SUBCHAPTER 3.3

UTILITIES AND SERVICE SYSTEMS

3.3 UTILITIES/SERVICE SYSTEMS

3.3.1 ENVIRONMENTAL SETTING

The SJVUAPCD covers all of Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare Counties and a large portion of western Kern County. Given the large area covered by the SJVUAPCD, public utilities are provided by a wide variety of local agencies.

3.3.1.1 Electricity

The electricity market in California was restructured under Assembly Bill 1890 (AB 1890), which was signed into law in 1996. Restructuring involved decentralizing the generation, transmission, distribution and customer services, which had previously been integrated into individual privately-owned utilities, to increase competition in the power generation business, while increasing customer choice through the Power Exchange (PX), and releasing of control by privately-owned utilities of their transmission lines to a central operator called the Independent System Operator (ISO). Publicly-owned utilities provide electric service to approximately one-quarter of the state's population, and although the changes instituted by AB 1890 do not apply to them to the same extent as to the privately-owned utilities, AB 1890 does state the Legislature's intention that the state's publicly-owned utilities voluntarily give control of their transmission facilities to the ISO, just as the privately-owned utilities are required to do.

In-state, power plants supply most of California’s electricity demand, while hydroelectric power plants from the Pacific Northwest, and power plants in the southwestern U.S. provide California’s out-of-state needs. The contribution between in-state and out-of-state power plants depend upon, among other factors, the precipitation that occurred in the previous year and the corresponding amount of hydroelectric power that is available. The largest power plants in the SJVAB are located in Kern County. These plants consume natural gas, and provide over 2100 megawatts (MW) of electricity. Additionally, a 750 MW facility is under construction in Kern County, and is scheduled to open in the summer of 2005 (CEC, 2004). Local electricity distribution service is provided to customers within the District primarily by the privately-owned utility Pacific Gas and Electric (PG&E). Some public-owned utilities, such as Merced Irrigation District, Modesto Irrigation District and Turlock Irrigation District also provide service. PG&E is the largest electricity utility in the SJVAB, with a service area that covers all, or nearly all, of Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare counties (CEC, 2001).

The main provider of electrical power and natural gas in the SJVAB is PG&E, which maintains an extensive network of high- and low-voltage electrical lines and substations, as well as natural gas mains and related facilities. PG&E has set minimum right-of-way standards, depending on the voltage of transmission lines. The higher the voltage, the greater the right-of-way required (City of Fresno, 2002).

PG&E maintains hydroelectric dams in the Sierra Nevada Mountains. In addition to power produced by its plants, PG&E purchases power from other producers for use within its service area. On a region-wide basis, electrical demand has increased while the available power supply has remained fairly constant. As a result, during peak demand periods, the reserve capacity of the overall system has dropped at times to under 3 perecent. In response, PG&E has developed plans that call for more stringent measures as reserve capacity diminishes. These measures include voluntary cutbacks, cutbacks for major users with whom PG&E has arrangements, and rolling blackouts.

PG&E has established several energy conservation programs, including retrofitting buildings with increased insulation, installing dual-pane windows, and providing rebates for energy conservation devices or more efficient appliances.

Table 3.3-1 shows the amount of electricity delivered to residential and nonresidential entities in the counties in the SJVUAPCD in 2000.

TABLE 3.3-1

San Joaquin Valley Air Basin Utility Electricity Deliveries for 2000 by County

	Residential		Non-Residential		Total	
County	**Number of Accounts**	**KWh[1] (million)**	**Number of Accounts**	**KWh (million)**	**Number of Accounts**	**KWh (million)**
Fresno	254,366	2,387	46,878	4,110	301,244	6,497
Kern	217,118	1,758	33,448	5,193	250,566	6,951
Kings	34,182	291	34,182	670	68,364	961
Madera	38,250	356	9,648	829	47,898	1,185
Merced	59,551	511	13,742	1,422	73,293	1,933
San Joaquin	180,552	1,572	29,126	3,534	209,678	5,106
Stanilaus	159,486	1,489	26,771	3,054	186,257	4,544
Tulare	113,867	927	40,572	2,416	154,439	3,343

Source: CEC, 2002

[1] kilowatt-hour (kWh): The most commonly used unit of measure telling the amount of electricity consumed over time. It means one kilowatt (1000 watts) of electricity supplied for one hour.

3.3.1.2 Natural Gas

Four regions supply California with natural gas. Three of them—the Southwestern U.S., the Rocky Mountains, and Canada—supply 85 percent of all the natural gas consumed in California. The remainder is produced in California. In 2000, approximately 35 percent of all the natural gas consumed in California was used to generate electricity. Residential consumption represented approximately one-fourth of California's natural gas use with the balance consumed by the industrial, resource extraction, and commercial sectors.

PG&E provides natural gas service throughout the SJVAB (CEC, 2002a). Energy Commission staff expects that PG&E will need to expand its pipeline capacity to access Canadian supplies by 2013 to meet the projected natural gas demand (CEC, 2003a).

Three recently-completed interstate pipeline projects (the Kern River Expansion, the Southern Trails project and the North Baja Project) coming into the state will provide significant benefits to California by improving the ability to move gas supplies to regional demand centers. In addition, Kern River's recently completed High Desert Lateral, and El Paso's Line 1903 conversion to be completed in 2004, will interconnect a number of main pipelines and should provide additional flexibility to both Southern California Gas and PG&E. PG&E also benefits from the 180 million cubic feet per day (MMcfd) expansion of the PG&E-National Energy Group's (NEG) interstate pipeline from Canada to the California border at Malin, Oregon, completed in 2002. Analysis shows that in addition to the 180 MMcfd capacity added in Oregon, PG&E will need additional receiving capacity or storage after 2006 (CEC, 2003).

Table 3.3-2 provides the estimated use of natural gas in California by residential, commercial and industrial sectors in 2000. About 71 percent of the natural gas consumed in California is for industrial and electric generation purposes.

TABLE 3.3-2

California Natural Gas Consumption for 2000
(Million Cubic Feet per Day – MMcfd)

Sector	Utility[1]	Non-Utility[2]	Total
Residential	1,381	--	1,381
Commercial	505	--	505
Industrial	1,327	1,044	2,371
Electric Generation	2,281	45	2,326
Total	**5,495**	**1,089**	**6,584**

[1] **Utility -** For the purposes of electric industry restructuring, "utility" refers to the regulated, vertically-integrated electric company.
[2] **Non-utility -** Independent power producers, exempt wholesale generators and other companies in the power generation business that have been exempted from traditional utility regulation.
Source: (CEC, 2004a)

Baseline Natural Gas Demand Forecast

The Energy Commission's forecast for total natural gas demand increases at an average of 1.0 percent per year in California from 2003 to 2013. This represents less than half of the annual rate by which total U.S. natural gas demand is projected to grow during the same period. Gas demand for electricity generation remains the fastest growing segment of California's natural gas demand. From 2003 to 2013, natural gas demand in California is expected to increase as follows:

- **Core demand** (including residential, commercial, and smaller industrial customers) will increase from 0.66 to 0.73 trillion cubic feet (Tcf), a rate of 0.9 percent per year.

- **Non-core demand** (large industrial customers) will increase from 0.74 to 0.77 Tcf, an annual growth rate of only 0.4 percent.

- **Electric generation demand** will increase from 0.8 to 0.93 Tcf, or 1.5 percent per year (CEC, 2003).

Figure 3.3-1 shows historic and forecast natural gas consumption for each California natural gas utility planning area—PG&E, SDG&E, Southern California Gas (SCG), and Other, and for electric generation. The natural gas demand data, both historical and forecast, include the impacts of natural gas energy efficiency programs, including building and appliance standards and utility energy efficiency programs. This forecast assumes that current levels of funding for utility energy efficiency programs will continue through 2011, as authorized by the state Legislature (CEC, 2003).

