

In meeting the existing and future travel demand needs of a growing county, the proposed 2009 Comprehensive Transportation Plan (CTP) aims to reduce the projected energy needs for the motor vehicle fleet, including consumption of conventional petroleum-based fuels and alternative fuels. Key issues include the impact of construction of transportation projects and the long-term impacts of operating the countywide transportation infrastructure on nonrenewable energy sources.

ENVIRONMENTAL SETTING

OVERALL ENERGY SUPPLY

In 2006, California produced approximately 13.5 percent of the natural gas, 38.8 percent of the petroleum, and 78.1 percent of the electricity it consumed.¹ About 21 percent of the state's energy demand is supplied by other energy resources, such as nuclear, geothermal, wind, solar, and hydropower.²

Electricity

The majority of Sonoma County's electricity is provided by PG&E. There is a diverse array of energy sources available to PG&E. For example, the Geysers Geothermal Power Plants generate significant energy that supports PG&E's power supply. As a result, electricity sources in Sonoma County generate about twice as much electricity as is consumed in the county. Currently, energy consumption in Sonoma County totals 2,847,000 megawatt hours per year (MWh/y).³

The County of Sonoma produces some of its own power through the Central Landfill Power Plant (generates 50,000 MWh/y) and the hydroelectric facility at Warm Springs Dam (13,000 MWh/y). There are many solar photovoltaic systems on the roofs of municipal buildings, such as the Sonoma County Water Agency building (130 MWh/y), which is one of the largest municipal solar projects in Sonoma County.⁴

Hydroelectric, Coal, and Geothermal

Due to strict federal and state emission laws, only a few small coal-fired power plants operate in California.⁵ Instead, a growing portion of Sonoma County's energy supply comes from electricity using hydroelectric and geothermal resources.

Hydroelectric power contributes to one-fifth of electricity generation in California. The Sonoma County Water Agency operates a hydroelectric facility at Warm Springs Dam rated at 2.6 megawatts (MW). The facility produces about 13,000 MWh (megawatt-hours) of electricity annually for sale to PG&E. In addition, the Geysers Geothermal Power Plant is the largest complex of geothermal power plants in the world, with more than 750 MW of installed capacity.⁶ This facility generates significant energy that supports the PG&E power supply.

¹ California Energy Commission (CEC), <http://energyalmanac.ca.gov/overview/index.html>, accessed November 2008.

² California Energy Commission (CEC), 2002.

³ California Energy Commission (CEC), 2007.

⁴ Sonoma County, *General Plan 2020, Draft EIR*, 2008.

⁵ *Ibid.*

⁶ *Ibid.*

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Solar Energy

Solar energy technology converts sunlight into usable energy, either electricity or direct heating of water or space. Aside from individual buildings and residences, the County of Sonoma estimates that an average government building outfitted with solar infrastructure generates approximately 130 MWh per year.⁷ This is the equivalent of 0.005 percent of electricity consumed by residential, commercial, industrial, and agricultural uses throughout Sonoma County.

Waste-to-Energy

Sonoma County has one landfill gas power plant, the Central Landfill Power Plant, that generates 50,000 MWh per year of electricity through the combustion of gas from the landfill.⁸ The County expanded the power plant to 7,500 kW in 2003 by adding two engine and generator sets. It also plans to construct a landfill gas filtration system to remove contaminants and compress the remaining methane to become compressed natural gas (CNG) to fuel Sonoma County Transit (SCT) buses.

Wind Energy

Sonoma County does not have wind farms. However, the County permits small wind facilities for smaller operations such as residences, agricultural operations, and commercial uses.

TRANSPORTATION-RELATED ENERGY SUPPLY

The transportation network in Sonoma County is largely powered by nonrenewable, petroleum-based sources of energy, including gasoline and diesel fuel. Statewide, the production and use of energy used to keep the transportation system moving has other impacts, contributing to about 40 percent of the state's greenhouse gas emissions and 60 percent of the county's criteria pollutant emissions. Automobiles, trucks, and other on-road motor vehicles generally consume gasoline and diesel fuel, while turbine aircraft use kerosene fuel. Locally, transit providers use natural gas, diesel, and gasoline to fuel coaches that provide public transit service.

Petroleum

California accounts for more than one-tenth of total nationwide production of crude oil. Drilling operations are concentrated primarily in Kern County and the Los Angeles basin, although substantial production also takes place offshore in both state and federal waters.⁹ The state is also home to major oil refinery infrastructure, ranking third nationwide in petroleum refining capacity and providing more than one-tenth of total U.S. capacity. With regard to the transportation sector, Sonoma County has no petroleum or natural gas production or refining facilities. As a result, all petroleum-based fossil fuels used to power the County's motor vehicle fleet are imported from other parts of the state and country.¹⁰

⁷ Sonoma County, *General Plan 2020, Draft EIR*, 2008.

