default values for potential methane generation capacity and methane generation rate are comparable to actual values for the three disposal sites

• Annual disposal rates at each landfill did not change from 1971 to 1996

• Because the landfills are owned, operated, and managed by the County, land fill emissions are included as direct emissions by the County. As a result, emissions are for the entire County, not just for unincorporated areas.

Visalia Disposal Site Data

37	years of operation
4,612,704	tons of waste in place
124,668	annual average
106,913	average of last three years (05 - 07)
1,448,953	sum of 96-07 - 12 years

3,163,751	waste in place as of 1996
126,550	annual average (1971 - 1996)
114,111	average from 2001 to 2007
1.0241649	county-wide annual % Increase in Population
60%	percent of total methane produced captured by thel landfill gas collection system
98%	efficiency rate of internal combustion engine generator

• Visalia Disposal Sites uses a internal combustion engine generator to convert methane emissions to electricity

Woodville Disposal Site Data

37	years of operation
2,396,736	tons of waste in place
64,777	annual average
73,622	average of last three years (05 - 07)
998,407	sum of 96-07 - 12 years
1,398,329	waste in place as of 1996
55,933	annual average (1971 - 1996)
67,465	average from 2001 to 2007
1.0241649	county-wide annual % Increase in Population
60%	percent of total methane produced captured by the landfill gas collection system
98%	efficiency rate of internal combustion engine generator

• Woodville Disposal Sites uses a internal combustion engine generator to convert methane emissions to electricity

Teapot Disposal Site Data

37	years of operation
2,421,480	tons of waste in place
65,445	annual average
72,190	average of last three years (05 - 07)
739,341	sum of 96-07 - 12 years
1,682,139	waste in place as of 1996
67,286	annual average (1971 - 1996)
63,244	average from 2001 to 2007
1.0241649	county-wide annual % Increase in Population
60%	percent of total methane produced captured by the landfill gas collection system (2007)
75%	percent of total methane produced captured by the landfill gas collection system (2030)
10%	percent of methane that is oxided as it passes through earthen landfill cover material (of methane not captured by the landfill gas collection system) (2030)

99% efficiency rate of disposal site flares

- The Teapot Dome Disposal Site will reach its permitted capacity in 2009 and will cease accepting new waste.
- After 2009, waste that would have gone to Teapot Dome will be diverted to Woodville Disposal Site
- Teapot Dome Disposal Sites flares captured landfill gas

Appendix B:
Emission Reduction Technical Documentation

Sector Emissions 2007-2030

Tulare County
EMISSIONS BY SECTOR IN 2007

Sector	CO2e (tonnes/year)	% of Total
Electricity	542,690	10%
Natural Gas	321,020	6%
Mobile Sources	822,230	16%
Dairy/Feedlots	3,294,870	63%
Solid Waste	227,250	4%
Total	5,208,060	100%
Per Capita	36.1	

Source: Tulare County 2030 General Plan Update, Appendix C

Tulare County
EMISSIONS BY SECTOR IN 2030

Sector	CO2e (tonnes/ year)	% of Total
Electricity	660,560	11%
Natural Gas	384,410	6%
Mobile Sources	1,212,370	20%
Dairy/Feedlots	3,601,390	59%
Solid Waste	246,750	4%
Total	6,105,480	100%
Per capita	27.4	

EMISSIONS BY SECTOR	2007	2020 CO2e	2030 CO2e	Increase 07-30		Avg Annual %
Sector	CO2e (tonnes/year)	(tonnes/year)	(tonnes/year)		Percent Inc	Inc
Electricity	542,690	609,312	660,560	117,870	0.217	5,125
Natural Gas	321,020	356,849	384,410	63,390	0.197	2,756
Mobile Sources	822,230	1,042,744	1,212,370	390,140	0.474	16,963
Dairy/Feedlots	3,294,870	3,468,120	3,601,390	306,520	0.093	13,327
Solid Waste	227,250	238,272	246,750	19,500	0.086	848
Total	5,208,060	5,715,297	6,105,480	897,420	0.172	39,018
Per Capita	36.1	30.5	27.4			

	Percent Unincorp.	Unincorporated County Pop
2007 Unincorp Pop	34	144,090
2010 Unincorp Pop	33	154,328
2020 Unincorp Pop	31	187,323
2030 Unincorp Pop	30	222,580
Average Annual Inc.		3,413

2007 Housing Units Uninc 44873 2008 TC Housing Report

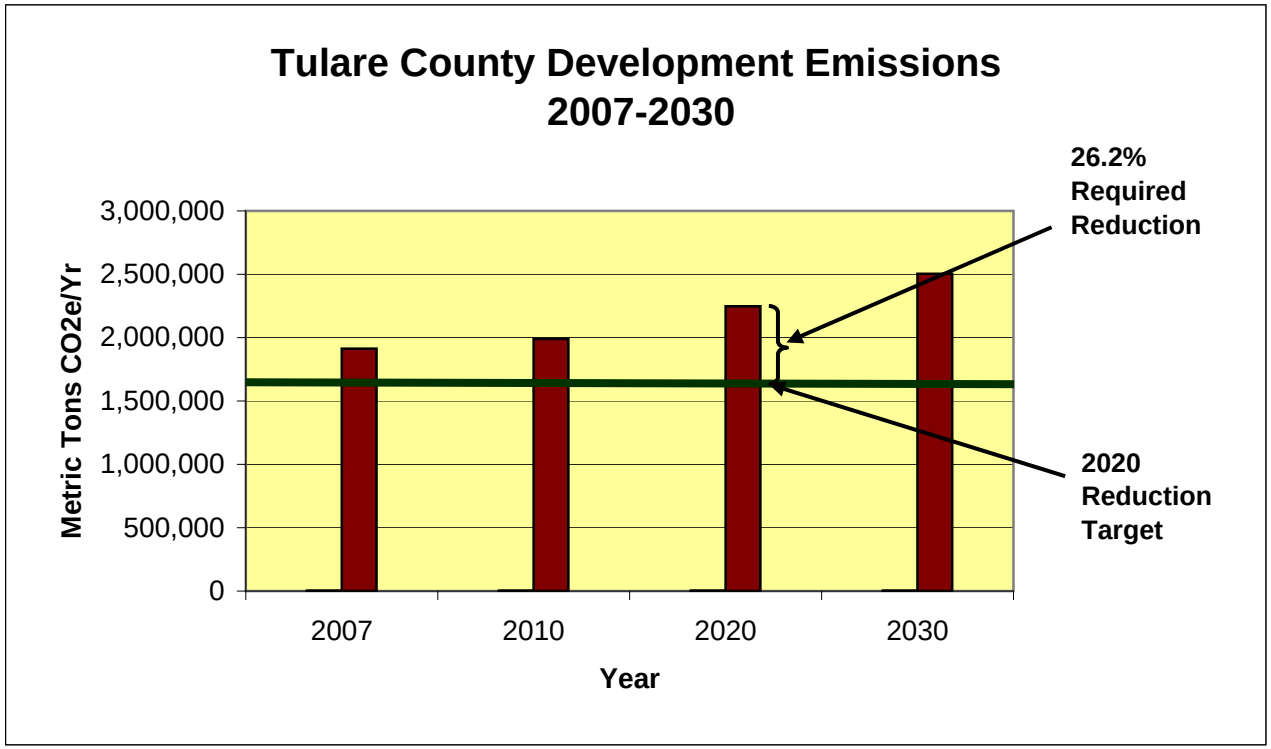
EMISSIONS BY SECTOR	2007		2020		2030	
Sector	CO2e (tonnes/year)	% of Development Related Emissions	CO2e (tonnes/year)	% of Development Related Emissions	CO2e (tonnes/year)	% of Development Related Emissions
Electricity	542,690	28.4	609,312	27.1	660,560	26.4
Natural Gas	321,020	16.8	356,849	15.9	384,410	15.4
Mobile Sources	822,230	43.0	1,042,744	46.4	1,212,370	48.4
Solid Waste	227,250	11.9	238,272	10.6	246,750	9.9
Development Related Subt	1,913,190	100.0	2,247,177	100.0	2,504,090	100.0
Dairy/Feedlots	3,294,872		3,468,120		3,601,387	
Total	5,208,896		5,715,297		6,105,477	
Per Capita	36.1	13.3	30.5	12.0	27.4	11.3