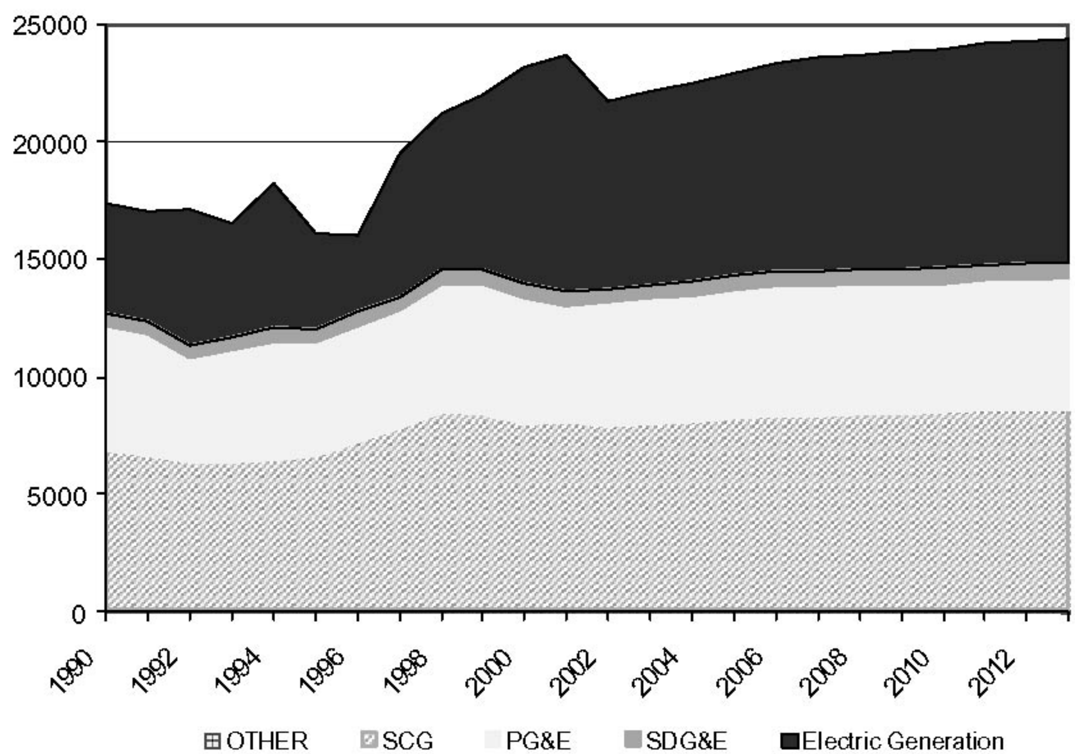

FIGURE 3.3-1
Natural Gas Consumption by Utility Planning Areas
(Millions of Therms)

Source: CEC, 2003

After dropping more than 6.5 percent in response to the gas price spikes of 2000-2001, end-user natural gas demand is expected to increase at a rate of 0.6 percent per year over the next ten years. Demand in PG&E territory increases at less than a half percent per year, as a result of weak economic growth and declining demand in the industrial sector. Figure 3.3-2 shows statewide demand by economic sector. Growth is strongest in the commercial and residential sectors (averaging 1 percent and 0.9 percent per year respectively), and weakest in the industrial sector (-0.1 percent per year) (CEC, 2003).

About 85 percent of the natural gas supply that California uses comes from out-of-state resource areas. Large pipelines extending hundreds of miles and across several states supply natural gas from areas in the southwest, Rocky Mountains and Canada. These pipelines need to be large enough not only to meet California's needs, but also the needs of the states along the delivery paths.

Total California natural gas demand is projected to grow about eight percent from 2003 to 2010. Three-fifths of this increase comes from power generation. If electricity generation gas use were held constant at the 2003 level, total demand for the state would only grow four percent.

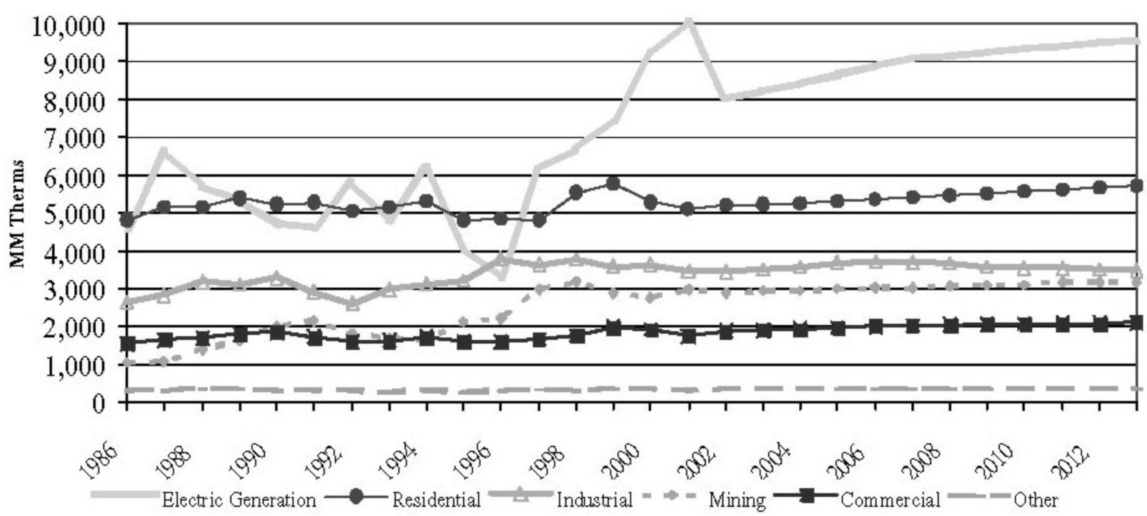

FIGURE 3.3-2
Statewide Natural Gas Consumption by Economic Sector
(Million of Therms)

Source:(CEC, 2003).

Between 2003 and 2013, annual average supplies of natural gas will be sufficient but more costly. The number of supply basins that are able to produce sufficient quantities of gas will decline over time, increasing the need for infrastructure to transport natural gas from a limited number of supply basins to various demand regions. As a consequence, the U.S. will likely become increasingly reliant on natural gas from Canadian and liquefied natural gas imports, while continuing to develop the domestic "unconventional" sources of natural gas to meet growing demand (CEC, 2003).

In some regions of the U.S., industrial and power generation customers with dual - fuel capability will likely switch to another fuel, such as distillates or residual oil during high natural gas price conditions. However, due to air quality controls no appreciable level of switching to any coal or oil derived fuels can occur in California (CEC, 2003).

Natural gas infrastructure has a strong impact on price and supply availability in each demand region. New gas- fired power plants in the Western U.S. are increasing gas demand and, in turn, triggering the need for new investments in interstate pipeline projects. Within California, analysis shows that in addition to the 180 MMcfd capacity added in 2002 at Malin, Oregon, PG&E will need additional receiving capacity or storage after 2006 (CEC, 2003).

3.3.1.3 Water

The SJVAB lies within two of California's Hydrologic Regions. These are the San Joaquin River and Tulare Lake Hydrologic Regions.