⁸ *Ibid.*

⁹ Energy Information Administration, Official Energy Statistics from the U.S. Government, http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CA, accessed November 2008.

¹⁰ Sonoma County, *General Plan 2020, Draft EIR*, 2008.

Natural Gas

California's natural gas production accounts for less than 2 percent of total annual U.S. production and satisfies less than one-fifth of the state's demand. The need to import natural gas from suppliers in Canada and the southern United States is a challenge to California's increasing focus on natural gas as an alternative energy source for the transportation sector. Sonoma County Transit's bus fleet utilizes CNG as its primary fuel source. Natural gas also fuels many newer power plants that today account for more than one-half of state electricity generation. The county does not have any natural gas production facilities.

ENERGY CONSUMPTION

The transportation sector consumed an estimated 20 billion gallons of gasoline and diesel fuel on the state's roadways in 2006, roughly one-half of all energy used in California. The energy consumed by the transportation sector accounts for roughly 60 percent of petroleum demand, of which natural gas represents 29 percent of statewide consumption. Statewide data indicate the following consumption levels in 2007:

- Taxable gasoline sales (includes aviation fuel): 15,672,334,029 gallons
- Taxable aviation gasoline sales: 27,801,567 gallons
- Taxable diesel fuel: 3,075,583,325 gallons
- Taxable jet fuel: 149,799,540 gallons¹¹

Forecasts indicate that gasoline, diesel, and jet fuel demand will continue to increase in California to between 26.3 billion and 33.1 billion gallons (627 to 789 million barrels) per year by 2030, an increase of 13.5 to 42.8 percent from 2005 levels.¹² On-road gasoline use is expected to increase through 2010 to between 16.6 billion and 17.5 billion gallons (395 to 417 million barrels) per year from 2005 levels of 15.9 billion, an increase of 3.8 to 9.8 percent. After 2010, demand rises 16.4 percent from 2005 in the highest demand case to 18.6 billion gallons (442 million barrels) in 2030. In the lowest demand case, it falls steadily to 14 billion gallons (333 million barrels), a decrease of 12.2 percent.¹³

As illustrated in **Table 4.13-1**, on-road motor vehicles in Sonoma County consume about 625,000 gallons of gasoline and 70,000 gallons of diesel daily. This includes 166 transit buses that are run by operators, including Santa Rosa City Bus and Cloverdale Transit. In addition, Sonoma County Transit runs 45 coaches that run on CNG that consume 411,000 diesel gallon-equivalents of compressed natural gas.¹⁴

¹¹ Caltrans, Division of Transportation System Information, Data Integration and Reporting Branch, June 2008.

¹² California Energy Commission (CEC), <http://www.energy.ca.gov/2007publications/CEC-600-2007-009/CEC-600-2007-009-SF.PDF>, accessed November 2008.

¹³ Ibid.

¹⁴ Annual therms of CNG fuel were converted to diesel fuel gallon equivalents. This assumes 1.39 therms per gallon of diesel fuel and an annual consumption of 9,122 gallon-equivalents per coach.

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**TABLE 4.13-1
MOTOR VEHICLE ENERGY CONSUMPTION (2008)**

2008	Passenger Cars	Light-Duty Trucks	Light-Duty Trucks	Medium-Duty Trucks	Heavy-Duty Trucks	Buses Total	School Buses	Urban Buses	Motor Homes	Motor Cycles	All
Vehicles	182,284	73,564	76,214	27,951	16,672	361	312	166	4,014	17,295	398,832
VMT/1000	5,026	2,097	2,360	989	765	17	11	18	42	122	11,442
Fuel Consumption (1,000 Gallons per Day)											
Gasoline	244	118	140	79	35	1	0	1	3	4	625
Diesel	1	5	0	0	57	1	2	3	1	0	70
CNG	n/a	n/a	n/a	n/a	n/a	n/a	n/a	411	n/a	n/a	411

n/a – Data not available

Sources: Sonoma County Transportation Model, 2008, and California Air Resources Board, Emfac2007 V2.3 BURDEN output (fuel consumption). CNG fuel usage data from Sonoma County Transit. (Assumes annual CNG fleet consumption-570,597 therms converted to diesel gallons. Max fleet size increase projected at a maximum of 10 buses during planning horizon [annual consumption of 9,122 diesel gallons per bus]. Assumes uniform rate of per capita bus CNG consumption over planning horizon.)