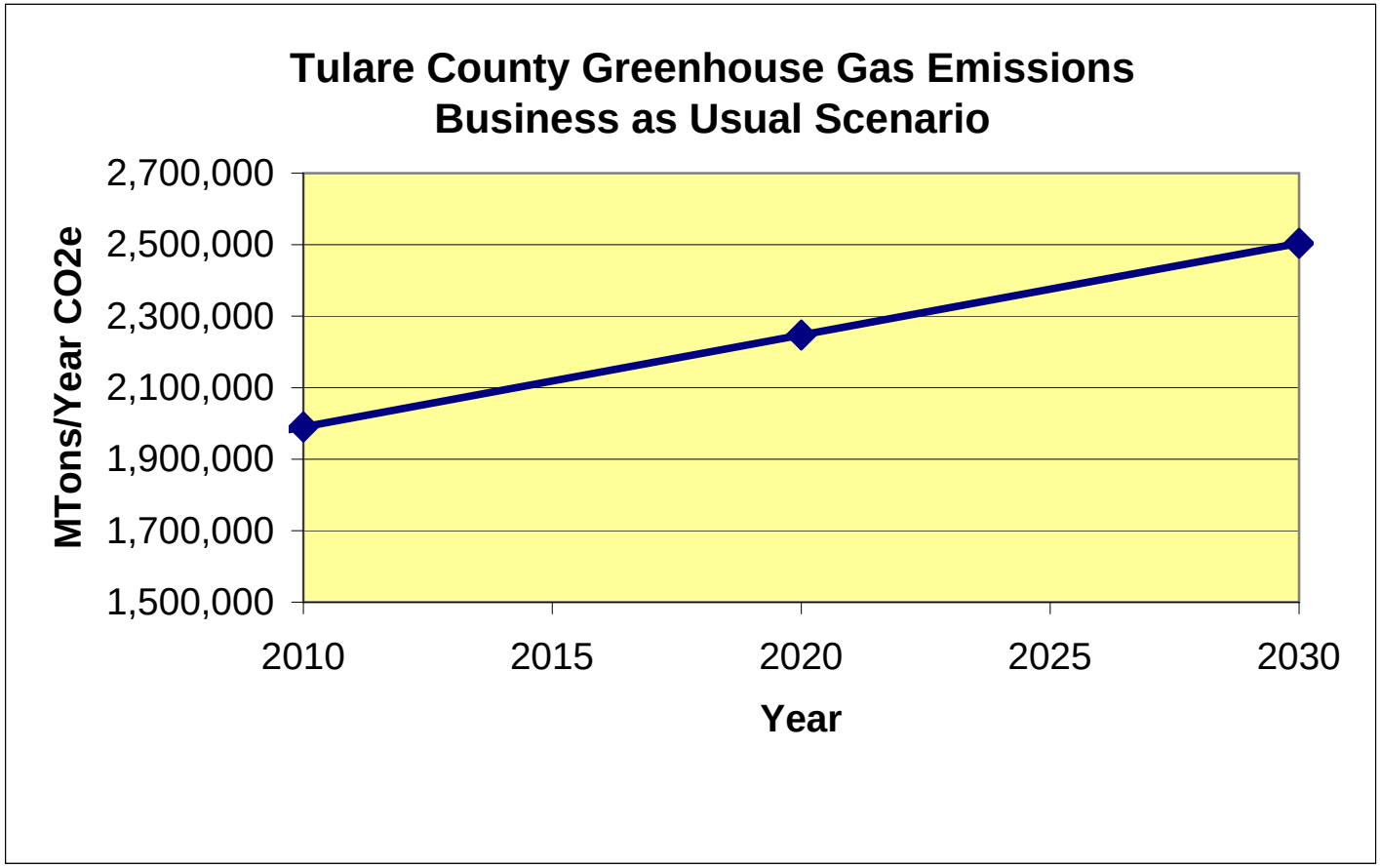
Tulare County Greenhouse Gas Emissions

Year	2007	2010	2020	2030	Avg Ann Inc.
Emissions (Mtons CO2e)	1,913,190	1,990,264	2,247,177	2,504,090	25,691
Emission Target - 26.2% Reduction			1,658,417		

2020 CO2e Emission by Sector

Sector	CO2e (tonnes/year)	Percent by Sector
Electricity	609,312	10.7
Natural Gas	356,849	6.2
Mobile Sources	1,042,744	18.2
Dairy/Feedlots	3,468,120	60.7
Solid Waste	238,272	4.2
Total	5,715,297	100


Tulare County Development Emissions
2007-2030
26.2%
Required
Reduction
2020
Reduction
Target
Metric Tons CO2e/Yr
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2007
2010
2020
2030
Year


Tulare County Greenhouse Gas Emissions
Business as Usual Scenario
MTons/Year CO2e
2,700,000
2,500,000
2,300,000
2,100,000
1,900,000
1,700,000
1,500,000
2010
2015
2020
2025
2030
Year

