4.7 GREENHOUSE GAS EMISSIONS

This chapter contains information about greenhouse gas (GHG) emissions in Danville. It provides an overview of the current regulatory framework, describes existing conditions, and analyzes the potential impacts of the proposed General Plan and Sustainability Action Plan (SAP). As noted in Chapter 3, Project Description, and as required by CEQA, impacts are determined by comparing the proposed General Plan and SAP to existing conditions, rather than to the existing General Plan. The following evaluation is based on a quantitative analysis and examines effects on existing emissions levels, compliance with a qualified GHG emissions reduction strategy, and conflicts with GHG emissions reduction plans, policies, and regulations. The GHG emissions data used in this analysis is contained in Appendix H of this Draft EIR.

A. Regulatory Framework

This section discusses the federal, State, and regional policies and regulations that are relevant to the analysis of GHG emissions in Danville.

1. Federal Laws and Regulations

Currently there are no adopted regulations to combat global climate change on a national level. On April 2, 2007, the US Supreme Court ruled that the US Environmental Protection Agency (EPA) has the authority to regulate carbon dioxide (CO_2) emissions under the federal Clean Air Act of 1970.

After a thorough examination of the scientific evidence and careful consideration of public comments, the EPA announced on December 7, 2009, that GHG emissions threaten the public health and welfare of the American people. The EPA also found that GHG emissions from on-road vehicles contribute to that threat. The EPA's final findings respond to the 2007 US Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements, but allow the EPA to finalize the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.

The EPA's endangerment finding covers emissions of six key GHGs – CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6) – that have been the subject of scrutiny and intense analysis for decades by scientists in the US and around the world. In response to the endangerment finding, the EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (e.g., large stationary sources) to report GHG emissions data. Facilities that emit more the 25,000 metric tons (MT) of carbon dioxide equivalents (CO_2e)[1] or more per year are required to submit an annual report.

2. State Laws and Regulations

This section describes State laws and regulations that pertain to GHG emissions.

a. Assembly Bill 32 and Executive Order S-03-05

Current State of California guidance and goals for reductions in GHG emissions are embodied in Assembly Bill (AB) 32, the Global Warming Solutions Act, and Executive Order S-03-05.

AB 32 was passed by the California State legislature on August 31, 2006, to place the State on a course toward reducing its contribution of GHG emissions. AB 32 follows the 2020 tier of emissions reduction targets established in Executive Order S-03-05, signed June 1, 2005. Executive Order S-03-05 set the following GHG reduction targets for the State:

- 2000 levels by 2010
- 1990 levels by 2020
- 80 percent below 1990 levels by 2050.

AB 32 directed the California Air Resources Board (CARB), which administers the air quality standards in California, to adopt discrete early-action measures to reduce GHG emissions and outline additional reduction

[1] CO_2 equivalents are discussed further in Section B.1. Greenhouse Gases.

measures to meet the 2020 target, which it did through the Scoping Plan that it published in December 2008. Key elements of CARB's Scoping Plan are:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
- Achieving 33 percent of energy generation from renewable sources.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system for large stationary sources.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard (LCFS).
- Creating target 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.

Based on the 2002 to 2004 GHG emissions inventory conducted for the Scoping Plan by CARB, GHG emissions in California in 2020 are anticipated to be approximately 596 million metric tons (MMT) of CO_2e. In December 2007, CARB approved a 2020 emissions limit of 427 $MMTCO_2e$ for the State, which is equivalent to 1990 emissions levels. Therefore, the 2020 target requires emissions reductions of 169 $MMTCO_2e$ compared to business-as-usual (BAU) conditions (i.e., projected levels of GHG emissions in 2020 if no actions were taken to reduce GHG emissions), a reduction of 28.5 percent from BAU in 2020 (i.e., 28.5 percent of 596 $MMTCO_2e$), in order to achieve the target to achieve 1990 emissions levels by 2020.[2]

[2] California Air Resources Board (CARB) defines BAU as emissions levels that would occur if California continued to grow and increase GHG emissions, but did not adopt any measures to reduce emissions.

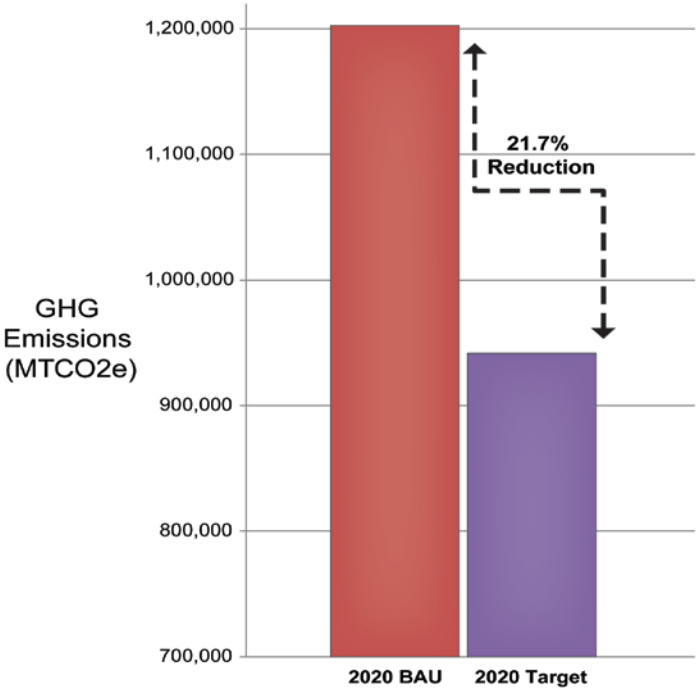
CARB recently released a Statewide GHG emissions inventory, updated for years 2000 to 2009, which shows that GHG emissions in California are increasing at a slower rate than had previously been anticipated in the 2008 Scoping Plan, likely due to the downturn in the economy. This revised inventory indicates that statewide BAU emissions in 2020 would be approximately 545 $MMTCO_2e$.

As shown in Figure 4.7-1, to achieve the AB 32 target of 1990 emissions levels by 2020 (427 MMTCO2e), the State would only need to reduce emissions by 118 MMTCO2 compared to BAU conditions, a reduction of 21.7 percent from BAU in 2020.[3]

Table 4.7-1 shows the proposed reductions from State-level regulations and programs outlined in the Scoping Plan to meet the State's emission reduction goal. Local government operations were not accounted for determining whether the actions of State agencies could achieve the 2020 emissions reduction. However, the appendices to the Scoping Plan indicated that if local governments took similar actions as State agencies were required to do, then the State would achieve additional GHG reduction benefits in the range of 5 $MMTCO_2e$, which is approximately 3 percent of the 2020 GHG emissions reduction goal.

[3] Association of Environmental Professionals, 2012. *Forecasting Community-Wide Greenhouse Gas Emissions and Setting Reduction Targets (Draft)*, available at: http://www.califaep.org/docs/AEP_Next_Steps_White_Paper.pdf.

Figure 4.7-1 State GHG Emission Reduction Target



Source: California Air Resources Board, 2007.

In recognition of the critical role local governments plays in successful implementation of AB 32, CARB recommends GHG reduction goals of 15 percent of 2005 to 2008 levels by 2020 to ensure that municipal and communitywide emissions match the State's reduction target. (Please see Section D.1, Project Impacts, for a description of whether the General Plan Update and SAP would enable Danville to meet a reduction goal consistent with AB 32.) It is anticipated that measures taken by local governments will emphasize compact, low-impact growth land use patterns over greenfield development, resulting in fewer vehicle miles traveled (VMT).