REGULATORY FRAMEWORK

FEDERAL REGULATIONS

Energy Policy and Conservation Act

The Energy Policy and Conservation Act (EPCA) of 1975 established nationwide fuel economy standards in order to conserve oil. Pursuant to this act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation, is responsible for revising existing fuel economy standards and establishing new vehicle fuel economy standards.

Corporate Average Fuel Economy Program

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. The United States Environmental Protection Agency (EPA) calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. The values are a weighted harmonic average of the EPA city and highway fuel economy test results. Based on information generated under the CAFE program, the U.S. Department of Transportation is authorized to assess penalties for noncompliance. CAFE rules require the average fuel economy of all vehicles of a given class that a manufacturer sells in each model year to be equal to or greater than the standard. The current standard is 27.5 miles per gallon for passenger cars and 20.7 miles per gallon for light trucks (gross vehicle weight of 8,500 pounds or less). Heavy-duty vehicles (i.e., gross vehicle weight over 8,500 pounds) are not currently subject to fuel economy standards.

Clean Air Act

Section 211(o) of the Clean Air Act, as amended by the Energy Policy Act of 2005, requires the EPA to annually determine a renewable fuel standard (RFS) which is applicable to refiners, importers, and certain blenders of gasoline, and to publish the standard in the Federal Register by November 30 of each year. On the basis of this standard, each obligated party determines the volume of renewable fuel that it must ensure is consumed as motor vehicle fuel. This standard is calculated as a percentage, by dividing the amount of renewable fuel that the act requires to be blended into gasoline for a given year by the amount of gasoline expected to be used during that year, including certain adjustments specified by the act. The current requirement is an RFS of 4.66 percent for 2008.

STATE REGULATIONS

State of California Energy Plan

The California Energy Commission (CEC) is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The CEC adopts an Integrated Energy Policy Report (IEPR) every two years and an update every other year. The 2007 Integrated Energy Policy Report was adopted by the Energy Commission on December 5, 2007. The focus of the 2007 report outlines strategies that include: California's energy industries must meet environmental goals while accommodating economic and population growth; AB 32 –

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California's reduction of greenhouse gas emissions to 1990 levels by 2020 is part of California's challenge to meet growing energy needs while reducing CO₂ emissions.

The CEC has five major areas of responsibility: forecasting future electricity and energy needs, licensing energy facilities to meet those needs, promoting energy efficiency, developing renewable energy sources and alternative energy generating technologies, and planning for and directing state response to energy emergencies. The California Public Utilities Commission (CPUC) regulates privately owned utilities in the energy, rail, telecommunications, and water sectors.

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission. The act established a state policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures.

California Environmental Quality Act (CEQA)

Appendix F of the CEQA Guidelines describes the types of information and analyses related to energy conservation that are to be included in environmental impact reports (EIRs), with a particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary energy consumption. Appendix F of the CEQA Guidelines describes energy conservation in terms of decreased per capita energy consumption, decreased reliance on natural gas and oil, and increased reliance on renewable energy sources.

California Building Energy Efficiency Standards: Title 24

New transit stations associated with SMART commuter rail service, transit maintenance facilities, or other similar improvements associated with the 2009 CTP may be required to meet Title 24 building energy efficiency standards. These state requirements call for both prescriptive and performance-based approaches to reducing energy use. The standards have helped save more than \$56 billion in electricity and natural gas costs since 1978.¹⁵ The standards include provisions applicable to all buildings, residential and nonresidential, which describe requirements for documentation and certification that buildings meet these standards. These provisions include mandatory requirements for efficiency and design of the systems, equipment, and appliances.

The standards include mandatory requirements for space conditioning (cooling and heating), water heating, and indoor and outdoor lighting systems and equipment in nonresidential, high-rise residential, and hotel or motel buildings. Mandatory requirements for low-rise residential buildings cover indoor and outdoor lighting, fireplaces, space cooling and heating equipment (including ducts and fans), and insulation of the structure, foundation, and water piping. The standards also call for further energy efficiency through performance and prescriptive compliance approaches.

The standards are updated every three years as technology and design have evolved. In 2005, major revisions to the standards included updated energy budgets that recognize the time

¹⁵ California Energy Commission (CEC), <http://www.energy.ca.gov/title24/>, accessed November 2008.

dependence of energy usage by season and time of day, new federal appliance standards and other advances in technology, new state standards for outdoor lighting and for indoor and outdoor signs, and changes to improve the quality of construction and verification of reliable energy savings. The CEC is developing an update for the 2008/2009 time frame.