MOBILE SOURCES

OFF-ROAD EMISSIONS			CO2 emissions	CH4 emissions	N20 emissions	CO2 equivalent (Total emissions)
2007	Total County	tonnes/day	1,047	0.32	0.05	1,070
	Total County	tonnes/year	381,981	116.25	18.66	390,449
	Unincorporated County	tonnes/year	128,298	39.05	6.27	131,142
2030	Unincorporated County	tonnes/year	141,822	43.16	6.93	144,966

Data Source OFFROAD2007 Model, Califo

Data Collection Period Calendar Year 2007

Assumptions
• Total County emissions are allocated to unincorporated areas on a per capita basis (using % population residing in unincorporated areas).
• 2030 emissions will increa
• Population and job growth

ON-ROAD EMISSIONS			CO2 emissions	CH4 emissions	N20 emissions	CO2 equivalent (Total emissions)
2007	Total County	lbs/day	12,062,280	1,058	1,138	12,427,774
	Total County	tonnes/year	1,997,046	175	188	2,057,558
	Unincorporated County	tonnes/year	670,765	59	63	691,081
2030	Total County	lbs/day	20,819,696	1,810	1,946	21,444,823
	Total County	tonnes/year	3,446,934	300	322	3,550,432
	Unincorporated County	tonnes/year	1,032,637	101	108	1,067,400

Data Source CO2 Emission Factors: EMFA
Vehicle Miles Trave

Data Collection Period Calendar Year 2007

Assumptions
• Total County emissions are allocated to unincorporated areas on a per capita basis (using % population residing in unincorporated areas).
• VMT: Assuming 20% @ 35mph, 60% @ 55mph, 20% @ 65mph
• Population projections pro

VMT Fractions by Vehicle Type

2030 Trip Percentages by Category (from URBEMIS defaults) Type	Percent	# VMT	Passenger Veh	Trucks and Buses
LDA	49.90%	8,808,893	85.50%	14.50%
LDT	33.60%	5,931,439		
MDT	7.80%	1,376,941		
HDT	2.70%	476,633		
BUS	4.00%	706,124		
MCY	2.00%	353,062		
Total	100.00%	17,653,092		

2007 Trip Percentages by Category (from URBEMIS defaults) Type	Percent	# VMT
LDA	49.90%	5,150,316
LDT	33.60%	3,467,948
MDT	7.80%	805,059
HDT	2.70%	278,674
BUS	4.00%	412,851
MCY	2.00%	206,425
Total	100.00%	10,321,274

CO2 Emission Rates by Vehicle Type

CO2 Emission Factors	(g CO2/mi)	LDA (g CO2/mi)	LDT (g CO2/mi)	MDT (g CO2/mi)	HDT (g CO2/mi)	BUS (g CO2/mi)	MCY
2007	35mph	390.436	466.381	619.381	1669.4	1530.9	112.7
	55mph	397.093	473.709	629.43	1547.7	1536	99.2
	65 mph	485.447	577.422	771.999	1599.4	1638.5	104.3
2030	35mph	385.552	482.063	621.818	1659.5	1527.2	139.9
	55mph	392.544	490.472	632.365	1541	1531.8	171.4
	65 mph	479.469	599.307	781.252	1592.6	1626.3	235.8

Source: EMFAC 2007

CH4 emission factor	0.0465	grams/mile
N20 emission factor	0.05	grams/mile

Source: Calif. Climate Action Registry (CCAR) Protocol ver 3.0; rate in grams/mile; asumes 60% cars, 35% light trucks, 5% heavy diesel trucks & older ve

Tulare County Vehicle Miles Traveled 2007, 2020, and 2030

Type	Percent	2007 VMT	2020 VMT	2030 VMT	VMT Increase	Avg Annual Increase
LDA	49.90%	5,150,316	7,218,207	8,808,893	3,658,577	159,069
LDT	33.60%	3,467,948	4,860,356	5,931,439	2,463,491	107,108
MDT	7.80%	805,059	1,128,297	1,376,941	571,882	24,864
HDT	2.70%	278,674	390,564	476,633	197,959	8,607
BUS	4.00%	412,851	578,614	706,124	293,273	12,751
MCY	2.00%	206,425	289,307	353,062	146,637	6,376
Total	100.00%	10,321,274	14,465,345	17,653,092	7,331,818	318,775

Tulare County Population and VMT 2007-2030

	2007	2010	2020	2030
Population	144,094		170,925	191,564
Vehicle Miles Traveled	10,321,274	11,277,598	14,465,345	17,653,092

VMT for 2020 is interpolated from 2007 and 2030 data.

Tulare County Mobile Emissions by Vehicle Type

Type	Percent	2007 Mobile EI	Percent of Dev. EI	2020 Mobile EI	Percent of Dev. EI	2030 Mobile EI	Percent of Dev. EI
LDA	49.90%	410,293	21.4%	520,329	23.2%	604,973	24.2%
LDT	33.60%	276,269	14.4%	350,362	15.6%	407,356	16.3%
MDT	7.80%	64,134	3.4%	81,334	3.6%	94,565	3.8%
HDT	2.70%	22,200	1.2%	28,154	1.3%	32,734	1.3%
BUS	4.00%	32,889	1.7%	41,710	1.9%	48,495	1.9%
MCY	2.00%	16,445	0.9%	20,855	0.9%	24,247	1.0%
Total	100.00%	822,230	43.0%	1,042,744	46.4%	1,212,370	48.4%
LDA + LDT		686,562	35.9%	870,691	38.7%	1,012,329	40.4%
MDT +HDT + Bus		119,223	6.2%	151,198	6.7%	175,794	7.0%
All Mobile		822,230	43.0%	1,042,744	46.4%	1,212,370	48.4%

	Mtons CO2e
Development EI 2007	1,913,190
Development EI 2020	2,247,177
Development EI 2030	2,504,090

	1,012,329
	127,299
	1,212,370

NATURAL GAS

		Total Usage (Mcf/yr)	CO2 emissions (tonnes/yr)	CH4 emissions (tonnes/yr)	N20 emissions (tonnes/yr)	CO2e emissions (tonnes/year)	% of total
2007	Residential	1,239,323	67,087	7.46	0.01	67,276	21.0%
	Commercial	2,059,449	111,483	12.39	0.01	111,796	34.8%
	Industrial	2,614,877	141,549	15.74	0.01	141,947	44.2%
	Total	5,913,648	320,119	35.59	0.03	321,019	100.0%
2030	Residential	1,914,418	103,632	11.52	0.01	103,923	27.0%
	Commercial	2,276,543	123,234	13.7	0.01	123,521	32.1%
	Industrial	2,890,521	156,470	17.4	0.02	156,910	40.8%
	Total	7,081,483	383,337	42.62	0.04	384,410	100.0%