San Joaquin Hydrologic Region

<u>Setting</u>

The San Joaquin River Hydrologic Region is located in the heart of California and includes the northern portion of the San Joaquin Valley. It is bordered on the east by the Sierra Nevada and on the west by the coastal mountains of the Diablo Range. It extends from the southern boundaries of the Sacramento – San Joaquin Delta south to include all of the San Joaquin River drainage area to the northern edge of the San Joaquin River in Madera. Roughly half of the Sacramento – San Joaquin Delta region lies within this hydrologic region, encompassing those portions of the Delta within Contra Costa, Alameda, and San Joaquin Counties. The Region extends south from just below the northeastern corner of Sacramento County and eastward to include the southern third of El Dorado County, almost all of Amador County, all of Calaveras and Tuolumne Counties, and the western slope of Alpine County. The San Joaquin River Basin is hydrologically separated from the Tulare Lake Basin by a low, broad ridge across the trough of the San Joaquin Valley between the San Joaquin and Kings Rivers.

The San Joaquin River's average unimpaired runoff is approximately 1.8 million acre-feet per year, and it is one of the state's longest rivers at 300 miles. The San Joaquin River and its eight major tributaries drain about 32,000 square miles. The headwaters of the San Joaquin River begin nearly 14,000 feet above sea level at the crest of the Sierra Nevada. The river runs west down the mountains and foothills, and then flows northwest to the Delta where it meets the Sacramento River. The two rivers converge in the 1,153-square-mile Sacramento-San Joaquin Delta—a maze of channels and islands—which also receives fresh water inflow from the Cosumnes, Mokelumne and Calaveras rivers and other smaller streams. Historically, more than 40 percent of the state's run-off flowed to the Delta via the Sacramento, San Joaquin and Mokelumne rivers (CDWR, 2004a).

The area included in the San Joaquin Hydrologic Region encompasses 15,214 square miles (9.6 percent of California). The average rainfall in this section of the state is 26.3 inches. The total irrigated agricultural land in the area is 1,964,500 acres, while the total reservoir storage capacity is 11,477 thousand acre feet (TAF) (CDWR, 2004).

Water Supply and Use

The primary sources of surface water in the San Joaquin River Basin are the rivers that drain the western slope of the Sierra Nevada Mountains. These include the San Joaquin River and its major tributaries, the Merced, Tuolumne, Stanislaus, Calaveras, Mokelumne, and Cosumnes rivers. Most of these rivers drain large areas of high elevation watershed that supply snowmelt runoff during the late spring and early summer months. Other tributaries to the San Joaquin River, including the Chowchilla and Fresno rivers, originate in the Sierra Nevada foothills, where most of the runoff results from rainfall.

In 2000, an average water year, about 43 percent of the San Joaquin region's developed water supply came from local surface sources, 24 percent was from imported surface supplies, and groundwater provided about 33 percent of the water supply. About 30 percent of the developed supply (excluding surface and groundwater reuse) was considered dedicated natural flows for meeting instream flow requirements.

Surface water supply systems in the Sierra streams and rivers form a general pattern. A series of small reservoirs in the mountain valleys gather and store snowmelt. This water is used to generate electricity as it is released downstream. Some diversions occur for consumptive use in local communities, but most flows are recaptured in larger reservoirs located in the foothills and along the eastern edge of the valley floor. Most of these reservoirs were built primarily for flood control; however, many of them also have additional storage capacity for water supply and other uses included in their design. Irrigation canals and municipal pipelines divert much of the water from or below these reservoirs. Most of the small communities in the Sierra foothills receive much of their water from local surface supplies. The extensive network of canals and ditches constructed in the 1850s for hydraulic mining forms the basis of many of the conveyance systems. In addition to surface water, many of these mountain communities pump groundwater from hard rock wells and old mines to augment their supplies, especially during droughts. Groundwater is the only source for many mountain residents who are not connected to a conveyance system.

On the valley floor, many agricultural and municipal users receive their water supply from large irrigation districts, including Modesto Irrigation District, Merced, Oakdale, South San Joaquin and Turlock Irrigation Districts. Most of this region’s imported supplies, about 1.9 million acre-feet per year, are delivered by the federal Central Valley Project (CVP).

Most of the water in the upper San Joaquin River is diverted at Friant Dam, and is conveyed north through the Madera Canal and south through the Friant-Kern Canal. Average annual diversions from the San Joaquin River through the Friant-Kern and Madera Canals is about 1,500,000 acre-feet. Releases from Friant Dam to the San Joaquin River are generally limited to those required to satisfy downstream water rights (above Gravelly Ford) and for flood control. In the vicinity of Gravelly Ford, high channel losses to the ground water basin occur because the river bed is primarily sand and gravel. Due to the operation of Friant Dam, there are seldom any surface flows in the lower San Joaquin River except for flows originating in the major downstream tributaries plus agricultural and municipal return flows.

The San Joaquin River tributaries provide the San Joaquin River Basin with high-quality water and most of its surface water supplies. Most of this water is regulated by reservoirs, and used on the east side of the valley, but some is diverted across the valley to the Bay Area via the Mokelumne Aqueduct. This diversion supplies some of the urban water needs of East Bay Municipal Utility District, and the Hetch-Hetchy Aqueduct, which supplies urban water to the City of San Francisco, and several other bay areas cities. Average annual diversion from the Mokelumne and Tuolumne rivers that are directly exported from the basin include 245,000 acre-feet through the Mokelumne Aqueduct and 267,000 acre-feet through the Hetch-Hetchy Aqueduct. Major dams on the tributary streams include Pardee and Camanche dams on the Mokelumne River, New Melones, Donnells, and Beardsley dams on the Stanislaus River, O'Shaunessy and New Don Pedro dams on the Tuolumne River, and Exchequer Dam on the Merced River.

In 2000, an average water year, agriculture accounted for 57 percent of the region's total developed water use, while urban water use was about 5 percent and environmental water use for dedicated purposes was 38 percent of the total. Imported supplies, including CVP, SWP, and other federal deliveries, amounted to 1,902,300 acre feet. Environmental demands (refuges, instream requirements, and wild and scenic flow requirements) totaled 4,634,000 acre feet. Table 3.3-3 shows the water balance for the San Joaquin hydrologic region and summarizes the regional water accounting (CDWR, 2004a).

Table 3.3-3
San Joaquin River Region Water Budget with Existing Facilities and Programs
(total acre feet)

	1995		**2020**	
	Average	***Drought***	***Average***	***Drought***
Water Use				
Urban	574	583	954	970
Agricultural	7,027	7,244	6,450	6,719
Environmental	3,396	1,904	3,411	1,919
Total	**10,996**	**9,731**	**10,815**	**9,609**
Supplies				
Surface Water	8,562	6,043	8,458	5,986
Groundwater	2,195	2,900	2,295	2,912
Recycled and Desalted	0	0	0	0
Total	**10,757**	**8,943**	**10,753**	**8,898**
Shortage	**239**	**788**	**63**	**711**

Source: CDWR, 1998

Bulletin 160-98 developed average water year conditions based on actual water uses and supplies from year 1995. This average was then "normalized" - adjusted based on historic trends, so that the 1995 level of water use would be representative of what would be expected to occur in a statistically average water supply year. In the same way, a drought scenario was calculated to represent anticipated 1995 level water uses under drought conditions (CDWR, 2004).

State of the Region

Historically, the surface water originating from Sierra Nevada rivers has proven to be a dependable supply of high quality water, but it meets only about half of the region's total water requirement. Imported surface water and groundwater make up the difference. Due to the reliance on imported surface water from other regions, there is growing concern over the long-term availability of these supplies.

Additionally, proposals to restore fisheries on the San Joaquin River through higher releases of water from Friant Dam have resulted in growing concerns over the long-term availability of the Sierra water supplies.