TABLE 4.7-1 **SCOPING PLAN GHG REDUCTION MEASURES AND REDUCTIONS TOWARD 2020 TARGET**

Recommended Reduction Measures	Reductions Counted Toward 2020 Target of 169 $MMTCO_2e$	Percentage of Statewide 2020 Target
Cap and Trade Program and Associated Measures[a]		
California Light-Duty Vehicle GHG Standards	31.7	19%
Energy Efficiency	26.3	16%
Renewable Portfolio Standard (33 % by 2020)	21.3	13%
Low Carbon Fuel Standard	15	9%
Regional Transportation-Related GHG Targets[b]	5	3%
Vehicle Efficiency Measures	4.5	3%
Goods Movement	3.7	2%
Million Solar Roofs	2.1	1%
Medium/Heavy Duty Vehicles	1.4	1%
High Speed Rail	1.0	1%
Industrial Measures	0.3	0%
Additional Reduction Necessary to Achieve Cap	34.4	20%
Total Cap and Trade Program Reductions	*146.7*	*84%*
Uncapped Sources/Sectors Measures		
High Global Warming Potential Gas Measures	20.2	12%
Sustainable Forests	5	3%
Industrial Measures (for sources not covered under cap and trade program)	1.1	1%

TABLE 4.7-1 **SCOPING PLAN GHG REDUCTION MEASURES AND REDUCTIONS TOWARD 2020 TARGET** (CONTINUED)

Recommended Reduction Measures	Reductions Counted Toward 2020 Target of 169 $MMTCO_2e$	Percentage of Statewide 2020 Target
Recycling and Waste (landfill methane capture)	1	1%
Total Uncapped Sources/Sectors Reductions	*27.3*	*16%*
Total Reductions Counted toward 2020 Target	**174**	**100%**
Other Recommended Measures – Not Counted toward 2020 Target		
State Government Operations	1.0 to 2.0	1%
Local Government Operations	To Be Determined	NA
Green Buildings	26	15%
Recycling and Waste	9	5%
Water Sector Measures	4.8	3%
Methane Capture at Large Dairies	1	1%
Total Other Recommended Measures – Not Counted Toward 2020 Target	*42.8*	*NA*

Notes: $MMTCO_2e$: million metric tons of carbon dioxide equivalent.
The percentages in the right-hand column add up to more than 100 percent because the emissions reduction goal is 169 $MMTCO_2e$ and the Scoping Plan identifies a reduction of 174 MMTCO2e from emissions reductions strategies.
[a] "Cap and trade" refers to a program under which an overall limit on GHG emissions from "capped" sectors is established and facilities subject to the cap may trade permits to emit GHGs. The overall cap is designed to decline over time. Capped facilities include refineries, power plants, industrial facilities, and transportation fuels. Eight percent of a company's emissions can be covered using offset credits from emission reduction projects in uncapped sectors, such as agriculture and forestry projects. For more information, please see: http://www.arb.ca.gov/cc/capandtrade/ capandtrade.htm.
[b] Reductions represent an estimate of what may be achieved from local land use changes. It is not the Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act of 2008, regional target.
Source: California Air Resources Board (CARB), 2008, Climate Change Proposed Scoping Plan, a Framework for Change.

b. Energy Conservation Standards

The California Energy Resources Conservation and Development Commission, frequently referred to as the California Energy Commission (CEC), is charged with "forecasting energy supply and demand, developing and implementing energy conservation measures, conducting energy–related research and development programs, and siting major power plants."[4] Energy conservation standards for new residential and nonresidential buildings were adopted by the CEC in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. In May 2012, the CEC adopted the 2013 Building and Energy Efficiency Standards, which will become effective on January 1, 2013. These standards are approximately 24 percent more energy efficient for residential buildings and 30 percent more energy efficient for non-residential buildings compared to the 2008 Building and Energy Efficiency Standards.

The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608) were adopted by the CEC on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. While these regulations are now often viewed as "business-as-usual," they exceed the standards imposed by all other states and they reduce GHG emissions by reducing energy demand.

On July 17, 2008, the California Building Standards Commission, an eleven-member, Governor-appointed commission which administers and implements California's building codes, adopted the nation's first green building

[4] Legislative Analyst's Office, California Energy Resources Conservation and Development Commission, http://www.lao.ca.gov/analysis_2008/resources/res_anl08006.aspx, accessed on August 23, 2012.

standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). The green building standards that became mandatory in the 2010 edition of the code established voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. The mandatory provisions of the California Green Building Code Standards became effective January 1, 2011.

c. Renewable Power Requirements

A major component of California's Renewable Energy Program is the renewable portfolio standard (RPS) established under Senate Bills 1078 (Sher) and 107 (Simitian). Under the RPS, certain retail sellers of electricity were required to increase the amount of renewable energy each year by at least 1 percent in order to reach at least 20 percent by December 30, 2010. In September 2010, CARB approved an even higher goal of 33 percent by 2020.[5] Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. The increase in renewable sources for electricity production will decrease indirect GHG emissions from development projects because electricity production from renewable sources is generally considered carbon neutral.

d. Vehicle Emission Standards/Improved Fuel Economy

Vehicle GHG emission standards were enacted under AB 1493 (Pavley I) and the Low Carbon Fuel Standard (LCFS). Pavley I is a clean-car standard that reduces GHG emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016 and is anticipated to reduce GHG emissions from new passenger vehicles by 30 percent in 2016. The LCFS requires a reduction of 2.5 percent in the carbon intensity of Califor-

[5] California Air Resources Board press release, 2010, *California Commits to More Clean, Green Energy*, http://www.arb.ca.gov/newsrel/newsrelease.php?id=155, accessed on September 5, 2012.

nia's transportation fuels by 2015 and a reduction of at least 10 percent by 2020.

e. Senate Bill 375

In 2008, Senate Bill (SB) 375, the Sustainable Communities and Climate Protection Act, was adopted to connect the GHG emissions reductions targets established in the CARB Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excluding emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce VMT and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions reduction targets for each of the 17 regions in California managed by a metropolitan planning organization (MPO). The Metropolitan Transportation Commission (MTC) is the MPO for the nine-county San Francisco Bay Area region that includes Danville. MTC's targets are a 7 percent reduction in emissions from light-duty trucks and automobiles from 2005 levels by 2020, and a 15 percent reduction from 2005 levels by 2035.

MTC's strategies to reduce vehicle emissions are based on land use, road-pricing options (e.g. tolls and high-occupancy vehicle toll lanes), and maintenance policy options, as well as the potential reductions from combining these policies. MTC's 2035 targets might be achieved through a focused growth strategy and reliance on road pricing. MTC's current plan builds on the regional plan, FOCUS, which identified approximately 120 Priority Development Areas (PDAs) to focus the region's future growth. FOCUS, a regional development and conservation strategy, promotes a more compact land use pattern for the Bay Area and unifies the four regional agencies (the Association of Bay Area Governments [ABAG], Bay Area Air Quality Management District [BAAQMD], Bay Conservation and Development Commission [BCDC], and MTC) into a single program that links land use and transportation by encouraging the development of complete, livable communities in areas served by transit, and promotes conservation of the region's most significant resource lands. FOCUS is partially funded by a Blueprint Plan-

ning Program Grant from the State of California Business, Transportation, and Housing Agency. The plan also includes investments of more than 80 percent of MTC's revenues into maintaining and operating the region's existing transportation network, building out high occupancy vehicle lanes, converting express high occupancy toll lanes, completing several transit projects, expanding the ferry system, conducting region-wide ramp metering, and completing a regional bicycle network.