Assembly Bill (AB) 1007, Alternative Fuels Plan

As mandated by AB 1007 (Pavley), the CEC adopted an Alternative Fuels Plan on November 2, 2007, to clean the state's air, diversify fuel sources, and protect the state from oil spikes that affect prices, the economy, and jobs. The plan supports Governor Arnold Schwarzenegger's goal of reducing statewide greenhouse gases to 80 percent below 1990 levels by 2050. It recommends that the Governor set targets on a gasoline gallon equivalent basis for use of 10 different alternative motor fuels in the on-road and off-road sectors by 9 percent by 2012, 11 percent by 2017, and 26 percent by 2022. These targets do not apply to air, rail, or marine fuel uses. These goals will require a dramatic expansion in the use of such fuels as electricity, compressed natural gas, hydrogen, renewable diesel, biodiesel, and ethanol in motor vehicles. The plan also includes a strategy to develop hybrid and electric vehicle technologies, build the infrastructure to deliver alternative fuels, increase the blending of more biofuels into gasoline and diesel, improve the fuel efficiency of vehicles, and reduce miles traveled by California motorists with more effective land use planning.

Senate Bill (SB) 107, Renewable Energy Procurement

This law (Simitian, D-Palo Alto) requires investor-owned utilities such as PG&E, Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E) to derive 20 percent of electricity from renewable sources by 2010. Previously, state law required that this target be achieved by 2017. Energy to power electric vehicles, plug-in hybrids, or other motor vehicles that rely on the power grid to supply fuel could, as a result, require less use of fossil fuels and more use of solar, wind, or other renewable energy sources.

AB 2075, Reducing Dependence on Petroleum

This 2000 bill calls on the CEC and California Air Resources Board (CARB) to adopt recommendations for reducing dependence on petroleum by reducing demand 15 percent below 2003 levels. The options include Near-Term Options (could be fully implemented by 2010) that include using more fuel-efficient replacement tires with proper inflation, improving fuel economy in government fleets, and improving private vehicle maintenance. Mid-Term Options (could be fully implemented in the 2010–2020 time frame) include doubling the fuel efficiency of current model light-duty vehicles to 40 miles per gallon and using natural gas-derived Fischer-Tropsch fuel as a 33 percent blending agent in diesel. Long-Term Options include introducing fuel cell light-duty vehicles in 2012 and increasing to 20 percent of new vehicle sales by 2030.

LOCAL REGULATIONS

Within Sonoma County, local governments have their own energy-based initiatives in general plans and other plans and programs. For example, the City of Santa Rosa, in partnership with Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, Sonoma County, and others, formed Solar Sonoma County, a countywide Solar Implementation Plan. The plan significantly reduces the financial, regulatory, and educational market barriers to the installation of solar photovoltaic and solar thermal systems in Sonoma County. Santa Rosa and its partners aim to increase the amount of solar energy generating capacity in the county by 25 megawatts in the short term. The plan will include financial incentives to address market barriers

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such as tax assessment district financing and/or partnering with Global Legacy's Green Energy Loan Program for homeowners in Sonoma County and standardization of the planning and building permitting processes, adoption of ordinances for solar, and the use of energy conservation elements in general plans for cities and the County.

Sonoma County looks at transportation-related energy use in its Community Climate Action Plan that is the implementation tool to meet its goal of reducing greenhouse gas (GHG) emissions 25 percent below 1990 levels by 2015.¹⁶ All nine Sonoma cities and the County established this goal in 2005.¹⁷ Implementation of all major quantified solutions in the plan will assist in reducing GHG emissions approximately 22 percent below 1990 levels (37 percent below business as usual).¹⁸ While this action plan focuses on reducing the county's carbon footprint, it also calls on reductions in energy consumption, including in the transportation sector, to achieve its goals. Please see Section 5.0, Cumulative Impacts, for a detailed discussion about the CTP's impact on climate change from motor vehicle activity.

The ten local jurisdictions in Sonoma County have a variety of energy-based goals, objectives, and policies that seek to reduce demand from transportation-related sources (e.g., motor vehicle fuel use, energy for bus maintenance facilities):

- **Sonoma County General Plan 2020:** One of the primary intentions in the Energy section of the Circulation and Transit Element of the 2020 General Plan is reducing the number of vehicles on the road and encouraging other forms of transport. The Circulation and Transit Element outlines many objectives that support those goals. Policies include mixed-use development, strategic development that reduces distance between housing and jobs, increases use of public transit, work programs that encourage less commuting by employees, encourages home businesses, public education programs for safe biking, and working with schools to ensure safe walking conditions to and from school.¹⁹
- **Cloverdale General Plan Policy and Program Document:** In the Circulation Element of the City of Cloverdale General Plan, two goals are mentioned as methods of minimizing personal automobile usage: the promotion of bicycle use and walking, and promotion of transit service and use.²⁰
- **Cotati General Plan:** Objective 9.3 in the Cotati General Plan states that "Land Use design features shall maximize energy conservation." It calls for future layouts and designs to ensure practicality and feasibility of transportation modes other than trucks and automobiles. Objective 9.5 calls for a reduction in the consumption of natural resources. This objective, in terms of encouraging alternative transportation, requires zoning ordinances to be amended to require developments to provide safe and practical bicycle storage facilities.²¹
- **Healdsburg General Plan:** Plans D and E in the Healdsburg General Plan Transportation Policy Section address modes of travel other than automobiles and trucks. Plan D plans to provide a safe and secure bicycle route system. Plan E is concerned with improving

¹⁶ Sonoma County, *Community Climate Action Plan*, October 2008.