Groundwater pumping, a major source of supply in the region, continues to increase in response to growing urban and agricultural demands. Over the long-term, groundwater extraction cannot continue to be utilized to satisfy the portion of water demands that are not met by surface water supplies, without producing negative groundwater basin impacts. One such impact is groundwater overdraft, a condition wherein the average long term amount of water withdrawn by pumping exceeds the amount of water that recharges the basin. A serious effect of long-term groundwater overdraft is land subsidence, which results in a loss of aquifer storage space and may cause damage to public facilities such as canals, utilities, pipelines, and roads. To help battle potential serious "overdraft" conditions in some areas of the region, groundwater replenishment is being provided through planned recharge programs, the over-irrigation of crops with extra surface water in wet years, incidental deep percolation, and seepage from unlined canal systems.

The major surface water quality problems of San Joaquin Valley streams are a result of significant salt loads from agricultural and wetland drainage and runoff, as well as from the degraded water quality of municipal and industrial wastewater discharges. High salinity is a problem in the lower San Joaquin River, principally under low flow conditions, when there is not enough flow to dilute agricultural return flows into the river. Additionally, high water table conditions along the western side of the San Joaquin River Basin promote subsurface drainage problems. This high water table condition is managed by collecting the drainage water via earthen canals and/or tile drains, conveying it away from the area to storage ponds, reusing it, or allowing it to flow into the San Joaquin River (CDWR, 2004a).

Tulare Lake Hydrologic Region

<u>Setting</u>

The Tulare Lake Region or Basin is located in the southern end of the Central Valley. It is comprised of Fresno, Tulare, Kings and Kern counties. The Tulare Lake Region is one of the nation's leading areas in agricultural production with a wide variety of crops being grown on approximately 3 million acres. This Region is also home to a growing number of people. Its population began increasing above historical trends in the 1980s. This trend has accelerated in recent years, and the California Department of Finance reported the population at 2 million in 2001. Major cities in this region include Fresno, Bakersfield and Visalia.

The largest river is the San Joaquin River, which flows along the northern border of this hydrologic region. The California Aqueduct extends the entire length of the west side of the region, delivering water to SWP contractors in the Tulare Lake region, and exporting water over the Tehachapi Mountains to southern California. Significant watercourses in the region include the Kings, Kaweah, Tule and Kern Rivers, which drain into valley floor of this hydrologically closed region. The Kern River historically terminated in two smaller lakes, Kern Lake and Buena Vista Lake. These lake bottoms have been dry since the waters that fed them have long since been diverted to irrigation. No significant rivers or creeks drain eastward from the Coast Ranges into the valley (CDWR, 2004a).

The area included in the Tulare Lake Hydrologic Region encompasses 17,033 square miles (10.7 percent of California). The average rainfall in this section of the state is 26.3 inches. The total irrigated agricultural land in the area is 3,083,000 acres, while the total reservoir storage capacity is 2,046 thousand acre feet (CDWR, 2004).

Water Supply and Use

This region receives most of its surface water runoff from four main rivers that flow out of the Sierra Nevada Mountains, which are the Kings, Kaweah, Tule, and Kern rivers. The use of water from these rivers has played a major role in the historic and economic development of the region. Major water conveyance facilities for the area include the California Aqueduct, the Friant-Kern Canal, and the Cross Valley Canal. Water districts within the region have developed an extensive network of canals, channels, and pipelines to deliver developed water supplies to customers. Water storage facilities and conveyance systems control and retain runoff from the watersheds in the Tulare Lake Region, except in extremely wet years when floodwaters may exit the region. During flood years, excess water flows down the north fork of the Kings River toward Mendota Pool and on to the San Joaquin River. In the wettest years, Kings River floodwaters reach the Tulare Lake bed via the south fork of the river. Excess runoff from the Kaweah and Tule Rivers may also flow into Tulare lakebed, flooding low-lying agricultural fields. Excess surface water is managed to the maximum extent in artificial groundwater recharge facilities. In the rare event water leaves the basin, it is because the absorptive capacity of the ground water systems in the region has been exceeded. When this happens, water is diverted northward and southward through the Kern River intertie into the California Aqueduct to avoid local flooding.

Captured and stored water in many Sierra Nevada reservoirs is used to generate electricity as it is released downstream. Some diversions occur for consumptive use in local communities, but most flows are recaptured in larger reservoirs located in the foothills and along the eastern edge of the valley floor. These reservoirs were built primarily for flood control; however, many of them were also designed to have additional storage capacity for conservation purposes. Canals and pipelines divert much of the water from or below these reservoirs. Smaller communities in the Sierra foothills receive their water from local surface supplies and groundwater. These mountain communities pump groundwater from hard rock wells and old mines to augment their supplies, especially during droughts. Groundwater is the only source for many mountain residents who are not connected to a municipal conveyance system.

Major statewide water projects within the Tulare Lake Region include the SWP's California Aqueduct (which has a state/federal joint use portion known as San Luis Canal) along the western side of the valley. Sacramento-San Joaquin Delta water is brought into the region through the California Aqueduct. CVP supplies are also sent down from the Delta through the SWP to agencies with federal entitlements on the west side of the valley, such as Westlands Water District. The CVP's Friant- Kern Canal runs south along the eastern side of the valley and transports San Joaquin River water to agencies along the valley's eastern side and Kern County. The Friant Unit of the CVP also diverts water northward from Millerton Lake via the Madera Canal.

The SWP provides an average of about 1,200,000 acre feet of surface water annually to the region, which is used for both agricultural and urban purposes. The U.S. Bureau of

Reclamation supplies an average of 2,700,000 acre feet from the CVP via Mendota Pool, the Friant-Kern Canal, and the San Luis Canal, primarily for agricultural uses.

Groundwater has historically been important for both urban and agricultural uses. It accounts for 33 percent of the region's total annual supply and 35 percent of all groundwater use in the State. Additionally, the region' groundwater represents about 10 percent of the State's overall supply for agricultural and urban uses. Many valley cities, including Fresno, Visalia and Bakersfield, rely primarily on groundwater. Bakersfield occasionally obtains supplemental supplies from local surface water and some imported water. These cities also have groundwater recharge programs to help ensure that groundwater will continue to be a viable water supply. On the valley's western side, smaller cities like Avenal, Huron, and Coalinga, rely on imported surface water from the San Luis Canal to meet municipal demands. This surface water replaces groundwater of poor quality.

Most towns and cities along the east side of the valley floor rely on groundwater for municipal use. The largest cities of Fresno and Visalia are, at this time, entirely dependent on ground water for their supply. Fresno is the second largest city in the United States reliant solely on ground water. Fresno, Visalia, Bakersfield and other cities have groundwater recharge programs to ensure that groundwater will continue to be a viable water supply.

In addition to the recharge programs employed by some valley cities, extensive groundwater recharge programs (know as water banks) are also in place in the south valley where water districts have recharged several million acre-feet of surplus water for future use and transfer through water banking programs. For over 100 years, water supply and irrigation districts throughout the region have used conjunctive use practices to maximize water supply and maintain the groundwater system. Other conjunctive use practices utilized throughout the valley include water exchange and transfer programs.

A comparison of regional urban, agricultural and environmental water uses indicates that urban water use is about 5 percent, agricultural water use is 84 percent and environmental water use is about 11 percent of the developed water supplies.

Many different crops are grown throughout the region. Most of the agricultural land in the Tulare Lake region lies in organized water districts. Many water districts in recent years have actively been changing water management practices and physical structures to improve the efficiency of water delivery and use.