Data collection period: 2007 Calendar Ye

Figures in italics provide

Assumptions
- 2030 Residential will increase proportionate to population growth (~54%)
- 2030 Commercial and Industrial will increase proportionate to job growth (~11%)
- Population and job growth projections provided by the Tulare County Association of Governments

Emission Factors		Source
11.7	CO2 (lbs/therm)	The Gas Company: Gail Henry, Tulare County Utility Coordinator
0.0059	CH4 (kg/MMBtu)	California Climate Action Registry General Reporting Protocol,Version 3.0,April 2008;weighted U.S. avg
0.0001	N20 (kg/MMBtu)	California Climate Action Registry General Reporting Protocol,Version 3.0,April 2008;weighted U.S. avg

Natural Gas Conversion

1	cubic foot	1050	Btu
1	therm	100,000	Btu
1	Mcf	10.2	therms
1	MMBtu	10	therms

Source: The Gas Company. http://www.socalgas.com/residential/billing/meter.html

2020 Emission Interpolation

	2007 MT CO2e/yr	2020 MT CO2e/yr	2030 MT CO2e/yr	Inc 07-30 MT CO2e	Avg Ann Inc MT CO2e
Residential	67,276	87,990	103,923	36,647	1593.3
Commercial	111,796	118,423	123,521	11,725	509.8
Industrial	141,947	150,404	156,910	14,963	650.6
Total	321,019	356,849	384,410	63,391	2756.1

	2020 MT CO2e/yr	% of total	
Residential	87,990	24.7	3.92
Commercial	118,423	33.2	5.28
Industrial	150,404	42.1	6.70
Total	356,849	100.0	11.98

ELECTRICITY

2007		Total Usage (kWh)	CO2 emissions (tonnes/yr)	CH4 emissions (tonnes/yr)	N20 emissions (tonnes/yr)	CO2e emissions (tonnes/year)
PG&E	Residential	73,395,636	17,445	0.22	0.12	17,487
	Commercial	275,430,673	65,466	0.84	0.46	65,624
	Industrial	0	0	0	0	0
SCE	Residential	295,063,091	117,645	0.9	0.5	117,815
	Commercial/Industr	452,885,586	180,571	1.38	0.76	180,832
	Street Lighting	6,982,029	2,784	0.02	0.01	2,788
	Agricultural	396,066,698	157,916	1.2	0.66	158,145
Total		1,499,823,713	541,827	4.56	2.52	542,691

2030		Total Usage (kWh)	CO2 emissions (tonnes/yr)	CH4 emissions (tonnes/yr)	N20 emissions (tonnes/yr)	CO2e emissions (tonnes/year)
PG&E	Residential	113,376,367	26,948	0.34	0.19	27,013
	Commercial	304,464,947	72,367	0.93	0.51	72,542
	Industrial	0	0	0	0	0
SCE	Residential	455,792,510	181,730	1.39	0.76	181,992
	Commercial/Industr	500,626,108	199,606	1.52	0.84	199,894
	Street Lighting	10,785,343	4,300	0.03	0.02	4,306
	Agricultural	437,817,709	174,563	1.33	0.73	174,815
Total		1,822,862,983	659,513	5.54	3.06	660,563

Data collection period PG&E--2007 Calen
SCE--December 1, 200

Figures in italics provid

Assumptions
- 2030 Residential and Street Lighting total usage will increase proportionate to population growth (~54%)
- 2030 Commercial, Industrial, and Agricultural total usage will increase proportionate to job growth (~11%)
- Population and job growth projections provided by the Tulare County Association of Governments

Emission Factors	Used For	Source	
0.879	CO2 (lb/kWh)	SCE	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; CAMX eGRID subregion
0.524	CO2 (lb/kWh)	PG&E	PG&E (http://www.pge.com/mybusiness/environment/calculator/assumptions.shtml)
6.70E-06	CH4 (lbs/kWh)	SCE and PG&E	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; CA average
3.70E-06	N20 (lbs/kWh)	SCE and PG&E	California Climate Action Registry General Reporting Protocol, Version 3.0, April 2008; CA average

SCE Percentage of Power Provided		Weighted Average
Residential	455,792,510	
Commercial/Industrial	500,626,108	
Street Lighting	10,785,343	
Agricultural	437,817,709	
SCE Total	1,405,021,670	
County Total	1,822,862,983	
SCE Percentage	0.770777444	
SCE 2007 Renewable	0.157	
RPS 33% Target	0.33	
Percent Red. SCE	0.173	13.3%
PGE Percentage	0.114	
RPS 33% Target	0.33	
Percent Red. PGE	0.216	5.0%
		18.3%

POPULATION IN TULARE COUNTY, 2007 AND 2030

Tulare County	2007	% of total--2007	2020	% of total--2020	2030	% of total--2030	Increase 07-30	%inc in Unincorp and Incorp Areas	Avg Annual Inc
Unincorporated	144,090	34%	188,454	31%	222,580	30.00%	78,490	0.249992	3412.6
Incorporated	284,910	66%	418,007	69%	520,390	70.00%	235,480	0.750008	10238.3
County Total	429,000	100%	606,461	100.0%	742,970	100%	313,970	1	

	Inc 07-20	Inc 07-30
Unincorporated	44,364	78,490
Incorporated	133,097	235,480
County Total	177,461	313,970

Tulare County Association of Governments (TCAG), 2008. Table 2: Historical City/County Population Estimates, 1991-2007, with 1990 and 2000 Census Counts. Data provided by Mark Hays, TCAG Associate Regional Planner.

		People/DU	DU 20	DU 30		% by Housing Density	People /DU	DU 07	DU 20	DU 30	Total Units 20	Total Units 30
2008 RHNA People per DU		3.382	13,118	23,208	2008 RHNA People per DU		3.382	42,606	13,118	23,208	55722.62	65813.13
Low Density	8.70%		1,141	2,019	Low Density	12.60%		5,368	1,653	2,924		
Medium Density	49.80%		6,533	11,558	Medium Density	62.10%		26,458	8,146	14,412		
High Density	41.50%		5,444	5,444	High Density	25.30%		10,779	3,319	5,872		
	100.00%					100.00%		42,606	13,118	23,208		

Source: Tulare County 2008 Regional Housing Needs Assessment Plan

	Housing Units
2007	42,606
New Units 2007-2020	13,118
New Units 2007-2030	23,208
Total Units 2030	65,814

Emissions Required from New Development

	2007	2020	2030
Population	144,090	188,454	222,580
Increase		44,364	78,490
Percent New Growth		0.308	0.545
2020 Emissions		2,247,177	2,504,090
2020 Control Potential from Growth		691,884	1,364,050
26.2% Reduction Target		588,760	651,063
24.6% State Meas Red.		552,806	605,990
0.5% Air District Red.		11,236	
State + Air District Red		564,041	
2020 Req Reductions		24,719	45,074
Percent of Potential Needed		3.573%	0.033
Percent of 2020 Emissions		1.10%	