SB 375 requires the MPOs to prepare a Sustainable Communities Strategy (SCS) in their regional transportation plan. For the MTC region, the first SCS is anticipated by April 2013. The SCS sets forth a development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement). The SCS is meant to provide individual jurisdictions with growth strategies that, when taken together, achieve the regional GHG emissions reduction targets. However, the SCS does not require that local general plans, specific plans, or zoning be consistent with the SCS, instead it provides incentives for consistency to governments and developers. If the SCS is unable to achieve the regional GHG emissions reduction targets, the MPO is required to prepare an Alternative Planning Strategy that shows how the GHG emissions reduction target could be achieved through other development patterns, infrastructure, and/or transportation measures.

3. Regional Plans and Policies

Danville falls within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). BAAQMD is responsible for achieving and maintaining healthful air quality for its residents by establishing programs, plans, and regulations enforcing air pollution control rules in order to attain all State and federal ambient air quality standards and to minimize public exposure to airborne toxins and nuisance odors.

BAAQMD has published guidance on the criteria for a "qualified" GHG emissions reduction strategy, which allows future developments to potential-

ly "tier" off the plan by avoiding the need for project-specific GHG emissions analyses under CEQA. BAAQMD permits this tiering consistent with the State CEQA Guidelines, Section 15183.5, which reads, in part:

> *(a) Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review.*
>
> *(b) Plans for the Reduction of Greenhouse Gas Emissions. Public agencies may choose to analyze and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions or similar document... ...a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.*

Put simply, tiering means that, for the purpose of analyzing GHG emissions impacts, projects that conform to the qualified GHG emissions reduction plan have already received CEQA analysis and may simply conclude that the project impacts are less than significant. Since the GHG reduction goals for the SAP are for the year 2020, tiering in this manner would only be applicable through that year. Tiering beyond year 2020 would rely on the compliance of future SAP updates with GHG reduction goals for future years, these goals have not yet been determined by State or regional agencies and are currently unknown.

The determination that a plan or project conforms with a qualified GHG emissions reduction strategy is made if the actions and policies of the plan or project do not conflict with those in the qualified GHG emissions reduction plan. BAAQMD sets forth the required elements for a GHG emissions reduction strategy, which is often called a climate action plan, to be considered qualified. BAAQMD also stipulates the characteristics that qualified GHG emissions strategies must have.

Beyond these criteria, BAAQMD requires that qualified GHG emissions reduction strategies address certain key emissions sectors, including: residential, commercial, industrial, transportation and land use, waste, agriculture (if pertinent), and water and wastewater treatment. In general and for each of these sectors, BAAQMD provides standards, sources, and guidelines for performing suitable GHG inventories. Qualified GHG emissions reduction strategies must evaluate the specific current emissions for each of these sectors, as well as projected emissions under both a BAU scenario and under the proposed strategy. Qualified GHG emissions reduction strategies must reasonably demonstrate that the proposed strategy would lead to decreases in GHG emissions consistent with the goals and targets of State laws, such as AB 32.

In this regard Danville's Sustainability Action Plan would be functionally indistinguishable from a climate action plan. The proposed Danville SAP has been prepared in accordance with these guidelines from BAAQMD, and is evaluated as part of this EIR.

B. Existing Conditions

The earth's atmosphere contains a group of naturally occurring gases that are responsible for maintaining a habitable climate. These gases allow sunlight to enter the earth's atmosphere freely and then prevent a portion of the resulting heat from exiting the atmosphere. Because of their ability to contain heat, these gases are known as greenhouse gases, or GHGs. Natural levels of GHGs exist in balanced proportion, resulting in steady maintenance of the temperature within earth's atmosphere. Emissions from human activities, such as electricity production and motor vehicle use, elevate the concentrations of GHGs, upsetting their natural balance.

Please see Chapter 4.9, Hydrology and Water Quality, for a description of existing climate conditions as they pertain to Danville's drainage characteristics.

1. Greenhouse Gases

The natural process through which heat is retained in the troposphere is called the "greenhouse effect." The greenhouse effect traps heat in the troposphere, the lowest portion of earth's atmosphere, through a three-fold process, as follows: 1) short-wave radiation emitted by the sun is absorbed by the earth; 2) the earth emits a portion of this energy in the form of long-wave radiation; and 3) GHGs in the upper atmosphere absorb this long wave radiation and emit some of it back toward the earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the earth is the underlying process of the greenhouse effect.

To gauge the potency of GHGs, scientists have established an international unit of measure, called Global Warming Potential (GWP). All GHGs have a GWP and this value is used to estimate the relative impact GHGs will have on global climate change. Assigning a GWP value allows policy makers to compare the impacts of emissions and reductions of different gases. For instance, methane is a significant contributor to the greenhouse effect and has a GWP of 21. This means methane is approximately 21 times more heat-absorptive than carbon dioxide per unit of mass.

Based on the GWP, all GHGs can be converted into CO_2e. For a given mixture and amount of GHGs, the CO_2e is a quantity that describes the amount of carbon dioxide that would have the same global warming potential when measured over a specified period, generally 100 years. The carbon dioxide equivalency for a gas is obtained by multiplying the GWP of the gas by the amount of gas emitted, measured in mass rather than volume.

California State law defines GHGs to include the following: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride.[6] However, some of these GHGs are only emitted through very specific processes, such as semiconductor manufacturing, and those GHGs are not likely to be emitted in Danville.

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[6] Health and Safety Code, Section 38505(g).

Table 4.7-2 shows the various GWPs and atmospheric lifetimes of the GHGs likely to be emitted in significant quantities as a consequence of this project. These GHGs that are relevant to the proposed project are described below:

- **Carbon dioxide** (CO_2) enters the atmosphere through the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, trees, and wood products; through respiration; and as a result of other chemical reactions. Carbon dioxide is also removed from the atmosphere (i.e., sequestered) when it is absorbed by plants as part of the biological carbon cycle.
- **Methane** (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, as well as from the decay of organic matter, including waste in municipal landfills and wastewater treatment facilities.
- **Nitrous oxide** (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

2. Human Influence on Climate Change

For approximately 1,000 years before the Industrial Revolution, the amount of GHGs in the atmosphere remained relatively constant. However, during the 20th century, scientists observed rapid changes in the climate and in the atmospheric levels of climate change pollutants that are attributable to human activities. The amount of atmospheric CO_2 has increased by more than 35 percent since preindustrial times and has increased at an average rate of 1.4 parts per million (ppm) per year since 1960, mainly due to combustion of fossil fuels and to deforestation.[7] These recent changes in climate change pollutants far exceed the extremes of the ice ages, and the global mean temperature is warming at a rate that cannot be explained by natural causes alone. Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants.[8]

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[7] Intergovernmental Panel on Climate Change (IPCC), 2007. *Fourth Assessment Report: Climate Change 2007*, New York: Cambridge University Press.

[8] California Climate Action Team, 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*.

TABLE 4.7-2 **GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES**

GHGs	Atmospheric Lifetime (Years)	Global Warming Potential
Carbon Dioxide (CO_2)	50 to 200	1
Methane (CH_4)[a]	12 (±3)	21
Nitrous Oxide (N_2O)	120	310

[a] The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.
Source: United States Environmental Protection Agency (USEPA), 2009, *Global Warming Potentials and Atmospheric Lifetimes, Non-CO_2 Gases Economic Analysis and Inventory*, available at: http://www.epa.gov/climatechange/glossary.html#GWP.