Urban water use accounts for about 5 percent of the total applied water in the region. Many of the communities in the region that are served by agency-produced water are not metered, and customers are charged a flat rate for water use. However, urban communities are gradually working towards the installation of water meters over time as funding allows. Legislation (AB 514) that requires all California cities that receive water from the CVP to install and use water meters was signed into law in October of 2003. Some of the larger cities that are effected include Sacramento, Folsom and Fresno. In

Fresno, the new law is being viewed as an ideal solution to a longstanding problem. It is believed the new law will remove the requirement for Fresno to obtain voter approval of another charter amendment to permit metering. The U.S. Bureau of Reclamation and the federal Department of Interior have made the installation of water meters a requirement, if Fresno plans to renew its CVP contract for 60,000 acre-feet of surface water from the Friant Division.

The variability of industrial water use is a function of economic, climatic, and technological factors. Agriculture harvest schedules have a large impact. Local water agencies supply water to most of the smaller industrial facilities situated in cities within the region. However, larger industrial and institutional water users both inside and outside urban areas generally develop their own ground water supplies or divert from local streams. Higher per capita water use in areas like Fresno and Bakersfield are generally due to their higher concentration of these industries. In the case of Bakersfield, the oil industry and food processing comprise a large segment of industrial water use activities.

Table 3.3-4 shows the water balance for the Tulare Lake hydrologic region and summarizes the regional water accounting (CDWR, 2004a).

Table 3.3-4
Tulare Lake Region Water Budget with Existing Facilities and Programs
(total acre feet)

	1995		**2020**	
	Average	***Drought***	***Average***	***Drought***
Water Use				
Urban	690	690	1,099	1,099
Agricultural	10,736	10,026	10,123	9,532
Environmental	1,672	809	1,676	813
Total	**13,098**	**11,525**	**12,897**	**11,443**
Supplies				
Surface Water	7,888	3,693	7,791	3,593
Groundwater	4,340	5,970	4,386	5,999
Recycled and Desalted	0	0	0	0
Total	**12,228**	**9,663**	**12,177**	**9,592**
Shortage	**870**	**1,862**	**720**	**1,851**

Source: CDWR, 1998

Bulletin 160-98 developed average water year conditions based on actual water uses and supplies from year 1995. This average was then "normalized" - adjusted based on historic trends, so that the 1995 level of water use would be representative of what would be expected to occur in a statistically average water supply year. In the same way, a drought scenario was calculated to represent anticipated 1995 level water uses under drought conditions (CDWR, 2004).

State of the Region

In the short term, those areas of California that rely on the Sacramento – San Joaquin Delta for all or a portion of their surface water supplies, face uncertain water supply reliability due to the evolving outcome of actions being implemented to protect aquatic species and water quality. At the same time, California's water supply infrastructure is severely limited in its capacity to transfer marketed water through the Delta due to those same operating constraints. Until solutions to complex Delta problems are identified and put in place, and demand management and supply augmentation options are implemented, some water dependent regions will experience imported water shortfalls. Such limitations of surface water deliveries will exacerbate groundwater overdraft in the Tulare Lake Region because groundwater is used to replace much of the shortfall in surface water supplies. In addition, water transfers within these areas have and will become more common as farmers seek to minimize water supply impacts on their operations. In urban areas, water conservation and water recycling programs will be accelerated to help offset short-term water needs. The recently approved Proposition 50 provides the mechanism for funding projects to augment systems and supplies, optimize delivery systems, utilize recycled water and increase water management efficiency.

Groundwater pumping, a major source of supply in the Tulare Lake region, continues to increase in response to growing urban and agricultural demands. If groundwater extraction continues to be utilized to offset anticipated but unmet surface water imports, negative groundwater impacts will continue to occur. One such impact of long-term groundwater overdraft is land subsidence, which results in a loss of aquifer storage space. This has already caused some damage to public facilities such as canals, utilities, pipelines, and roads in the region. In an effort to slow this condition, many water agencies have adopted groundwater replenishment programs, and have taken advantage of excess water supplies available in wet years, incidental deep percolation, and seepage from unlined canal systems.

The Tulare Lake Region includes significant areas that have been experiencing drainage problems for many years. The need for proper drainage has long been recognized by federal and State agencies. Planning for drainage facilities to serve the San Joaquin Valley began in the mid 1950s. The poorly drained area is concentrated along the western side of the San Joaquin Valley from Kern County northward into the San Joaquin River Region. Although the San Joaquin Valley has some of the most productive agricultural lands in the world, much of the west side of the Valley is plagued by poor subsurface drainage conditions that adversely impact crop productivity. Between 1977 and 1991 the area affected by saline shallow groundwater on the west side doubled to about 750,000 acres. At present, a substantial portion of the Valley, about 2.5 million acres, is threatened by saline shallow groundwater.

In addition, the drainage water is sometimes contaminated with naturally occurring, but elevated, levels of selenium, boron and other toxic trace elements that threaten the water quality, environment, and fish and wildlife. Water planners had originally envisioned a master surface water drain to remove this poor quality water, but that proposal was never completed. The U.S. Bureau of Reclamation has an obligation to provide agricultural drainage service to CVP westside acreage, and a portion of that drainage service system, the San Luis Drain, was constructed. This drain currently carries water northward to storage and evaporation ponds the Kesterson Wildlife Refuge.

The monitoring of San Joaquin Valley agricultural drainage water began in 1959 as a cooperative agreement between the California Department of Water Resources and the University of California. In 1984 the San Joaquin Valley Drainage Program was established as a joint federal and state effort to investigate drainage and drainage-related problems and identify possible solutions. In September 1990, the San Joaquin Valley Drainage Program summarized its findings and presented a plan to manage drainage problems in a report entitled "A Management Plan For Agricultural Subsurface Drainage and Related Problems in the Westside San Joaquin Valley ". In December 1991, several federal and state agencies signed a memorandum of understanding (MOU), and released an implementation strategy entitled “The San Joaquin Valley Drainage Implementation Program.” The purpose of the 1991 MOU and its strategy document was to coordinate various programs in implementing the 1990 recommendations.

In 1997, an Activity Plan was initiated by the SJVDIP and the University of California to review and evaluate the 1990 Plan and update its recommendations. Eventually, the San Joaquin Valley Drainage Authority which includes districts in the Grassland, Westlands, and Tulare subareas was formed to develop a long-term solution for drainage problems in the Valley, which could include out-of-valley disposal. Studies continue in pursuit of cost effective ways to dispose of the drainage water.

In 2002, the U.S. Bureau of Reclamation released the San Luis report, which declared that an “in-valley” solution to the drainage problem on the Valley’s Westside should be implemented. The proposed alternative includes the following features: a drainwater collection system, regional drainwater reuse facilities, selenium treatment, reverse osmosis treatment for the Northerly Area, and evaporation ponds for salts disposal.

Also in 2002, the Westlands Water District, and the United States reached a settlement agreement regarding drainage that the U.S. was legally bound to provide to Westside farmers. As a result of this agreement, the number of acres requiring drainage service in the San Luis Unit will initially be reduced by retiring approximately 33,000 acres, part of a proposal to retire up to a total of 200,000 acres (CDWR, 2004a).

<u>Looking to the Future</u>

The counties in the Tulare Lake Region have water agencies that have been proactive for many years. Water from local streams has been developed for agricultural and urban use. In addition, when it became apparent that the groundwater supplies were not sustainable, many agencies worked to get the CVP and SWP approved and completed. The predominant agricultural economy has been slowly transitioning to share with the growing urban economy. New projects have been identified to better manage the local water supplies, adhere to more stringent water quality standards and environmental regulations.

The SJVAB's water agencies have many ongoing projects and programs to address water supply problems. These include investigations for new local surface storage projects and investigations for storage development in conjunction with CALFED. Local agencies are further implementing conjunctive use projects and increasing their efforts on water use efficiency and water recycling programs. As the urban cities on the valley floor continue to grow and expand, the current trend of agricultural land conversion to subdivisions is likely to continue. As an outcome of urban expansion, urban water usage is expected to increase in the future, while agricultural water use is projected to decline slightly. The effectiveness of current and planned urban and agricultural water conservation and use efficiency measures will influence these water use trends(CDWR, 2004a).