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Sonoma County, *2020 General Plan*, 2008.

²⁰ Cloverdale, *General Plan Policy and Program Document*, 1992.

²¹ Cotati, *General Plan*, 1996.

transit, bicycle and pedestrian facilities and conditions in order to encourage usage of alternative forms of transportation and discourage single-occupancy vehicle trips.²²

- **Petaluma General Plan:** The Air Quality and Mobility Elements of the Petaluma General Plan include policies to promote more interconnected mobility systems, better motor vehicle circulation, improved bicycle implementation and maintenance systems, and improved transit services. Policy 5-P-13 encourages larger employers to implement Transportation Demand Management services in order to reduce peak period traffic flow. Policy 5-P-21 sets a goal of creating a 5 percent bicycle commute share by 2025. Policy 4-P-24 calls for the city to comply with AB 32 regulations to the fullest capacity.²³
- **Rohnert Park General Plan:** The Rohnert Park General Plan Transportation Element has three goals applicable to energy. The first, transit, calls for promotion of transit and facilities and also the facilitation of transfers between routes. It also calls for continued encouragement of park-and-ride activities in order to lessen traffic on the U.S. 101. The second goal of street system improvements includes a policy of encouraging compact mixed-use facilities in order to support alternative modes of travel. The third goal of Transportation Demand Management services is a strategy to reduce peak hour traffic volume and congestion.²⁴
- **Santa Rosa 2020 General Plan:** The Santa Rosa 2020 General Plan strongly discourages single-occupancy automobile use and strongly encourages alternate transportation. The transportation section includes the goal of ensuring Santa Rosa's citizens a safe and sustainable transportation system. In addition, the plan calls for an expansion of the existing transit network. The city calls for energy savings by supporting more attractive and safe streets for pedestrians and bicyclists and development of a citywide system of designated bikeways to serve both experienced and casual riders.²⁵
- **Sebastopol General Plan:** The Transportation and Conservation Elements of the Sebastopol General Plan include a goal to reduce the number of cars on the road, specifically single-occupancy vehicles, and to encourage alternative transportation methods.²⁶
- **Sonoma General Plan:** The City of Sonoma establishes two goals in the Transportation Element: to increase bicycle usage and decrease the number of vehicles on the road. Strategies to implement these goals include, respectively, bike path extensions to popular destinations and improving and promoting transit use.²⁷
- **Windsor General Plan:** One goal listed in the Land Use and Circulation Element of the Town of Windsor General Plan is to encourage land use patterns and management patterns that conserve energy resources. It proposes that this goal will eliminate vehicle miles traveled and therefore reduce air pollutants as well.²⁸

²² Healdsburg, *General Plan Policy Document*, 2004.

²³ Petaluma, *General Plan*, 2008.

²⁴ Rohnert Park, *General Plan*, 2000.

²⁵ Santa Rosa, *2020 General Plan*, 2002.

²⁶ Sebastopol, *General Plan*, 2003.

²⁷ Sonoma, *General Plan*, 1998.

²⁸ Windsor, *General Plan*, 2000.

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IMPACT ANALYSIS

METHODOLOGY

The methodology for determining the significance of energy impacts compares existing conditions to the expected future energy consumption with the 2009 CTP, pursuant to CEQA Guidelines Section 15126.2(a). This analysis focuses on the increase in fuel consumption from the on-road vehicle fleet through 2035. The Sonoma County Transportation Model supplied vehicle activity data (i.e., VMT) for all analysis scenarios (i.e., existing 2008, No Project scenario 2035, and proposed CTP 2035) used to conduct energy impact assessments. The Air Resources Board's Emfac2007 model (version 2.3) was used to forecast consumption of petroleum-based gasoline and diesel fuels. Existing and projected natural gas consumption by Sonoma County Transit was derived from data from SCT staff.