3. California's GHG Sources and Relative Contribution

California is the second largest emitter of GHGs in the United States, only surpassed by Texas, and the tenth largest GHG emitter in the world.[9] However, because of more stringent air emission regulations, in 2001 California ranked fourth lowest in carbon emissions per capita and fifth lowest among states in CO_2 emissions from fossil fuel consumption per unit of Gross State Product (i.e., total economic output of goods and services). In 2009, California produced 457 MMTCO2e GHG emissions, of which 86 percent were from CO_2, 7 percent were from CH_4, and 3 percent were from N_2O. The remaining 4 percent of GHG emissions were from high GWP gases, which include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.[10]

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[9] California Energy Commission, 2005. Climate Change Emissions Estimates from Bemis, Gerry and Jennifer Allen, *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2002 Update,* California Energy Commission Staff Paper CEC-600-2005-025, Sacramento, California.

[10] California Air Resources Board (CARB), 2011. *California Greenhouse Gas Emissions Inventory: 2000 to 2009*, available at http://www.arb.ca.gov/cc/inventory/data/data.htm.

CO_2 emissions from human activities make up 84 percent of California's total GHG emissions. California's transportation sector is the single largest generator of GHG emissions, producing 38 percent of the State's total emissions. Electricity generation is the second largest source, comprising 23 percent. Industrial activities are California's third largest source of GHG emissions, generating 20 percent of state's total emissions. Commercial and residential electricity consumption, recycling and waste, agriculture, forestry, and high GWPs make up the balance of California's GHG emissions.[11]

4. Potential Climate Change Impacts for California

Climate change is not a local environmental impact; it is a global impact with local implications. Unlike criteria pollutants (i.e., principal air pollutants subject to health-based air quality standards established by the State and federal governments), CO_2 emissions cannot be attributed to a direct health effect. However, human-caused increases in GHG have been shown to be highly correlated with increases in the surface and ocean temperatures on earth.[12] The extent of the impact on environmental systems, however, is less clear.

In California and western North America, climate observations have indicated: 1) a trend toward warmer winter and spring temperatures; 2) a decreasing fraction of precipitation falling as snow; 3) diminished mountain spring snow accumulation in the lower and middle elevations; 4) spring snowmelt occurring 5 to 30 days earlier; and 5) a similar shift (5 to 30 days earlier) in the timing of spring flower blooms.[13]

The Intergovernmental Panel on Climate Change (IPCC) is an international scientific organization that was established in 1988 by the United Nations

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[11] California Air Resources Board (CARB), 2011. *California Greenhouse Gas Emissions Inventory: 2000 to 2009*, available at http://www.arb.ca.gov/cc/inventory/data/data.htm.

[12] Intergovernmental Panel on Climate Change, 2007. *Fourth Assessment Report: Climate Change 2007*, New York: Cambridge University Press.

[13] California Climate Action Team, 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*.

Environmental Programme and World Meteorological Organization. The IPCC's 2007 Fourth Assessment Report projects that the global mean temperature increase from 1990 to 2100, under different climate change scenarios, will range from 1.4 to 5.8°C (2.5 to 10.4°F). In the past, gradual changes in the earth's temperature changed the distribution of species, availability of water, and other environmental characteristics. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic timeframe but within a human lifetime.[14]

Like the variability in the projections of the expected increase in global surface temperatures, the environmental consequences of gradual changes in the earth's temperature are also hard to predict. According to the California Energy Commission's (CEC) 2008 report, *The Future Is Now, An Update on Climate Change Science, Impacts, and Response Options for California*, global climate change risks include: public health impacts, water resources impacts, agricultural impacts, disruption of native ecosystems, altered landscapes, increased wildfire risk, accelerated rises in sea level, forestry impacts, and higher energy demand. These risks are shown in Table 4.7-3.

The California Climate Action Team (CAT) is comprised of State agency secretaries and heads of agencies, boards, and departments that works to coordinate various Statewide efforts to reduce GHG emissions. According to the CAT, even if actions could be taken to immediately curtail climate change emissions, the potency of emissions that have already built up, their long atmospheric lifetimes, and the inertia of the earth's climate system could produce as much as 0.6°C (1.1°F) of additional warming. Consequently, some impacts from climate change are now considered unavoidable.

[14] Intergovernmental Panel on Climate Change, 2007. *Fourth Assessment Report: Climate Change 2007*, New York: Cambridge University Press.

TABLE 4.7-3 **SUMMARY OF CLIMATE CHANGE RISKS TO CALIFORNIA**

Impact Category	Potential Risk
Public Health Impacts	Poor air quality made worse More severe heat
Water Resources Impacts	Decreasing Sierra Nevada snow pack Challenges in securing adequate water supply Potential reduction in hydropower Loss of winter recreation
Agricultural Impacts	Increasing threats from pests and pathogens Declining productivity Irregular blooms and harvests
Ecosystem Impacts	Northward/upward shifts of biotic communities Altered timing of migration and mating habits Loss of sensitive or slow-moving species
Landscape Alteration	Movement of forest areas Conversion of forest to grassland Changes to water bodies
Wildfire Risk	Increased risk and severity of wildfire Lengthening of wildfire season
Coast Sea Level Impacts	Accelerated sea level rise Increasing coastal floods Worsened impacts on infrastructure
Forestry Impacts	Increasing wildfires Increasing threats from pest and pathogens Declining forest productivity Shifting vegetation and species distribution
Energy Demand Impacts	Potential reduction in hydropower Increased energy demand

Sources: California Energy Commission (CEC), *The Future Is Now, An Update on Climate Change Science, Impacts, and Response Options for California*, 2008 Report, PIER Publications, CEC-500-2008-077, 2008; California Climate Action Team (CAT), March 2006, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*.

5. Danville Emissions

This section summarizes existing GHG emissions in Danville resulting from the following sectors: transportation, residential and non-residential energy use, water and wastewater, solid waste disposal, and other sources. This baseline GHG inventory was compiled for the year 2008.[15] Danville's average annual communitywide GHG emissions in 2008 were 351,590 $MTCO_2e$. The results of the inventory are shown in Table 4.7-4.

a. Transportation Emissions

Transportation sources of GHG emissions are a result of fuel combustion from the burning of fossil fuels, including gasoline and diesel, and from on-road mobile sources (e.g., passenger vehicles and trucks). Transportation emissions are based on trips generated by land uses within Danville. Transportation emissions include:

- 100 percent of trips that both begin and end within Danville.
- 50 percent of the trip length for trips from Danville to somewhere else (internal-external trips) and trips from somewhere else to Danville (external-internal trips).
- 0 percent of pass-through trips that neither begin nor end in Danville, such as cars driving from Walnut Creek to San Ramon on Interstate 680.

This approach reflects standard modeling techniques based on agency-supported methodologies, which ensure equitable estimation of community contributions to Vehicular Miles Traveled (VMT). VMT generated by land uses within the town were compiled by Fehr & Peers for Danville in 2010; these estimates were normalized to the year 2008 using changes to the service population. GHG emissions from those VMT were compiled by The Planning Center | DC&E using CARB's Emissions Factors 2011 (EMFAC2011) program and are shown in Table 4.7-5.

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[15] Energy use (purchased electricity and natural gas), water use, and waste disposal fluctuate according to meteorological conditions (e.g. precipitation and temperatures), so it is recommended that a three-year average be used. A three-year average between 2006 and 2008 was obtained for energy use, waste disposal, and water use/wastewater generation.