3.3.1.4 Solid and Hazardous Wastes

3.3.1.4.1 Solid Wastes

Permit requirements, capacity, and surrounding land use are three of the dominant factors limiting the operations and life of landfills. Landfills are permitted by the local enforcement agencies with concurrence from the California Integrated Waste Management Board (CIWMB). Local agencies establish the maximum amount of solid waste which can be received by a landfill each day and the operational life of a landfill. Landfills are operated by both public and private entities (CIWMB, 2002a).

There are three primary classes of landfill sites permitted to receive a varying severity of waste materials. Class I sites are facilities that can accept hazardous waste as well as municipal solid waste, construction debris, and yard waste. Class II sites may receive certain designated waste along with municipal solid waste, construction debris, and yard waste. Class III sites can only accept non-hazardous waste, e.g., solid waste construction debris, wood and yard waste and certain non-hazardous industrial waste.

A total of 28 Class III active landfills are located within the District with a total capacity of 31,448 tons per day (see Table 3.3-5). More detailed information on each landfill is in Appendix C.

TABLE 3.3-5

Number of Class III Landfills Located within the District and Related Landfill Capacity

County	Number of Landfills	Capacity (tons/day)
Fresno[(1)]	4	3,154
Kern	12	8,692
Kings	2	1,700
Madera	1	395
Merced	2	2,300
San Joaquin	3	10,993
Stanislaus	1	1,500
Tulare	3	2,714
TOTAL	28	31,448

(1) Sources: California Integrated Waste Management System. See Appendix C for further details.

In addition, there are a total of 29 green waste composting facilities in the San Joaquin Valley (see Appendix C for further details).

3.3.1.4.2 Hazardous Wastes

There are two hazardous waste (Class I) facilities in California, the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Kettleman Hills has an estimated 9 million cubic yard capacity (4 million currently, with an additional 5 million expected upon completion of a berm expansion). The facility expects to continue receiving wastes for approximately 9 years under its current permit. The facility is in the process of permitting a new landfill which would extend the life of the operation another 15 years. (Personal Communication, Terry Yarbough, Chemical Waste Management Inc., June 2004). Buttonwillow receives approximately 960 tons of hazardous waste per day and has a remaining capacity of approximately 9 million cubic yards. The expected life of the Buttonwillow Landfill is approximately 40 years (Personal Communication, Marianna Buoni, Safety-Kleen (Buttonwillow), Inc., June 2004).

Hazardous waste also can be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, located in Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., located in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co., Eau Claire, Wisconsin.

About 193,472 tons of hazardous waste were generated in the seven counties that comprise the District in 2003 and about 2.9 million tons of hazardous waste were generated in California (see Table 3.3-6). The most common types of hazardous waste generated in the SJVAB include waste oil, other inorganic solid waste, contaminated soils, organic solids, asbestos-containing waste, and unspecified oil-containing wastes. Not all wastes are disposed of in a hazardous waste facility. Many of the wastes generated, including waste oil, are recycled.

TABLE 3.3-6

Hazardous Waste Generation in the SJVAB in 2003
(tons per year)

County	Total Hazardous Waste Generated
Fresno	40,651
Kern	80,748
Kings	4,422
Madera	943
Merced	11,174
San Joaquin	27,475
Stanislaus	22,359
Tulare	5,700
District Total	193,472
California Total	2,919,002

Source: DTSC, 2004.

3.3.2 SIGNIFICANCE CRITERIA

The impacts to utilities/service systems will be considered significant if any of the following criteria are met:

An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.

The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use a substantial amount of potable water.

The project increases demand for water by more than 300,000 gallons per day.

The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

3.3.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The potential impacts on utilities and service systems have been divided into separate sections to discuss the potentially significant impacts on: (1) energy (electricity, natural gas, petroleum fuels and alternative fuels); (2) water demand; and (3) solid/hazardous wastes. The impacts for each of these resources are discussed in separate subsections below.

3.3.3.1 Energy

Table 3.3-7 lists the control measures in the Extreme Ozone Attainment Demonstration Plan with potential energy impacts.

TABLE 3.3-7

Control Measures with Potential Utilities/Service Systems Impacts - Energy

Control Measures	Control Measure Description	Control Methodology	Impact
2004 – 2007 Control Measures			
C	Fleet Rule – School Buses	Replacing existing buses, replacing older engines, retrofitting emission controls, use cleaner-burning diesel or alternate fuels.	Potential increase or saving in petroleum fuel use
E	Small Boilers, Process Heaters, and Steam Generators (2-5 mmBtu/hr)	Combustion modifications include low excess air, low NOx burners, water/steam injection, flue gas recirculation, SCR, and SNCR.	Potential increase in electricity and natural gas use
F	Wineries – Fermentation	Use of vapor collection and control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation and temperature control	Potential increase in electricity and natural gas use
G	Solid Fuel Fired Boiler, Steam Generators and Process Heaters	Low excess air, low NOx burners, SNCR, SCR and thermal de-NOx	Potential increase in electricity and natural gas use
H	Stationary IC Engines	Use electric motors, replace old engines, retrofit older engines with add-on control devices, use cleaner-burning diesel or alternate fuels	Potential increase in electricity use.

TABLE 3.3-7

Control Measures with Potential Utilities/Service Systems Impacts – Energy (cont.)

Control Measures	Control Measure Description	Control Methodology	Air Quality Impact
I	Commercial Dryers	Use of natural gas, excess air controllers, low NOx burners, and flue gas recirculation	Potential increase in electricity and natural gas use
J	Composting/Biosolids Operations	Vapor collection and control systems, forced aeration, and windrow of material	Potential increase in electricity use
K	Automotive Coating	VOC limits, application equipment, and add-on control devices	Potential increase in electricity and natural gas use
L	Concentrated Animal Feeding Operations	Removal and disposal of livestock wastes	Potential increase in electricity and petroleum fuel use
M	Various Coating Rules	VOC limits, application equipment, and add-on control devices	Potential increase in electricity and natural gas use
O	Steam-Enhanced Oil Well Vents	Additional VOC vapor recovery systems	Electricity generation to operate equipment, afterburner combustion emissions
P	Soil Decontamination	Thermal destruction, biofiltration beds, carbon adsorption, condensation, and burial in sealed drums or in impermeable landfills	Potential increase in electricity and natural gas.
Q	Open Burning	Phase out open burning	Potential increase in petroleum fuel use
R	Polymeric Foam Manufacturing	Alternative, non-VOC blowing agent, add-on controls	Potential increase in electricity and natural gas use
S	Stationary Gas Turbines	Use water or steam injection, low NOx burners, SCR, or some combination of these technologies	Potential increase in electricity and natural gas
U	Aviation Fuel Transfer (Phase 1)	Pressure-vacuum relief valves on storage tanks, submerged fill tubes to reduce splashing, vapor recovery destruction systems	Potential increase in electricity and natural gas
Potential Control Measures Requiring Further Study			
A	Portable Equipment Registration	Diesel oxidation catalyst, catalyzed diesel particulate filters, early retirement of older portable engines	Potential increase or saving in petroleum fuel use
B	Asphalt Plant Dryers/Heaters	Use clean fuel and low NOx burners for the heaters, capture and controls for blue smoke emissions and catalytic particulate filters	Potential increase electricity and natural gas

TABLE 3.3-7

Control Measures with Potential Utilities/Service Systems Impacts – Energy (concluded)