SIGNIFICANCE CRITERIA

This analysis uses several criteria to determine whether the 2009 CTP will have a significant effect on energy resources. The CTP would have significant impacts on energy if it would support increased on-road vehicle activity that would:

- Substantially increase the consumption of gasoline, diesel, natural gas, or other nonrenewable energy types by on-road motor vehicles. For the purposes of this analysis, a substantial increase is defined as a 5 percent or more increase in 2008 fuel consumption by the CTP's horizon year of 2035.
- Cause a considerable increase in energy consumption and effects through construction of projects included in the CTP.

IMPACTS AND MITIGATION

Increase in Fuel Consumption from Transportation Sector

Impact 4.13-1 Implementation of the 2009 CTP would not directly cause increases in energy consumption from the transportation sector. However, in addressing current and projected mobility challenges, the 2009 CTP would accommodate planned growth in Sonoma County that will substantially increase the consumption of nonrenewable petroleum-based products like gasoline and diesel fuel by 2035. By 2035, motor vehicles would consume 159,000 more gallons of gasoline and 5,000 more gallons of diesel fuel per day than under existing conditions. This represents a 20 percent increase in gasoline consumption and a 7 percent increase in diesel fuel. In addition, proposed commuter rail service and freight service on the SMART corridor will consume 916,000 gallons of diesel fuel daily starting in 2014. This impact is **significant and unavoidable**.

Over time, demand for energy and fuels from the transportation system will increase, based largely on 15 percent population growth in Sonoma County and a growing job base that will attract workers from outside Sonoma County.²⁹ By 2035, motor vehicles will consume 782,000 gallons of gasoline and 74,000 gallons of diesel fuel daily by 2035 (see **Table 4.13-2**). This

²⁹ Sonoma County Transportation Authority, *Draft 2009 CTP*.

represents a 25 percent increase in gasoline use and 6 percent increase in diesel fuel use over existing conditions, excluding fuel use for the SMART system (see **Table 4.13-3**). This is a worst-case scenario assumption, as some of this demand will be reduced with SMART rail service, NCRA freight service, and improved fuel economy standards. However, countywide fuel consumption is still expected to increase over time. See **Appendix D** for CARB's BURDEN model documentation.

TABLE 4.13-2
TRANSPORTATION ENERGY CONSUMPTION (2035)

2035	Passenger Cars	Light-Duty Trucks	Light-Duty Trucks	Medium-Duty Trucks	Heavy-Duty Trucks	Buses	School Buses	Urban Buses	Motor Homes	Motor Cycles	All
Vehicles	251,319	100,464	107,010	39,399	22,867	507	403	214	5,431	24,008	551,621
VMT/1000	6,495	2,749	2,891	1,134	882	21	14	21	54	157	14,418
Fuel Consumption (1,000 Gallons per Day)											
Gasoline	303	161	173	92	44	0	0	1	4	4	782
Diesel	0	0	0	0	67	3	2	3	1	0	74
CNG	n/a	n/a	n/a	n/a	n/a	n/a	n/a	502	n/a	n/a	502

n/a – Not Available

Sources: Sonoma County Transportation Model, 2008, and California Air Resources Board, Emfac2007 V2.3 BURDEN output (fuel consumption). CNG fuel usage data from Sonoma County Transit. (Assumes annual CNG fleet consumption-570,597 therms converted to diesel gallons. Max fleet size increase projected at a maximum of 10 buses during planning horizon [annual consumption of 9,122 diesel gallons per bus]. Assumes uniform rate of per capita bus CNG consumption over planning horizon.)

TABLE 4.13-3
2009 CTP TRANSPORTATION ENERGY CONSUMPTION (2008 AND 2035)

	2008	No Project (2035)	2008 CTP (2035)	Change 2008 to 2035	
				Annual	Percentage
VMT*	11,441,811	14,768,411	14,417,956	+2,976,145	+26%
Fuel Consumption (1,000 Gallons per Day)					
Gasoline	625	802	782	+157	+25%
Diesel	70	76	74	+4	+6%
CNG **	411	512	502	+91	+22%
Diesel from SMART System***	0	0	916	+916	Infinite
Total Consumption	1,106	1,390	2,274	+1,168	+106%

Sources:

* Sonoma County Transportation Model, 2008, and California Air Resources Board, Emfac2007 V2.3 BURDEN output.

**Sonoma County Transit. Annual CNG fleet consumption-570,597 therms converted to diesel gallons. Max fleet size increase projected at a maximum of 10 buses during planning horizon (annual consumption of 9,122 diesel gallons per bus). Assumes uniform per capita bus rate of CNG consumption over planning horizon.