TABLE 4.7-4 **BASELINE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS SUMMARY**

Source Sector	GHG Emissions ($MTCO_2e$/Year)	Percent of Total
Transportation[a]	158,620	45%
Residential[b]	119,120	34%
Non-Residential[b]	23,810	7%
Water/Wastewater[c]	24,220	7%
Solid Waste Disposal[d]	7,380	2%
Other Off-Road Emissions[e]	18,440	5%
Total	**351,590**	

Note: Emissions are rounded to the nearest tens place.
[a] EMFAC2011 based on VMT provided by Fehr & Peers.
[b] Natural gas and purchased energy provided by PG&E.
[c] Local Government Operations Protocol (LGOP) Version 1.1 based on water use data provided by EBMUD and wastewater data provided by CCCSD.
[d] US EPA Warm Model based on waste disposal data obtained from CalRecycle.
[e] OFFROAD Model, based on information from sources cited below.
Source: The Planning Center | DC&E, 2012; Fehr & Peers, 2012; County of Contra Costa, Department of Agriculture, 2011; 2010 Contra Costa County Crop Report (County); Danville 2030 General Plan Land Uses (Town); Association of Bay Area Governments (ABAG 2009).

TABLE 4.7-5 **BASELINE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS FROM TRANSPORTATION SOURCES**

Vehicle Miles Traveled		GHG Emissions
Daily	Annual	MTCO2e /Year
936,783	325,063,750	158,620

Notes: Daily VMT is multiplied by 347 days/year to account for reduced traffic on weekends and holidays, consistent with the CARB methodology within the Climate Change Scoping Plan Measure Documentation Supplement. Emissions are rounded to the nearest tens place.
Source: EMFAC2011.

Vehicle Miles Traveled (VMT) is a measure of the total distance traversed by motor vehicles for a given area or population. Passenger miles traveled is a another measure that changes based on the number of riders in a vehicle; because VMT is alternatively reflective of total vehicle usage, it is a better means to estimate vehicular GHG emissions.

b. Residential Emissions

Residential land uses generate GHG emissions primarily from purchased electricity and natural gas used for heating and cooking.[16] Pacific Gas and Electric Company (PG&E) provided residential purchased energy and natural gas use for years 2006–2008. Table 4.7-6 shows these data.

c. Non-Residential Emissions

The non-residential category includes GHG emissions associated with commercial, office, and industrial land uses. Non-residential land uses generate GHG emissions primarily from purchased electricity and natural gas used for heating and cooking (e.g. restaurants). PG&E provided data on non-residential purchased energy use and natural gas use for years 2006 to 2008, as shown in Table 4.7-7.

[16] Burning wood is considered a biogenic source of carbon dioxide (a GHG) because the carbon is associated with recently living organic material. Biogenic sources of GHG emissions are not included as part of a communitywide GHG inventory.

TABLE 4.7-6 **BASELINE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS FROM RESIDENTIAL LAND USES**

Source	Energy Usage	GHG Emissions MTCO2e /Year
Residential Building Purchased Energy	167,972,519 kWh	44,240
Residential Building Natural Gas	11,230,720 therms	74,880
Total		**119,120**

Notes: Based on the three-year average energy use from 2006 to 2008. Excludes properties owned by another governmental entity that are outside the land use authority of the Town of Danville (i.e. County or State jurisdiction). Based on PG&E's third-party verified GHG emission factors. Emissions are rounded to the nearest tens place. "kWh" = kilowatt hours.
Source: PG&E, 2012.

TABLE 4.7-7 **BASELINE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS FROM NON-RESIDENTIAL LAND USES**

Source	Energy Usage	GHG Emissions MTCO2e /Year
Non-Residential Building Purchased Energy	58,056,674 kWh	15,290
Non-Residential Building Natural Gas	1,277,747 therms	8,520
Total		**23,810**

Notes: Based on the three-year average energy use from 2006 to 2008. Excludes properties owned by another government entity that are outside the land use authority of the Town of Danville (i.e. County or State jurisdiction). Based on PG&E's third-party verified GHG emission factors. Emissions are rounded to the nearest tens place. "kWh" = kilowatt hours.
Source: PG&E, 2012.

d. Water/Wastewater Emissions

Water demand and wastewater generation in Danville result in indirect GHG emissions from the energy required to convey, treat, and distribute potable water and from emissions of methane and nitrous oxide from wastewater treatment that are not captured within the wastewater treatment system. Table 4.7-8 shows GHG emissions from the town's water use and wastewater generation.

Wastewater treatment processes produce "fugitive" GHG emissions. Under anaerobic conditions, microorganisms biodegrade soluble organic material in wastewater during both nitrification and denitrification and generate emissions of nitrous oxide. These are shown in Table 4.7-8 as Fugitive Emissions. For comparison to other emissions sources, these emissions are converted to CO_2e.

The vast majority of households and businesses in Danville are connected to the Town's sanitary sewer system.[17] Wastewater from Danville is treated at the Central Contra Costa Sanitary District Treatment Plant in Martinez, California. Treated water is discharged into Suisun Bay.

e. Solid Waste Disposal Emissions

Treatment and disposal of solid waste produces significant amounts of methane, a GHG. Most operating landfills in California also implement a landfill gas recovery system as a common way to reduce methane emissions from solid waste disposal. Although solid waste disposal sites produce biogenic CO_2, biogenic sources of GHG emissions are not included as part of a communitywide GHG inventory.

[17] A small portion of households in the hillsides are on separate septic tank systems. For the purpose of this GHG emissions inventory, all wastewater was modeled as treated wastewater.

TABLE 4.7-8 **BASELINE COMMUNITYWIDE GHG EMISSIONS FROM WATER USE AND WASTEWATER TREATMENT**

	Energy (Megawatt Hours/Year)[a]	Energy Emissions (MTCO2e/ Year)[b]	Fugitive Emissions (MTCO2e/ Year)	Total GHG Emissions (MTCO2e/ Year)
Water Use	67,486	17,800	--	17,800
Wastewater Treatment	16,581	4,380	2,040	6,410
Total	**84,068**	**22,180**	**2,040**	**24,210**

Notes: Emissions are rounded to the nearest tens place.
[a] Energy associated with water conveyance, treatment, and distribution, and wastewater treatment.
[b] Based on GHG emission factors provided by the California Energy Commission (2006) and PG&E.

The California Department of Resources Recycling and Recovery (CalRecycle) maintains a disposal reporting system to document waste disposal by jurisdiction and facility; this system was used to access the data needed to identify GHG emissions from solid waste generated in Danville. The system tracks solid waste disposal and alternative daily cover that is used as a temporary overlay on an exposed landfill face to reduce insects and vermin. Typical cover materials include green materials, sludge, ash and kiln residue, compost, construction, and demolition debris, and special foams and fabric; these materials contribute to the total solid waste disposal documented for Danville.

The US Environmental Protection Agency's Waste Reduction Model (WARM), Version 12, was used to calculate average annual GHG emissions from communitywide waste disposed in a given year. Pursuant to BAAQMD's methodology, a three-year average (2006 to 2008) was compiled. According to the CalRecycle disposal reporting system, between 2006 and 2008, Danville disposed of an average of 37,208 tons of solid waste and 12,452 tons of alternative daily cover, for a total disposal of 49,660 tons of solid waste.

TABLE 4.7-9 **BASELINE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS FROM WASTE DISPOSAL**

CO2e Generated (Metric Tons/Year)	Fugitive CO2e Not Captured (Metric Tons/Year)[a]
29,530	7,380

Notes: Biogenic carbon dioxide is not included. Highest emissions occur approximately three years after disposal. An aggregated three years of emissions was used to account for cumulative disposal (waste-in-place). Emissions are rounded to the nearest tens place.
[a] Assumes a landfill gas control efficiency of 75 percent based on the LGOP.
Source: US EPA, February 2012, Waste Reduction Model (WARM), Version 12.