	2020	2030
2020 Emissions (MT/yr)	2,168,288	2,364,517
2020 Req Reductions (MT/yr)	24,719	
60% Subj to CEQA (MT/yr)	415,130	
2020 Req Red from CEQA	5.95%	

Emission Reductions from State Regulations and Measures

Affected Emission Sources	California Legislation	% Reduction from 2020 GHG Inventory	Percentage Applicable to Tulare Co. Inventory	End Use Sector (Percentage of Tulare County Inventory)	Scaled Emission Reduction Credit
Mobile	AB 1493 Pavley	19.7	0.387	On-road passenger/light truck transportation (38.7)	7.62
	LCFS	7.2	0.387	On-road passenger/light truck transportation (38.7)	2.79
	LCFS	7.2	0.067	On-road Heavy/Medium Duty transportation (6.7)	0.48
	Heavy Duty Efficiency	2.9	0.013	On-road Heavy Duty transportation (1.3)	0.04
	Passenger Vehicle Efficiency	2.8	0.387	On-road passenger/light truck transportation (38.7)	1.08
Area	Energy Efficiency Measures	9.4	0.039	Natural Gas (Residential) (3.9)	0.37
			0.12	Natural Gas (Non-Residential) (12.0)	1.13
Indirect	Renewable Portfolio Standard	18.3	0.271	Electricity (excluding cogeneration) (27.1)	4.96
	Energy Efficiency Measures	15.7	0.271	Electricity (27.1)	4.25
	Solid Waste Methane	14.2	0.106	Solid Waste (10.6)	1.51
	Solar Roofs	1.5	0.271	Electricity (excluding cogeneration) (27.1)	0.41
Total Reductions from Statewide Measures in Tulare County					**24.63**
Notes:					

Appendix C:
San Joaquin Valley Air Pollution Control District Greenhouse Gas Emission Reduction Measures - Development Projects

Final Draft Staff Report

Appendix J: GHG Emission Reduction Measures - Development Projects

GHG Emission Reduction Measures						
MEASURE #	***Measure Name***	***Commercial***	***Mixed-Use***	***Residential***	***Estimated CO_2 Equivalent Point Reductions***	***Measure Description***
Bicycle/Pedestrian/Transit Measures						
1	**Bike parking**	C	M	~	0.625	Non-residential projects provide plentiful short-term and long-term bicycle parking facilities to meet peak season maximum demand. Short term facilities are provided at a minimum ratio of one bike rack space per 20 vehicle spaces. Long-term facilities provide a minimum ratio of one long-term bicycle storage space per 20 **employee** parking spaces.
2	**End of trip facilities**	C	M	~	0.625	Non-residential projects provide "end-of-trip" facilities including showers, lockers, and changing space. Facilities shall be provided in the following ratio: four clothes lockers and one shower provided for every 80 employee parking spaces. For projects with 160 or more employee parking spaces, separate facilities are required for each gender.
3	**Bike parking at multi-unit residential**	~	~	R	0.625	Long-term bicycle parking is provided at apartment complexes or condominiums without garages. Project provides one long-term bicycle parking space for each unit without a garage. Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, or a standard rack in a location that is staffed and/or monitored by video surveillance 24 hours per day.
4	**Proximity to bike path/bike lanes**	C	M	R	0.625	Entire project is located within 1/2 mile of an existing Class I or Class II bike lane and project design includes a comparable network that connects the project uses to the existing offsite facility. Existing facilities are defined as those facilities that are physically constructed and ready for use prior to the first 20% of the projects occupancy permits being granted. Project design includes a designated bicycle route connecting all units, on-site bicycle parking facilities, offsite bicycle facilities, site entrances, and primary building entrances to existing Class I or Class II bike lane(s) within 1/2 mile. Bicycle route connects to all streets contiguous with project site. Bicycle route has minimum conflicts with automobile parking and circulation facilities. All streets internal to the project wider than 75 feet have class II bicycle lanes on both sides.
5	**Pedestrian network**	C	M	R	1	The project provides a pedestrian access network that internally links all uses and connects to **existing** external streets and pedestrian facilities. Existing facilities are defined as those facilities that are physically constructed and ready for use prior to the first 20% of the projects occupancy permits being granted.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
5a	**Pedestrian Network**	C	M	R	0.5	The project provides a pedestrian access network that internally links all uses for connecting to **planned** external streets and pedestrian facilities (facilities must be included pedestrian master plan or equivalent).
6	**Pedestrian barriers minimized**	C	M	R	1	Site design and building placement minimize barriers to pedestrian access and interconnectivity. Physical barriers such as walls, berms, landscaping, and slopes between residential and non-residential uses that impede bicycle or pedestrian circulation are eliminated. Barriers to pedestrian access of neighboring facilities and sites are minimized. This measure is not meant to prevent the limited use of barriers to ensure public safety by prohibiting access to hazardous areas, etc…
7	**Bus shelter for existing transit service**	C	M	R	0.5	Bus or Streetcar service provides headways of one hour or less for stops within 1/4 mile; project provides safe and convenient bicycle/pedestrian access to transit stop(s) and provides essential transit stop improvements (i.e., shelters, route information, benches, and lighting).
8	**Bus shelter for planned transit service**	C	M	R	0.25	Project provides transit stops with safe and convenient bicycle/pedestrian access. Project provides essential transit stop improvements (i.e., shelters, route information, benches, and lighting) in anticipation of future transit service. If measure 7 is selected, it excludes this measure.