***Sonoma-Marin Area Rail Transit. Draft SEIR, March 2008. Based on 2025 forecast for weekday and weekend service. Includes direct energy use from passenger vehicles, transit buses, heavy-DMU passenger rail at 95,000 BTU/mile, plus indirect energy use, which includes maintenance vehicles. Assumes 130,500 BTUs are equal to one gallon of diesel. Consumption rates projected through 2025 only. SMART DMUs use 25 percent fewer BTUs per vehicle mile than traditional passenger rail vehicles. SMART is also considering operating the DMUs on a biodiesel fuel mixture. Biodiesel blends of 20 percent or less can be used in DMU vehicles without requiring

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any modifications to the vehicles. Fuel efficiency is expected to be slightly less than DMUs operated on conventional diesel—two miles per gallon for diesel fuel (Colorado Railcar Manufacturing, LLC, 2003) and 1.96 miles per gallon for biodiesel (EPA, 2002). A biodiesel consumption rate is not currently available.

It should be noted that the 2008 CTP would reduce fuel consumption from on-road motor vehicles when compared to a No Project scenario. In 2035, the CTP would reduce gasoline consumption by 2 percent and diesel fuel consumption by 3 percent annually over a No Project scenario (see **Table 4.13-4**).

TABLE 4.13-4
2009 CTP TRANSPORTATION ENERGY CONSUMPTION (2035)
COMPARISON TO NO PROJECT SCENARIO

	No Project (2035)	2009 CTP (2035)	Change from No Project to 2009 CTP (2035)	
			Annual	Percentage
VMT*	14,768,411	14,417,956	-350,455	-2%
Fuel Consumption (1,000 Gallons)				
Gasoline	802	782	-20	-2%
Diesel	76	74	-2	-3%
CNG**	512	502	-10	-2%
Diesel from SMART System***	916	916	0	0%
Total Consumption	2,306	2,274	-32	-1%

Sources:

* Source: Sonoma County Transportation Model, 2008, and California Air Resources Board, Emfac2007 V2.3 BURDEN output.

**Sonoma County Transit. Annual CNG fleet consumption-570,597 therms converted to diesel gallons. Max fleet size increase projected at a maximum of 10 buses during planning horizon (annual consumption of 9,122 diesel gallons per bus). Assumes uniform per capita bus rate of CNG consumption over planning horizon.

*** Sonoma-Marín Area Rail Transit. Draft SEIR, March 2008. Based on 2025 forecast for weekday and weekend service. Includes direct energy use from passenger vehicles, transit buses, heavy-DMU passenger rail at 95,000 BTU/mile, plus indirect energy use, which includes maintenance vehicles. Assumes 130,500 BTUs are equal to one gallon of diesel. Consumption rates projected through 2025 only. SMART DMUs use 25 percent fewer BTUs per vehicle mile than traditional passenger rail vehicles. SMART is also considering operating the DMUs on a biodiesel fuel mixture. Biodiesel blends of 20 percent or less can be used in DMU vehicles without requiring any modifications to the vehicles. Fuel efficiency is expected to be slightly less than DMUs operated on conventional diesel—two miles per gallon for diesel fuel (Colorado Railcar Manufacturing, LLC, 2003) and 1.96 miles per gallon for biodiesel (EPA, 2002). A biodiesel consumption rate is not currently available.

The proposed CTP would increase energy use from transportation infrastructure that supports the roadway and transit system. For example, electricity use to power streetlights, turn signals, and ITS improvements would increase, as would power needed to service bus and rail transit maintenance facilities and SMART rail service and stations. These represent new demand for electrical power that will increase the need to provide power plant-based energy through the electrical power grid. While the grid is largely powered by renewable sources of energy (e.g., hydroelectric), many power plants are expected to be fueled by nonrenewable petroleum sources, including natural gas.

The CTP promotes transportation-related energy efficiency by reducing traffic congestion from projected trends, improving existing infrastructure to maximize capacity and minimize roadway failures and closures, and streamlining and expanding transit service. It also supports legislation and local programs that increase fuel efficiencies, improving the quality and quantity of

alternative fuels, and promoting accelerated school bus replacement. Specific CTP objectives that support reducing transportation-based energy consumption include:

- Objective 1A: Part of the objective includes the maintenance of bicycle routes along roadways as part of this measure.
- Objective 1B: Bus Fleet Management: Ensure that all revenue vehicles and all bus stop facilities and transfer stations are properly maintained and all maintenance personnel are properly trained.
- Objective 2A: Implement strategic transit and roadway capacity expansion to meet current and future needs.
- Objective 2B: Expand rideshare, carpool, van pool, travel demand management, and telecommute programs.
- Objective 3A: Reduce vehicle miles of travel (VMT) per capita by 10% below 2005 levels by 2035.
- Objective 3B: Increase transit use and productivity.
- Objective 3C: Improve accessibility and safety for pedestrians at and around activity centers.
- Objective 3D: Implement 2008 Countywide Bicycle and Pedestrian Master Plan.