The vast majority of solid waste generated by the town is disposed of by the Central Contra Costa Solid Waste Authority, which uses two landfills: the Keller Canyon Landfill in Pittsburg, CA and the Acme Landfill in Martinez, CA.18 A landfill gas control efficiency of 75 percent was assumed based on the default value recommended by the Local Governments Operations Protocol (LGOP). However, most large landfills, have clay or geomembrane covers, which have a gas collection efficiency of 85 to 90 percent, respectively.19 Therefore, GHG emissions estimates for Danville from waste disposal are conservative. Table 4.7-9 shows total GHG emissions from waste disposal for the town.

f. Other Off-Road Emissions

Other sources of GHG emissions include the combustion of fossil fuels for off-road stationary equipment, such as landscaping and construction equipment; these sources are summarized in Table 4.7-10.

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[18] CIWMB website, http://www.calrecycle.ca.gov/profiles/Facility/ Landfill/LFProfile1.asp?COID=7&FACID=07-AA-0032, accessed August 16, 2011.

[19] Bay Area Air Quality Management District (BAAQMD), 2008. *Greenhouse Gas Mitigation Landfill Gas and Industrial, Institutional, and Commercial Boilers, Steam Generators and Process Heaters*, Prepared by URS Corporation.

TABLE 4.7-10 **BASELINE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS FROM OTHER OFF-ROAD EMISSIONS**

Source	GHG Emissions (MTCO2e/Year)
Agricultural Equipment	110
Construction Equipment	16,390
Lawn & Garden Equipment	870
Light Commercial Equipment	1,070
Total	**18,440**

Notes: Emissions are rounded to the nearest tens place.
Source: OFFROAD Model, based on information from: County of Contra Costa, Department of Agriculture. 2011. 2010 Contra Costa County Crop Report (County); Danville 2030 General Plan Land Uses (Town); Association of Bay Area Governments (ABAG 2009).

This category represents GHG emissions from off-road equipment exhaust from the following types of equipment used within Danville:

- Agricultural equipment such as tractors and combines.
- Off-road construction equipment, such as bulldozers, cranes, backhoes, and water trucks.
- Landscaping equipment, including blowers, mowers, and other landscaping tools.
- Light commercial and industrial equipment, including generators, pressure washers, welders, and pumps.

C. *Standards of Significance*

CEQA requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects considered for approval, including cumulative impacts. Cumulative impacts are the collective impacts of one or more past, present, or future projects that, when combined, result in adverse changes to the environment. Global climate change is considered an "effect on the environment" and an individual project's incremental contribution to global climate change, although small, can have a cumulatively significant impact when considered collectively with past, present, and future projects. Therefore, climate change is addressed primarily as a cumulative impact for purposes of CEQA.

Danville falls within the jurisdiction of BAAQMD. BAAQMD's CEQA Air Quality Guidelines include a methodology and thresholds for GHG emissions. On March 5, 2012, the Court issued a ruling in California Building Industry Association v. Bay Area Air Quality Management District (Superior Court Case No. RG10548693). Pursuant to the ruling, the Court found that the adoption of the BAAQMD's CEQA Guidelines is a "project" requiring CEQA review. No CEQA review was conducted for the CEQA Guidelines prior to their adoption. Therefore, the Court set aside adoption of the BAAQMD CEQA Guidelines for determining the significance of air quality and greenhouse gas emissions. The Court also ordered BAAQMD to take no further action to disseminate those standards before performing CEQA review related to issuing the standards. While adoption of the thresholds was set aside until an environmental evaluation is conducted, BAAQMD's GHG significance criteria, as outlined in their Draft CEQA Guidelines, are supported by extensive studies and analysis. Accordingly, pursuant to its discretion under CEQA Guidelines section 15064 (b), the Town has decided to apply the BAAQMD CEQA thresholds to the proposed Project.

On December 30, 2009, the California Natural Resources Agency adopted CEQA Guidelines Amendments related to climate change. These amend-

ments became effective on March 18, 2010. Consistent with the amended guidelines, climate change impacts associated with the project would be considered significant if the project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

For the first impact above, BAAQMD sets the plan-level standards of significance by which the proposed project is to be evaluated. The Guidelines include methodology and thresholds for GHG impacts for General Plan analyses which are consistent with the GHG reduction goals of AB 32. As such, the impact of the proposed project is deemed less than significant if it:

- Complies with a qualified GHG emissions reduction strategy, or
- Results in emissions less than 6.6 MTCO2e per service population, per year, where service population is the total number of employees and residents within the town.

BAAQMD, in accordance with the updated CEQA Guidelines, allows cities to tier off plans to mitigate the effects of GHG emissions on a city/town-level, consistent with AB 32 goals. An AB 32 consistency determination is considered equivalent to a qualified GHG reduction strategy, so long as it achieves one of the following GHG emissions reduction goals within its jurisdiction:

- Reduce emissions to 1990 GHG emission levels by 2020
- Reduce emissions 15 percent below 2008 or earlier emission levels by 2020
- Meet the plan efficiency threshold of 6.6 MTons per service population (SP) per year

For general plan level analyses, BAAQMD CEQA Guidelines recommend that GHG emissions from direct and indirect communitywide emission

sources be quantified for the baseline year, the year 2020, and the projected year of buildout. Direct sources of emissions include onsite combustion of energy such as natural gas used for heating and cooking, emissions from industrial processes (not applicable to Danville), and fuel combustion from mobile sources. Indirect emissions are emissions produced offsite from energy production and water conveyance due to a project's energy use and water consumption. Biogenic CO_2 emissions are not included in the quantification of a project's GHG emissions because biogenic CO_2 is derived from living biomass (e.g., organic matter present in wood, paper, vegetable oils, animal fat, food, animal and yard waste) as opposed to fossil fuels.

D. Impact Discussion

This section discusses potential impacts of the proposed General Plan and SAP related to GHG emissions.

1. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance. The sections of this discussion are organized to reflect the general hierarchy of the standards discussed above.

a. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment

Using BAAQMD plan-level standards, the project would have a less-than-significant impact if it:

i. Complies with a qualified GHG emissions reduction strategy, or

ii. Results in emissions less than 6.6 MTCO2e per service population, per year, where service population is the total number of employees and residents within the town.

The proposed SAP would be adopted concurrent with the 2030 General Plan and is the Town's GHG emissions reduction strategy. BAAQMD guidelines

state that in order for a GHG emissions reduction strategy to be considered qualified, it must include certain elements. Table 4.7-11 describes each of these elements and demonstrates how the Danville SAP would satisfy the requirements for each element. BAAQMD also stipulates that qualified GHG emissions reduction strategies must be characterized by certain characteristics. Table 4.7-12 describes each of these characteristics and demonstrates how the Danville SAP would incorporate them.

Finally, a qualified GHG emissions reduction strategy must address the residential, commercial, industrial, transportation and land use, waste, agriculture (if pertinent), and water and wastewater treatment sectors. Qualified GHG emissions reduction strategies must evaluate the specific current emissions for each of these sectors, as well as projected emissions under both a BAU scenario and under the proposed strategy. Qualified GHG emissions reduction strategies must reasonably demonstrate that the proposed strategy would lead to decreases in GHG emissions consistent with the goals and targets of State laws, such as AB 32.

The proposed SAP also addresses the emissions sectors identified in BAAQMD guidance, with the following exceptions:

- Although there is a very small amount of industrial activity in Danville, the proposed SAP does not include industrial stationary source GHG emissions in the inventory or forecasts because those emissions are regulated by BAAQMD, and are not under the jurisdiction of the Town of Danville, therefore Danville cannot adopt measures to reduce emissions from these sources.
- Although there are currently limited agricultural uses in Danville, and the conversion of agricultural lands to urban land uses can release GHGs, the potential for emissions from biomass stored in agricultural areas in the town does not constitute a substantial portion of the town's GHG emissions. Therefore, carbon stock from agricultural biomass would not make a measurable difference in determining the amount of Danville's future emissions, and is not included in the GHG emissions inventory or forecasts.