<table>
<tr><th>MEASURE #</th><th>Measure Name</th><th>Commercial</th><th>Mixed-Use</th><th>Residential</th><th>Estimated CO_2 Equivalent Point Reductions</th><th>Measure Description</th></tr>
<tr><td>9</td><td>Traffic calming</td><td>C</td><td>M</td><td>R</td><td>see table in Measure Description</td><td>Project design includes pedestrian/bicycle safety and traffic calming measures in excess of jurisdiction requirements. Roadways are designed to reduce motor vehicle speeds and encourage pedestrian and bicycle trips by featuring traffic calming measures. Traffic calming measures include: bike lanes, center islands, closures (cul-de-sacs), diverters, education, forced turn lanes, roundabouts, speed humps, etc… Percent of Streets with Improvements
<table>
<tr><td></td><td colspan="5">Percent of Streets with Improvements</td></tr>
<tr><td rowspan="5">Percent of Intersections with Improvements</td><td></td><td>25%</td><td>50%</td><td>75%</td><td>100%</td></tr>
<tr><td>25%</td><td>0.25</td><td>0.25</td><td>0.5</td><td>0.5</td></tr>
<tr><td>50%</td><td>0.25</td><td>0.5</td><td>0.5</td><td>0.75</td></tr>
<tr><td>75%</td><td>0.5</td><td>0.5</td><td>0.75</td><td>0.75</td></tr>
<tr><td>100%</td><td>0.5</td><td>0.75</td><td>0.75</td><td>1.0</td></tr>
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MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
Parking Measures						
10	**Paid parking**	C	M	R	see below	Employee and/or customer paid parking system
10a	**Paid Parking - Urban site within 1/4 mile from transit stop**	C	M	R	5	Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.
10b	**Paid Parking- Urban site greater than 1/4 mile from transit stop**	C	M	R	1.50	Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.
10c	**Paid Parking- Suburban site within 1/4 mile of transit stop**	C	M	R	2	Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.
10d	**Paid Parking- Suburban site greater than 1/4 mile from transit stop**	C	M	R	1	Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.
10e	**Parking cash out**	C	M		0.6	Employer provides employees with a choice of forgoing subsidized parking for a cash payment equivalent to the cost of the parking space to the employer.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
11	**Minimum parking**	C	M	R	3	Provide minimum amount of parking required. Special review of parking required. If zoning codes in the San Joaquin Valley area have provisions that allow a project to build less than the typically mandated amount of parking if the development features design elements that reduce the need for automobile use. This measure recognizes the air quality benefit that results when facilities minimize parking needs, and grants mitigation value to project that implement all available parking reductions. Once land uses are determined, the trip reduction factor associated with this measure can be determined by utilizing the Institute of Transportation Engineers (ITE) Parking generation publication. The reduction in trips can be computed as shown below by the ratio of the difference of minimum parking required by code and ITE peak parking demand to ITE peak parking demand for the land uses multiplied by 50%. The maximum achievable trip reduction is 6%. For projects where retail space occupies 50% or more of the total built space, do not use December specific parking generation rates (from ITE). Percent Trip Reduction = 50*[(min parking required by code - ITE peak parking demand) / (ITE peak parking demand)].
12	**Parking reduction beyond code**	C	M	R	6	Provide parking reduction less than code. Special review of parking required. Recommend a Shared Parking strategy. Trip reductions associated with parking reductions beyond code shall be computed in the same manner as described under measure 11, as the same methodology applies. The maximum achievable trip reduction is 12%. This measure can be readily implemented through a Shared Parking strategy, wherein parking is utilized jointly among different land uses, buildings, and facilities in an area that experience peak parking needs at different times of day and day of the week. For example, residential uses and/or restaurant/retail uses, which experience peak parking demand during the evening/night and on the weekends, arrange to share parking facilities with office and/or educational uses, which experience peak demand during business hours and during the week.
13	**Pedestrian pathway through parking**	C	M	R	0.5	Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances. Pathway must connect to all transit facilities internal or adjacent to project site. Site plan should demonstrate how the pathways are clearly marked, shaded, and are placed between transit facilities and building entrances.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
14	**Off street parking**	C	M	R	see below	Parking facilities are not adjacent to street frontage
14a	**Off street parking**	C	M	R	1.5	For 1.5% reduction, parking facilities shall not be sited adjacent to public roads contiguous with project site. Functioning pedestrian entrances to major site uses are located along street frontage. Parking facilities do not restrict pedestrian, bicycle, or transit access from adjoining uses. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a description of where parking is located relative to the buildings on the site, site plans, maps, or other graphics, which demonstrate the placement of parking facilities behind on-site buildings relative to streets contiguous with the project site. Surrounding uses should be high density or mixed-use, there shall be other adjoining pedestrian and bicycle connections, such as wide sidewalks and bike lanes, and surrounding uses shall also implement measure 15.
14b	**Off street parking**	C	M	R	1	For 1.0% reduction, (parking structures only) proponent must show that parking facilities that face street frontage feature ground floor retail along street frontage. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a written description of the parking facility and the amount of retail space on the ground floor, site plans, maps, or other graphics demonstrating the placement of retail/commercial space along all street fronts contiguous with parking structure.
14c	**Off street parking**	C	M	R	0.1	For 0.1% reduction, the project is not among high-density or mixed uses, is not connected to pedestrian or bicycle access ways, or is among uses that do not also hide parking. This point value is reflective of the importance that other pedestrian and density measures be in place in order for this measure to be effective.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
Site Design Measures						
15	**Office/Mixed-Use proximate to transit**	C	M	~	see below	Mitigation value is based on project density and proximity to transit. Planned transit must be in MTP or RT Master Plan. To count as "existing transit" service must be fully operational prior to the first 20% of the projects occupancy permits being granted. Project must provide safe and convenient pedestrian and bicycle access to all transit stops within 1/4 mile. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a written description of how the project complies with the measure, a map or graphic depicting the location of the project in relation to the transit stop. Graphic should demonstrate a 1/4 mile radius, arc, from transit and planned pathways and linkages to the transit stop. Proponent shall also provide graphics depicting the size and layout of the building as well as the calculations demonstrating the FAR (floor to area ratio).
15a	**Office/Mixed-Use proximate to Planned Light Rail Transit**	C	M	~	0.4	0.75-1.5 FAR (Floor to Area Ratio)
		C	M	~	0.5	1.5-2.25 FAR (Floor to Area Ratio)
		C	M	~	0.75	2.25 or greater FAR (Floor to Area Ratio)
15b	**Office/Mixed-Use proximate to Planned Bus Rapid Transit**	C	M	~	0.2	0.75-1.5 FAR (Floor to Area Ratio)
		C	M	~	0.25	1.5-2.25 FAR (Floor to Area Ratio)
		C	M	~	0.3	2.25 or greater FAR (Floor to Area Ratio)

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
15c	**Office/Mixed-Use proximate to Existing Light Rail Transit**	C	M	~	0.75	0.75-1.5 FAR (Floor to Area Ratio)
		C	M	~	1	1.5-2.25 FAR (Floor to Area Ratio)
		C	M	~	1.5	2.25 or greater FAR (Floor to Area Ratio)
15d	**Office/Mixed-Use proximate to Existing Bus Rapid Transit**	C	M	~	0.4	0.75-1.5 FAR (Floor to Area Ratio)
		C	M	~	0.5	1.5-2.25 FAR (Floor to Area Ratio)
		C	M	~	0.75	2.25 or greater FAR (Floor to Area Ratio)
16	**Orientation toward existing transit, bikeway, or pedestrian corridor**	C	M	R	0.5	Project is oriented towards existing transit, bicycle, or pedestrian corridor. Setback distance is minimized. Setback distance between project and adjacent uses is reduced to the minimum allowed under jurisdiction code. Setback distance between different buildings on project site is reduced to the minimum allowed under jurisdiction code. Setbacks between project buildings and sidewalks is reduced to the minimum allowed under jurisdiction code. Buildings are oriented towards street frontage. Primary entrances to buildings are located along public street frontage. Project provides bicycle access to existing bicycle corridor. Project provides access to existing pedestrian corridor. (Cannot get points for both this measure and measure 17)