Control Measures	Control Measure Description	Control Methodology	Air Quality Impact
C	Sumps, Pits, and Wastewater Processing Equipment	Additional VOC controls on sumps	Potential increase in electricity and natural gas
E	Adhesives	VOC limits, application equipment, and add-on control devices	Potential increase in electricity and natural gas
F	Graphic Arts	VOC limits on coating material, solvent VOC limits, allowable application equipment, evaporative loss minimization practices, and add-on controls	Potential increase in electricity and natural gas
G	Cutback Asphalt Application	Close-fitting lids on kettles, controlled operating temperatures, and after burners	Potential increase in natural gas
H	Restaurants, Under-fired Charbroilers	Add on control equipment, equipment modification, (e.g., Smokeless broiler, grease extraction hoods, electrostatic precipitator or water scrubber, adsorption filter system or afterburner, catalyst filters)	Potential increase in electricity and natural gas
J	Furnaces	Clean burning fuel, low NOx burners, catalytic filters	Potential increase in electricity
K	Brandy Production	Use of vapor collection and control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation, and additional temperature control	Potential increase in electricity and natural gas
District Incentive Programs			
	Heavy-Duty Engine Incentive Program	Funds new purchases, engine re-powers, add-on controls, or retrofits	Potential increase in electricity, and alternative fuels, potential increase or savings in petroleum fuel use
	Light and Medium-Duty Vehicle Incentive Program	Encourage the use of alternative fuel vehicles and low to zero emission vehicles	Potential increase in electricity
	Electric Lawnmower Incentives	Exchange old lawnmowers for electric, rechargeable mowers	Potential increase in electricity

3.3.3.1.1 Electricity

PROJECT-SPECIFIC IMPACTS: Potential electric energy impacts relative to the energy baseline forecast year 2010 are discussed below. The potential increase in electricity use due to implementation of the Extreme Ozone Attainment Demonstration Plan is associated with the potential installation of add-on control equipment. A number of control measures could result in the installation of add-on control equipment including: Control Measure E – Small Boilers, Process Heaters and Steam Generators; Control Measure F – Wineries; Control Measure G – Solid Fuel Fired Boilers, Steam Generators, and Process Heaters; Control Measure H – Stationary IC Engines; Control Measure I – Commercial Dryers; Control Measure J – Composting/Biosolids Operations; Control Measure K – Automotive Coatings; Control Measure L – Concentrated Animal Feeding Operations; Control Measure O – Steam-Enhanced Oil Well Vents; Control Measure P – Soil Decontamination; Control Measure R – Polymeric Foam Manufacturing; Control Measure S – Stationary Gas Turbines; and Control Measure U – Aviation Fuel Transfer. Additional control equipment could be required for some of the Potential Control Measures that Require Further Study.

For stationary sources, a slight increase in electricity demand is expected from the use of add-on air pollution controls associated with various control measures, including small boilers, heaters and steam generators, wineries, solid fuel fired boilers, steam generators and process heaters, stationary IC engines, commercial dryers, composting/biosolids operations, various coating operations, oil well vents, soil decontamination, polymeric foam manufacturing, stationary gas turbines, and aviation fuel transfer. The amount of electricity to run these control devices is unknown because the number of sources that will choose to use add-on control devices is unknown. Alternative processing equipment is expected to be the primary method of control for some of the control measures. For example, the primary method of control for Control Measure M – Various Coating Rules is expected to be the production of low VOC content products. Further, the primary method of control for other control measures is expected to be replacement of old equipment with newer equipment, e.g., Control Measure H – Stationary IC Engines.

Electrification of sources is expected to increase the District's electricity use. Shifting some of the fuel source of stationary IC engines to electricity will require an additional electrical load. The estimated baseline electricity use in the District is about 30,520 million kWh in 2000 (see Table 3.3-8). The CEC estimates that the electricity supply will increase by about 4 percent within the state between 2004 and 2010 (CEC, 2004b). Assuming the same increase in electricity generation occurs within the San Joaquin area by 2010, an increase in electricity demand of about 4 percent is expected [(30,520 x 0.04) + 30,520)= 31,802 kWh.]

Relative to the projected peak electricity demand in 2010, implementation of all the control measures is expected to result in an increase of about one percent of current electrical use in 2010 (see Table 3.3-8).

TABLE 3.3-8

Peak Electricity Demands for the District in 2010
(million kWh)

	2010
Baseline	31,802*
Overall Impact	305
Percent of Baseline	>1%

*CEC, 2004b

The electric energy impacts from the implementation of the Extreme Ozone Attainment Demonstration Plan are expected to be less than significant. The electric energy impacts above represent a conservative estimate of electric energy demand and peak demand impacts. This analysis conservatively includes increases in electricity demand due to the use of add-on controls from coating and solvent control measures. It is expected based on current practices that reformulated products will be used to meet future VOC emission reductions from these control measures. Add-on controls will be used only if they are cost effective.

The electric energy impacts presented above are expected to be conservative. The Extreme Ozone Attainment Demonstration Plan includes strategies that promote energy conservation. These energy impacts, although unavoidable, are expected to be less than significant because power generating utilities are expected to have the capacity to supply the estimated electrical increase.

PROJECT-SPECIFIC MITIGATION: No mitigation measures are required because no significant impacts on electricity demand were identified.

3.3.3.1.2 Natural Gas

PROJECT-SPECIFIC IMPACTS: Control measures in the Extreme Ozone Attainment Demonstration Plan will result in an increase in demand for natural gas associated with use as alternative fuels and with add-on controls, e.g.: Control Measure E – Small Boilers, Process Heaters and Steam Generators; Control Measure F – Wineries; Control Measure G – Solid Fuel Fired Boilers, Steam Generators, and Process Heaters; Control Measure I – Commercial Dryers; Control Measure K – Automotive Coatings; Control Measure L – Concentrated Animal Feeding Operations; Control Measure M – Various Coating Rules; Control Measure O – Steam-Enhanced Oil Well Vents; Control Measure P – Soil Decontamination; Control Measure R – Polymeric Foam Manufacturing; Control Measure S – Stationary Gas Turbines; and Control Measure U – Aviation Fuel Transfer. Additional control equipment could be required for some of the Potential Control Measures that Require Further Study.

Total natural gas (end use) consumption in California is approximately 6,584 miillion cubic feet per day. The residential, commercial, and industrial sectors account for approximately 21, 8, and 36 percent, respectively, of total statewide natural gas (end use) consumption. Approximately 35 percent of the natural gas used in the state is to generate electricity. The demand for natural gas in southern California is expected to increase by approximately 8 percent from 2003 to 2010 (CEC, 2003).

The San Joaquin Valley may show an increase in natural gas consumption used as an alternative fuel to fuel buses (Control Measure C – Fleet Rules, School Buses) and a related decrease in the use of diesel fuel. The need for natural gas fueling stations would be limited to school district bus yards. The use of natural gas in school buses would displace the use of diesel fuel in the future, the amount of which will be determined when the population of school buses in the District is known.

For stationary sources, a slight increase in natural gas demand is expected from the use of add-on air pollution controls. The amount of natural gas to run these control devices is unknown. Alternative processing equipment is expected to be the primary method of control, e.g., it is expected based on current practices that reformulated products will be used to meet some of the future VOC emission reductions from these control measures. Add-on controls will be used only if they are cost effective.

The increase in electricity is expected to be generated from the use of natural gas resulting in an increased demand for natural gas. The increase in natural gas associated with the additional electricity demands is expected to be negligible.