TABLE 4.7-11 **QUALIFIED GHG EMISSIONS REDUCTION STRATEGY ELEMENTS**

Required Element	Inclusion in Danville SAP
A GHG emissions inventory and a Business as Usual (BAU) projection.	The proposed SAP includes a GHG emissions inventory for 2008 in Chapter 2: Existing GHG Emissions Inventory, and a BAU projection in Chapter 3: 2020 Business As Usual and Adjusted GHG Emissions Inventory.
A GHG emissions reduction target consistent with AB 32.	The proposed SAP includes a GHG emissions target of a 15 percent reduction from 2008 Baseline emission levels. This target is discussed in Chapter 4: GHG Emissions Reduction Target, of the proposed SAP. As explained in that chapter, the target reflects the CEQA guidelines adopted by BAAQMD, which offer 15 percent below the 2008 baseline as an emissions target option.
A review of relevant local and State policies.	The proposed SAP includes a review of relevant State and local policies in Chapter 1: Introduction.
Quantitative emissions projections demonstrating target achievement.	In Chapter 5, GHG Reduction Measures, Implementation, and Monitoring, the proposed SAP quantifies the projected GHG emissions reductions from the SAP measures. These measures, in combination with GHG emissions reductions from State and federal regulations, which are quantified in Chapter 3, 2020 Business as Usual and Adjusted GHG Emissions Inventory, achieve the GHG emissions reduction target.
Strategies for implementation and monitoring.	The proposed SAP includes implementation and monitoring direction in Chapter 5, GHG Reduction Measures, Implementation, and Monitoring.
Environmental review.	This EIR serves as the environmental review for the proposed SAP.

TABLE 4.7-12 **QUALIFIED GHG EMISSIONS REDUCTION STRATEGY CHARACTERISTICS**

Required Characteristic	Inclusion in Danville SAP
A complete and comprehensive inventory of GHG emissions.	The inventory of GHG emissions provided in SAP Chapter 2, The existing GHG Emissions Inventory is consistent with BAAQMD guidance regarding methodology for GHG inventories.
Transparent calculations and assumptions.	All calculations and assumptions are transparently demonstrated in the SAP appendices.
GHG reductions measures which are mostly mandatory.	The proposed SAP includes a variety of types of measures, some of which are mandatory and some that are voluntary. The majority of the measures that contribute to the quantified GHG emissions reductions are mandatory or reflect programs to which the Town has made continuing commitments.
A "margin of safety" to ensure emission reduction goals are met.	The proposed SAP includes a substantial "margin of safety" to ensure that emissions reduction goals are met. Specifically, the proposed SAP must reduce GHG emissions by 74,778 $MTCO_2e$ in order to reach its target. The measures in the proposed SAP, in combination with State and federal requirements, would reduce GHG emissions by 95,103–95,891 $MTCO_2e$, leaving a "margin of safety" of 20,325–21,113 $MTCO_2e$, or 27–28 percent of the required reduction.
Measures that address both new and existing development.	The proposed SAP includes measures that apply to both new and existing development. While the majority of the measures apply to new development, some measures also apply to existing development, such as Measure EG-3, which requires outdoor lighting fixtures to be energy efficient, such as through use of lighting controlled by timers, motion sensors, or photocells. Measure RW-2 would require the provision of recycling areas in existing multi-family developments.
Clearly-defined implementation and monitoring strategies.	The implementation and monitoring strategies in Chapter 5, GHG Reduction Measures, Implementation, and Monitoring, of the proposed SAP are clearly defined. Implementation strategies address action items, responsible parties, and cost effectiveness for each measure. The monitoring plan directs the Town to review and modify the SAP every five years to evaluate implementation and achievement of measure reductions and to identify potential plan update needs. As part of this review, the plan directs the Town to re-inventory its GHG emissions, allowing the Town to monitor progress and report results toward local emissions reduction targets and identify opportunities to integrate new or improved measures into the emissions reduction plan.

The omitted sectors described above are addressed in Chapter 2, Existing GHG Emissions Inventory, of the proposed SAP, but are not included in the inventory or emissions projections for the reasons stated above.

For all other sectors, the proposed SAP evaluates the current emissions and projected emissions under both a BAU scenario and a scenario with implementation of the proposed SAP in Chapter 3, 2020 Business as Usual and Adjusted GHG Emissions Inventory, and Chapter 5, GHG Reduction Measures, Implementation, and Monitoring.

The proposed General Plan is consistent with the proposed SAP because the proposed General Plan policies and actions do not conflict with those in the proposed SAP, and instead are supportive of the GHG reduction measures in the SAP. Specifically, the policies and actions under proposed 2030 General Plan Goal 33 aim to reduce GHG emissions in Danville and closely mirror the GHG reduction measures included in the SAP. In this manner, the Draft 2030 General Plan demonstrates strong consistency with the proposed SAP.

The proposed SAP would act as a qualified GHG reduction strategy because it would serve to decrease Danville GHG emissions to 15 percent below the 2008 baseline, consistent with the guidelines from BAAQMD, discussed above. Table 4.7-13 shows the GHG emission projections which demonstrate that that SAP would meet BAAQMD's 2020 15 percent below baseline reduction goal.

TABLE 4.7-13 **DANVILLE GHG EMISSIONS BASELINE INVENTORY AND 2020 FORECASTS (ALL VALUES IN $MTCO_2E$ PER YEAR)**

	2008 Baseline	2020 Business as Usual	2020 Adjusted
Transportation[a]	158,620	169,290	129,920
Residential[b]	119,120	127,360	102,840
Non-Residential[b]	23,810	24,890	16,760
Water/Wastewater[c]	24,220	25,750	14,220
Solid Waste Disposal[d]	7,380	7,850	7,850
Other Off-Road Emissions[e]	18,440	18,490	16,640
Total	**351,590**	**373,630**	**277,740**
Goal: 15 percent below 2008 baseline		**298,850**	**298,850**
Achieves goal		**NO**	**YES**

Note: Emissions are rounded to the nearest tens place.
[a] EMFAC2011 based on VMT provided by Fehr & Peers.
[b] Natural gas and purchased energy provided by PG&E.
[c] Local Government Operations Protocol (LGOP) Version 1.1 based on water use data provided by EBMUD and wastewater data provided by CCCSD.
[d] US EPA Warm Model based on waste disposal obtained from CalRecycle.
[e] OFFROAD Model, based on information from sources cited below.
Source: The Planning Center | DC&E, 2012; Fehr & Peers, 2012; County of Contra Costa, Department of Agriculture, 2011; 2010 Contra Costa County Crop Report (County); Danville 2030 General Plan Land Uses (Town); Association of Bay Area Governments (ABAG 2009).

Additionally, under the 2020 adjusted forecast, whereby federal, State, and local measures would together serve to reduce GHG emissions, Danville would also meet the second significance criteria by achieving per-service-population emissions less than 6.6 $MTCO_2e$. With projected total GHG emissions of 288,330 $MTCO_2e$ in the adjusted 2020 forecast, and an estimated 2020 service population of 65,684 residents and employees, Danville is anticipated to have emissions of 5.69 $MTCO_2e$ "per service population." However,

since Danville has created a detailed and robust Sustainability Action Plan, the satisfaction of the first criteria is emphasized.