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
17	**Orientation toward planned transit, bikeway, or pedestrian corridor**	C	M	~	0.25	Project is oriented towards planned transit, bicycle, or pedestrian corridor. Setback distance is minimized. Planned transit, bicycle or pedestrian corridor must be in the MTP, RT Master Plan, General Plan, or Community Plan. Setback distance between project and existing or planned adjacent uses is minimized or non-existent. Setback distance between different buildings on project site is minimized. Setbacks between project buildings and planned or existing sidewalks are minimized. Buildings are oriented towards existing or planned street frontage. Primary entrances to buildings are located along planned or existing public street frontage. Project provides bicycle access to any planned bicycle corridor(s). Project provides pedestrian access to any planned pedestrian corridor(s).
18	**Residential Density With <u>No Transit</u>**	~	~	R	see below	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.
-	**3-6 Du/acre**	~	~	R	0	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.
-	**7-10 Du/acre**	~	~	R	1	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
-	**11-20 Du/acre**	~	~	R	3	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.
-	**21-30 Du/Acre**	~	~	R	5	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.
-	**31-40 Du/acre**	~	~	R	6	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.
-	**41-50 Du/acre**	~	~	R	8	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.
-	**50+ Du/acre**	~	~	R	10	Project provides high-density residential development. Mitgation value is based on project density with **no transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
18a	**Residential density With Planned Light Rail Transit**	~	~	R	see below	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**3-6 Du/acre**	~	~	R	0	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**7-10 Du/acre**	~	~	R	1.75	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**11-20 Du/acre**	~	~	R	3.75	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
-	**21-30 Du/Acre**	~	~	R	5.75	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**31-40 Du/acre**	~	~	R	6.75	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**41-50 Du/acre**	~	~	R	8.75	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**50+ Du/acre**	~	~	R	10.75	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
18b	**Residential Density with Planned Bus Rapid Transit**	~	~	R	see below	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**3-6 Du/acre**	~	~	R	0	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**7-10 Du/acre**	~	~	R	1.25	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**11-20 Du/acre**	~	~	R	3.25	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
-	**21-30 Du/Acre**	~	~	R	5.25	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**31-40 Du/acre**	~	~	R	6.25	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**41-50 Du/acre**	~	~	R	8.25	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.
-	**50+ Du/acre**	~	~	R	10.25	Project provides high-density residential development. Mitgation value is based on project density and proximity to **planned bus rapid transit**. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
18c	**Residential Density with Existing Light Rail Transit**	~	~	R	see below	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**3-6 Du/acre**	~	~	R	0	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**7-10 Du/acre**	~	~	R	2.5	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**11-20 Du/acre**	~	~	R	4.5	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**21-30 Du/Acre**	~	~	R	6.5	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
-	**31-40 Du/acre**	~	~	R	7.5	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**41-50 Du/acre**	~	~	R	9.5	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**50+ Du/acre**	~	~	R	11.5	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing light rail** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
18d	**Residential Density with Existing Bus Rapid Transit**	~	~	R	see below	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**3-6 Du/acre**	~	~	R	0	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**7-10 Du/acre**	~	~	R	2	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
-	**11-20 Du/acre**	~	~	R	4	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**21-30 Du/Acre**	~	~	R	6	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**31-40 Du/acre**	~	~	R	7	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**41-50 Du/acre**	~	~	R	9	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.
-	**50+ Du/acre**	~	~	R	11	Project provides high-density residential development. Mitgation value is based on project density and proximity to **existing bus rapid** transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
19	**Street grid**	C	M	R	1	Multiple and direct street routing (grid style). The measure applies to projects with an internal connectivity factor (CF)>=0.80, and average of 1/4 mile or less between external connections along perimeter of project. [CF=# of intersections / (# of cul-de-sacs + intersections)]
20	**Neighborhood Electric Vehicle access**	C	M	R	see below	Make physical development consistent with requirements for neighborhood electric vehicles (NEV). Current studies show that for most trips, NEVs do not replace gas,fueled vehicles as the primary vehicle. For the purpose of providing incentives for developers to promote NEV use, assume the percent reductions noted below.
20a	**Neighborhood Electric Vehicle access**	C	M	R	1.5	For 1.5% reduction, a neighborhood shall have internal NEV connections and connections to other existing NEV networks serving all other types of uses.
20b	**Neighborhood Electric Vehicle access**	C	M	R	1	For 1.0% reduction, a neighborhood shall have internal and external connections to surrounding neighborhoods.
20c	**Neighborhood Electric Vehicle access**	C	M	R	0.5	For 0.5% reduction, a neighborhood has internal connections only.
21	**Affordable Housing Component**	~	~	R	see below	Residential development projects of 5 or more dwelling units provide a deed-restricted low-income housing component on-site (as defined in Ch 22.35 of Sacramento County Ordinance Code) [Developers who pay into In-Lieu Fee Programs are not considered eligible to receive credit for this measure]. Percent reductions shall be calculated according to the following formula: % reduction=% units deed-restricted below the market rate housing *0.04
21a	**Affordable Housing Component**	~	~	R	0.6	Reductions apply if 15% of units are deed-restricted below the market housing rate.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
21b	**Affordable Housing Component**	~	~	R	0.8	Reductions apply if 20% of units are deed-restricted below the market housing rate.
21c	**Affordable Housing Component**	~	~	R	1.2	Reductions apply if 30% of units are deed-restricted below the market housing rate.
21d	**Affordable Housing Component**	~	~	R	1.6	Reductions apply if 40% of units are deed-restricted below the market housing rate.
21e	**Affordable Housing Component**	~	~	R	2	Reductions apply if 50% of units are deed-restricted below the market housing rate.
21f	**Affordable Housing Component**	~	~	R	2.4	Reductions apply if 60% of units are deed-restricted below the market housing rate.
21g	**Affordable Housing Component**	~	~	R	2.8	Reductions apply if 70% of units are deed-restricted below the market housing rate.
21h	**Affordable Housing Component**	~	~	R	3.2	Reductions apply if 80% of units are deed-restricted below the market housing rate.