The potential changes in transportation-related fuel prices and vehicle fuel economy will influence the demand for petroleum-based fossil fuels and renewable energy sources. As seen in 2008, there is a strong link between fuel prices and fuel use that could further dampen the use of transportation-related fuels over time if global dynamics (e.g., peak oil, Middle East instability, domestic economic problems) develop. During mid-2008 when gas prices spiked, according to the U.S. Department of Transportation Federal Highway Administration (FHWA), Americans drove 4.3 percent less (11 billion miles) which represents the sharpest yearly drop for any month in FHWA history.³⁰ Additionally, Caltrans and Amtrak reported a record-setting 5.5 million passengers rode California's state-supported intercity passenger trains in federal fiscal year 2008.³¹ The 2009 CTP assumes that gasoline costs will increase from a 2005 average of \$2.52 per gallon to \$7.47 per gallon in 2035 in today's dollars. Yet, the SCTA estimates that this price increase will generally be offset by increases in future vehicle fuel economies, which are expected to increase from 19.86 miles per gallon to 32.15 miles per gallon in 2035.

Nevertheless, regional forecasts for Sonoma County and the greater Bay Area indicate that energy use and transportation-related fuel use in particular will increase substantially through the 2035 horizon year of the proposed 2009 CTP. If these trends continue, implementation of the

³⁰ U.S. Department of Transportation, *Decline In American Driving Reaches Year-Mark Drop of Nearly 100 Billion Miles Driven Heightens Need for Highway Finance Reform*. Federal Highway Administration, <http://www.fhwa.dot.gov/pressroom/fhwa0826.htm>, accessed December 12, 2008.

³¹ California Department of Transportation, *Train Ridership in California Reached an All-Time High*, <http://www.dot.ca.gov/hq/paffairs/news/pressrel/08pr26.htm>, accessed December 12, 2008.

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proposed projects in the 2009 CTP would accommodate the increased use of petroleum fuels between the current conditions and 2035.³²

Mitigation Measures

In addition to the mitigation measures specified below, mitigation measures identified in the Transportation Section for the impacts of transportation system usage would serve to mitigate the impacts of growing transportation energy demand.

- MM 4.13-1a** Project sponsors shall promote green building standards in new or expanded transportation-related facilities (e.g., transit maintenance facilities) that can reduce energy use, rely on renewable energy resources, and reduce waste generation and water usage.
- MM 4.13-1b** Project sponsors shall promote use of low-energy technologies in roadway and transit facilities (e.g., use light emitting diodes in streetlights, rail switching facilities).
- MM 4.13-1c** As transit operators invest in new or expanded bus and rail service, they shall consider investments in alternative fuel buses and rolling stock (e.g., hybrid electric drivetrains) that consume less nonrenewable fossil fuels.

The countywide increase in transportation-related energy demand as a result of implementing the 2009 CTP would remain a **significant and unavoidable** impact, even with the above mitigation measures.

Increases in Energy Consumption

- Impact 4.13-2** Construction of capital roadway and transit improvements in the 2009 CTP will involve use of off-road vehicles and equipment that will consume gasoline, diesel, electricity, natural gas, and other nonrenewable energy sources. These increases in energy consumption will generally be consistent with local general plan policies in conservation elements and other policy plans and are not expected to be substantial. This impact is considered **less than significant**.

Construction of proposed projects in the 2009 CTP will typically involve the use of diesel-powered heavy equipment, portable diesel generators, and other battery-operated support equipment, as well as electricity generated from the grid. Construction work can range from days to months for more complex capital improvements. However, these energy demands are considered less than significant given their duration and the limited scope of combustion engines for most projects. However, the following measure can further reduce the energy consumption of equipment from construction activities.

Recommended Mitigation Measure

- MM 4.13-2** Project sponsors of capital projects shall evaluate the energy demands of construction activities and incorporate best available control technology and best management practices to the extent practicable. This includes the

³² California Energy Commission, *Transportation Energy Forecasts for the 2007 Integrated Energy Policy Report-Final Staff Report*. <http://www.energy.ca.gov/2007publications/CEC-600-2007-009/CEC-600-2007-009-SF.PDF>, accessed November 2008.

following types of measures that can reduce energy consumption during project construction:

- Reduce vehicle trips for construction materials to and from construction sites;
- Limit idling of construction equipment engines to less than 15 minutes;
- Require that all construction engines be properly tuned;
- Encourage ridesharing by construction personnel traveling to and from construction sites;
- Plan construction activities to minimize the use of on-site construction equipment; and
- Require off-road vehicles and equipment at construction sites to operate on alternative fuels.