Because the proposed SAP is anticipated to serve as a qualified GHG emissions reduction strategy, and because the Draft 2030 General Plan is consistent with the proposed SAP, the impact would be *less than significant*.

b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

i. AB 32 and CARB 2008 reduction goals

As described in Section A.2.a, Assembly Bill 32 and Executive Order S-03-05, in accordance with AB 32, CARB developed the Scoping Plan to outline the state's strategy to achieve 1990 level emissions by 2020. To estimate the reductions necessary, CARB projected statewide 2020 BAU GHG emissions, and then determined that the state as a whole would need to reduce GHG emissions by 28.5 percent from 2020 BAU in order to achieve 1990 levels, as directed by AB 32.[20] CARB's 2008 Scoping Plan also recognized that achieving the AB 32 2020 GHG reduction goal would require the state to reduce emissions by approximately 15 percent from current levels and recommended similar reduction goals for local governments.

The SAP aligns the Town's GHG reduction goals with the GHG target outlined in CARB's 2008 Scoping Plan. The Town's GHG reduction goal of 15 percent from existing conditions is also consistent with the target options identified in BAAQMD's CEQA Guidelines. As explained in Section D.1.a. Project Impacts, the proposed General Plan and SAP would meet the AB 32 GHG emissions reduction target for Danville for 2020. With adherence to the SAP, GHG emissions generated within the Town of Danville through 2020 would be less than cumulatively considerable, and the impact would be *less than significant*.

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[20] CARB, 2008. *Climate Change Proposed Scoping Plan, a Framework for Change.*

ii. Executive Order S-03-05

Danville's General Plan guides growth and development past the 2020 horizon year of CARB's Scoping Plan and the GHG reduction target of AB 32. While the GHG reduction measures outlined in the Town's SAP are applicable throughout the 2030 horizon year of the General Plan update, CARB's Scoping Plan only guides GHG reductions in the state through 2020 and the California legislature has not adopted a statewide GHG reduction target past 2020. Executive Order S-03-05 establishes a long-term goal for the state to reduce GHG emissions by 80 percent below 1990 levels by 2050. However, the emissions reductions required to achieve this goal are not feasible based on current emissions technologies, and the State has not yet identified programs and measures to achieve the long-term goal. Nonetheless, because the General Plan update guides growth and development in the town through its horizon year 2030, the measures identified in the SAP and 2030 General Plan would continue to assist the state in reducing emissions toward the long-term goal of Executive Order S-03-05.

Without consideration of any federal, State, or local measures to reduce GHG emissions, GHG emissions in Danville in 2030/35[21] under the proposed General Plan are projected to be 420,440 $MTCO_2e$. Known State and federal measures are projected to reduce 2030/2035 emissions to 305,180 $MTCO_2e$. While the proposed SAP measures would further reduce the 2030/2035 emissions to 290,970 $MTCO_2e$, it is likely that additional State and local measures would be needed to place Danville on-track to meet Executive Order S-03-05's 2050 goal. Neither State nor regional agencies have established GHG reduction goals or plans for any year between 2020 and 2050; however, given the 80 percent reduction goal by 2050 of Executive Order S-03-05, it is conservative to estimate that an additional 15 percent reduction (30 percent below 2008 baseline) would be needed by 2030.

[21] Buildout projections under the General Plan focus on development occurring by 2030. Significant growth is not anticipated between 2030 and 2035. However, the traffic modeling used to forecast Danville GHG emissions has a technical horizon year of 2035, therefore these projections are labeled as 2030/2035.

Table 4.7-14 shows Danville's forecast 2030/2035 GHG emissions and demonstrates that it is highly unlikely Danville's emissions would meet any interim 2030 goal consistent with reaching 2050 goals under Executive Order S-03-05. Moreover, any State or regional action regarding GHG reductions beyond 2020 is highly uncertain. Therefore, GHG emissions generated within the Danville would cumulatively contribute to GHG emissions post-2020, and the impact would be *significant*.

Impact GHG-1: As currently proposed, the General Plan and SAP alone would not be sufficient to meet plausible future GHG reduction goals consistent with Executive Order S-03-05's goal to reduce GHG emissions by 80 percent below 1990 levels by 2050.

The majority of the reductions needed to reach the 2050 target will likely come from State measures (e.g., additional vehicle emissions standards), but the Town does not have authority over such measures, and the State has not identified plans to reduce emissions beyond 2020. Additionally, this significant impact would occur irrespective of the adoption of the 2030 General Plan and the SAP; however, the adoption and implementation of these plans would serve to bring the town closer to meeting likely future GHG reduction goals. Lastly, as part of the SAP process, the Town considered a wide range of GHG emission reduction measures, and all feasible measures are included in the proposed SAP. No additional mitigation is currently available, and the impact is considered *significant and unavoidable*.

TABLE 4.7-14 **DANVILLE GHG EMISSIONS 2030/35 FORECAST (ALL VALUES IN $MTCO_2E$)**

Source Sector	2008 Baseline	2030/35 Business as Usual	2030/35 Adjusted
Transportation[a]	158,620	201,830	140,950
Residential[b]	119,120	137,670	110,340
Non-Residential[b]	23,810	26,260	17,570
Water/Wastewater[c]	24,220	27,670	15,280
Solid Waste Disposal[d]	7,380	8,430	4,320
Other Off-Road Emissions[e]	18,440	18,580	16,720
Total	**351,590**	**420,440**	**290,970**
Goal: 30 percent below 2008 baseline[f]		**246,110**	**246,110**
Achieves goal		**NO**	**NO**

Note: Emissions are rounded to the nearest tens place.
[a] EMFAC2011 based on VMT provided by Fehr & Peers.
[b] Natural gas and purchased energy provided by PG&E.
[c] Local Government Operations Protocol (LGOP) Version 1.1 based on water use data provided by EBMUD and wastewater data provided by CCCSD.
[d] US EPA Warm Model based on waste disposal obtained from CalRecycle.
[e] OFFROAD Model, based on information from sources cited below.
[f] The State has not set a goal for years beyond 2020; however this represents a very conservative estimate of the intermediate reduction that would be necessary to be on-track for meeting the 80 percent reduction goal for 2050 set by Executive Order S-03-05
Source: The Planning Center | DC&E, 2012; Fehr & Peers, 2012; County of Contra Costa, Department of Agriculture, 2011; 2010 Contra Costa County Crop Report (County); Danville 2030 General Plan Land Uses (Town); Association of Bay Area Governments (ABAG 2009).

2. Cumulative Impacts

Climate change is the result of cumulative global emissions. There is no single project when taken in isolation that can "cause" global warming as a single project's emissions are insufficient to change the radiative balance of the atmosphere. Because global warming is the result of GHG emissions, and GHGs are emitted by innumerable sources worldwide, global climate change is a significant cumulative impact of human development and activity. The global increase in GHG emissions that has occurred and will occur in the future is the result of the actions and choices of individuals, businesses, local governments, states, and nations. Therefore, the analysis in Section D.1. Project Impacts, addresses cumulative impacts.

E. Full Buildout

It is anticipated that full buildout of the 2030 General Plan would occur at or shortly after the Plan's horizon year of 2030. At that time, it is anticipated that all land designated for urban uses will have been fully developed, including designated infill sites within the Town's current urbanized land area. Therefore the potential for impacts related to GHG emissions at full buildout are accounted for in the 2030/35 forecast and are adequately addressed above in Section D.1.b.ii. under Project Impacts, where it was concluded that GHG emissions would represent a significant and unavoidable impact at the Plan's 2030 horizon year. Therefore, no additional analysis is required.