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
21i	**Affordable Housing Component**	~	~	R	3.6	Reductions apply if 90% of units are deed-restricted below the market housing rate.
21j	**Affordable Housing Component**	~	~	R	4	Reductions apply if 100% of units are deed-restricted below the market housing rate.
Mixed-Use Measures						
22	**Urban Mixed-Use Measure**	~	M	~	see below	Development of projects predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential are combined in a single building or on a single site in an integrated development project with functional inter-relationships and a coherent physical design. Mitigation points for this measure depend on job to housing ratio.
22a	**Urban Mixed-Use Measure**	~	M	~	3	Reductions apply if the ratio (jobs:houses) is ≥ .5 < 1.0
22b	**Urban Mixed-Use Measure**	~	M	~	6.6	Reductions apply if the ratio (jobs:houses) is ≥ 1 < 1.5
22c	**Urban Mixed-Use Measur**e	~	M	~	9	Reductions apply if the ratio (jobs:houses) is ≥ 1.5 < 2.0
22d	**Urban Mixed-Use Measure**	~	M	~	7.29	Reductions apply if the ratio (jobs:houses) is ≥ 2.0 < 2.5

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
22e	**Urban Mixed-Use Measure**	~	M	~	6	Reductions apply if the ratio (jobs:houses) is ≥ 2.5 < 3.0
22f	**Urban Mixed-Use Measure**	~	M	~	5	Reductions apply if the ratio (jobs:houses) is ≥ 3.0< 3.5
22g	**Urban Mixed-Use Measure**	~	M	~	4.2	Reductions apply if the ratio (jobs:houses) is ≥3.5 ≤ 4.0
23	**Suburban mixed-use**	C	M	R	3	Have at least three of the following on site and/or offsite within ¼ mile: Residential Development, Retail Development, Park, Open Space, or Office.
24	**Other mixed-use**	~	M	R	1	All residential units are within ¼ mile of parks, schools or other civic uses.
Building Component Measures						
25	**Energy Star roof**	C	M	R	0.5	Install Energy Star labeled roof materials. Energy star qualified roof products reflect more of the sun's rays, decreasing the amount of heat transferred into a building.
26	**Onsite renewable energy system**	C	M	R	1	Project provides onsite renewable energy system(s).
27	**Exceed title 24**	C	M	R	1	Project Exceeds title 24 requirements by 20%

MEASURE #	Measure Name	Commercial	Mixed-Use	Residential	Estimated CO_2 Equivalent Point Reductions	Measure Description
28	**Solar orientation**	~	~	R	0.5	Orient 75 or more percent of homes and/or buildings to face either north or south (within 30 degrees of North or South). Building design includes roof overhangs that are sufficient to block the high summer sun, but not the lower winter sun, from penetrating south facing windows. Trees, other landscaping features and other buildings are sited in such a way as to maximize shade in the summer and maximize solar access to walls and windows in the winter.
29	**Non-Roof Surfaces**	C	M	R	1	Provide shade (within 5 years) and/or use light-colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30% of the site's non-roof impervious surfaces, including parking lots, walkways, plazas, etc.; OR place a minimum of 50% of parking spaces underground or covered by structured parking; OR use an open-grid pavement system (less than 50% impervious) for a minimum of 50% of the parking lot area. Unshaded parking lot areas, driveways, fire lanes, and other paved areas have a minimum albedo of .3 or greater
30	**Green Roof**	C	M	R	0.5	Install a vegetated roof that covers at least 50% of roof area. Project should demonstrate detailed graphics depicting the planned roof, detailed information on maintenance requirements for the roof, and the facilities plan for maintaining the roof post construction.
TDM and Misc. Measures						
31	**Electric lawnmower**	~	~	R	1	Provide a complimentary electric lawnmower to each residential buyer

Additional GHG Emission Reduction Measures Requiring Additional Investigation			
1	**Bike Lane Street Design**		Incorporate bicycle lanes and routes into street systems, new subdivisions, and large developments.
2	**Bike & pedestrian design**		Include pedestrian and bicycle-only streets and plazas within developments. Create travel routes that ensure that destinations may be reached conveniently by public transportation, bicycling or walking.
3	**School siting**		Site schools to increase the potential for students to walk and bike to school.
4	**Transit street design**		The project will provide for on-site road and off-site bus turnouts, passenger benches, and shelters as demand and service routes warrant subject to review and approval by local transportation planning agencies.
5	**Site design measures**		Site design to minimize th need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.
6	**Other mixed-use**		All residential units are within 1/4 mile of parks, schools or other civic uses.
7	**Mixed-Use**		Include mixed-use, infill, and higher density in development projects to support the reduction of vehicle trips, promote alternatives to individual vehicle travel, and promote efficient delivery of services and goods.
8	**Open Space**		Preserve and create open space and parks. Preserve existing trees, and plant replacement trees at a set ratio.
9	**Natural Gas Stove**		Project features only natural gas or electric stoves in residences.
10	**Solar Design**		Incorporate appropriate passive solar design and solar heaters.
11	**Vehicle Idling**		Limit idling time for commercial vehicles, including delivery and construction vehicles.
12	**Ride Sharing Programs**		Create car sharing programs. Accommodations for such programs include providing parking spaces for the car share vehicles at convenient locations accessible by public transportation.
13	**Shuttle Service**		Provide shuttle service to public transit.

14	**School Bus Services**		Work with the school district to restore or expand school bus services.
15	**Shuttle Bus Services**		Operation of a shuttle bus to shopping, health care, public services sites and other nearby trip attactors to reduce automobile use.
16	**Energy efficient appliances**		Install energy efficient heating and cooling systems, appliances and equipment, and control systems.
17	**Renewable Energy Use**		Install solar, wind, and geothermal power systems and solar hot water heaters. Educate consumers about existing incentives.
18	**Solar Panels in Parking areas**		Install solar panels on carports and over parking areas.
19	**Photovoltaic Roofing Tiles**		Install Photovoltaic roofing tiles for solar power.
20	**Tree Planting**		Protect existing trees and encourage the planting of new trees. Adopt a tree protection and replacement ordinance, e.g., requiring that trees larger than a specified diameter that are removed to accommodate development must be replaced at a set ratio.
21	**Local Farmer's Market**		Project shall dedicate space in a centralized, accessible location for a weekly farmers' market.
22	**Community Gardens**		Project shall dedicate space for community gardens.
23	**Best management practices**		Require best management practices in agriculture and animal operations to reduce emissions, conserve energy and water, and utilize alternative energy sources, including biogas, wind and solar.
24	**Land Use Density**		The project should provide densities of nine units per acre or greater, where allowed by the General Plan and/or Zone Plan, along bus routes and at bus stops to encourage transit use, where feasible.
25	**Zero Emission Infrastructure**		Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
26	**Low carbon fuel incentive program**		Institute a low-carbon fuel vehicle incentive program.