It is estimated that the control measures will result in a very small increase in natural gas use (i.e., about one percent), which is an extremely small increase in the amount of natural gas used in California. In 2010, almost 25,000 million therms of natural gas will be consumed in California. The increase in natural gas use associated with the Extreme Ozone Attainment Demonstration Plan is expected to be within the statewide projections for natural gas use. The natural gas impacts from the implementation of the Extreme Ozone Attainment Demonstration Plan are expected to be less than significant. The Plan includes strategies that promote energy conservation. These energy impacts, although unavoidable, are expected to be less than significant because sufficient natural gas capacity and supplies are expected be available.

PROJECT-SPECIFIC MITIGATION: No mitigation measures are required because no significant impacts on natural gas resources were identified.

3.3.3.1.3 Petroleum Fuels

PROJECT-SPECIFIC IMPACTS: Implementation of the Extreme Ozone Attainment Demonstration Plan may result in a decrease in the demand for petroleum fuels (i.e., diesel) due to the potential use of alternative fuels for buses and IC engines. Reductions in the use of petroleum based fuels are expected due to Control Measure C – Fleet Rule, School Buses and Control Measure H – Stationary IC engines from switching to alternative clean fuels. For school buses, the combination of fleet standards, as well as trip reduction measures, may produce reductions in the use of petroleum-based fuels. A smaller reduction in diesel consumption would be expected if emulsified diesel fuels (diesel fuel mixed with water) were used.

An increase in the use of add-on control equipment associated with mobile sources could result in an increase in the use of petroleum fuels. Add-on control devices, such as diesel particulate filters, SCRs, catalytic controls, etc., generally result in a decrease in engine efficiency. The amount of fuel that would be required would be dependent on the type of control equipment installed and the energy requirement to operate the equipment.

Table 3.3-9 shows the gasoline and diesel fuel consumption in 2000 and the projected consumption in 2005 and 2010. Long term forecast is for total vehicles, vehicle travel and fuel consumption to continue to increase but at declining rates. The fuel consumption for new cars is expected to remain at 27.5 miles per gallon, and the fleet economy will reach a peak value of 18.82 per gallon by year 2021 (CEC/Caltrans 2002).

TABLE 3.3-9

Projected Fuel Consumption in the SJVUAPCD
(million gallons/year)

Fuel Type	2000	2005	2010
Gasoline	1,275.0	1,441.9	1,671.3
Diesel	457.3	503.0	586.3
Total	1,732.3	1,944.9	2,257.6

*Caltrans, 2003

The changes in the consumption of diesel fuels associated with the Extreme Ozone Attainment Demonstration Plan are expected to be included in the forecast in Table 3.3-9. The Plan may result in a minor increase in diesel fuel associated with a decreased fuel efficiency associated with add-on control equipment. On the other hand, a decrease in diesel fuel use would be expected to occur associated with Control Measure C – Fleet Rules, School Buses as some buses would be replaced or new buses purchased may use natural gas or other alternative fuels.

PROJECT SPECIFIC MITIGATION MEASURE: No significant impacts on petroleum fuels associated with the Extreme Ozone Attainment Demonstration Plan were identified so that no mitigation measures are required.

3.3.3.1.4 Alternative Fuels

PROJECT-SPECIFIC IMPACTS: The Extreme Ozone Attainment Demonstration Plan may cause a shift from conventional petroleum fuels to alternative fuels for school buses and stationary IC engines.

The use of alternative fuels in California's transportation energy market continues at a gradual pace, but could be limited by a variety of market and regulatory uncertainties. Continuing progress in reducing new gasoline vehicle emissions is having an important effect on auto industry development and marketing of alternative fuel vehicles. The use of cleaner-burning alternative fuels such as CNG is not receiving as much emphasis in light-duty vehicle emission-reducing strategies as previously expected. The combination of gasoline reformulation and advances in automotive emission control technology appears to be making the exhaust emission levels required by California's low-emission vehicle standards achievable without relying on the use of alternative fuels. Therefore, the demand for alternative fuels would depend on their marketing strategies and the development of infrastructure to affect consumer choice.

There is growing interest and financial support for the use of hydrogen-powered fuel cells to power cars, trucks, homes and business. The federal government is supporting the development of hydrogen-powered fuel cells in order to reverse America's growing dependence on foreign oil and is providing funding for the development of technologies and infrastructure to produce, store, and distribute hydrogen for use in fuel cell vehicles and electricity generation. A total of about $1.7 billion over a five year period was provided to develop hydrogen-powered fuel cells, hydrogen infrastructure and advance automotive technologies.

Hydrogen fuel cells are proven technology but more work is needed to make them cost-effective for use in cars, trucks, homes or businesses. Hydrogen fuel cells create electricity to power cars with minimal pollution. While hydrogen fuel cell technology is promising, its use in the future is dependent on many things (cost-effectiveness of the technology, availability of hydrogen, etc.), so that the extent to which it may be used in the future is currently unknown.

Although the Extreme Ozone Attainment Demonstration Plan may result in an increase in alternative transportation fuels, this increase is not expected to be significant since alternative fuels (e.g., natural gas and hydrogen) are available or the feedstock that produces the fuels are generally available. Future demand could be met through increased production. The energy impacts associated with the future use of alternative fuels are expected to be less than the current strategy that uses predominately petroleum-based fuels so that no significant impacts on alternative fuels are expected.

PROJECT-SPECIFIC MITIGATION: No significant impacts on alternative fuels are expected so that no mitigation measures are expected.

3.3.3.2 Water Demand

Table 3.3-10 lists the control measures with potential water impacts.

TABLE 3.3-10

Control Measures with Potential Utilities/Service Systems Impacts – Water Demand

Control Measures	Control Measure Description	Control Methodology	Impact
2004 – 2007 Control Measures			
E	Small Boilers, Process Heaters, and Steam Generators (2-5 mmBtu/hr)	Combustion modifications include low excess air, low NOx burners, water/steam injection, flue gas recirculation, SCR, and SNCR.	Potential impact on water demand
F	Wineries – Fermentation	Use of vapor collection and control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation and temperature control	Potential increase in water use
K	Automotive Coating	VOC limits, application equipment, and add-on control devices	Potential increased use of water based formulations
S	Stationary Gas Turbines (<10 MW)	Use water or steam injection, low NOx burners, SCR, or some combination of these technologies	Potential increase in water use
Potential Control Measures Requiring Further Study			
K	Brandy Production	Use of vapor collection and control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation, and additional temperature control	Potential increase in water use

<u>**Reformulated Coatings, Solvents and Consumer Products**</u>

PROJECT-SPECIFIC IMPACTS: Several of the control measures in the Extreme Ozone Attainment Demonstration Plan would include controlling VOC emissions through the reformulation of coatings including: Control Measure K – Automotive Coating; and Control Measure M – (Various Coating Rules; and potential control measures E and F which would reformulate adhesives and graphic art supplies. Emission reductions are expected to be achieved through the use of near-zero and zero VOC formulations.

Under these control measures, petroleum-based coatings and products are expected to be reformulated to aqueous-based coatings and products to comply with specified VOC emission reduction requirements. Like petroleum-based materials, aqueous materials may lead to adverse impacts to water resources if contaminated solvents, coatings or products are not handled properly. However, the use of water to reformulate coatings, solvents and products would generally lead to products that would be less toxic than petroleum based materials and generate fewer impacts to water quality.

The use of aqueous based solvents, coatings and products may lead to adverse impacts to water resources if contaminated solvents are not handled properly. If the aqueous cleaning operation does not substantially increase the amount of hazardous wastewater generated, then disposing of the wastewater will generally be considered a relatively small incremental addition to the wastewater stream and no adverse impacts would be expected. If, however, the material becomes contaminated with hazardous materials during the manufacturing or cleaning process, then the solution must be disposed of properly after its useful life. Proper disposal may be accomplished by use of wastewater treatment equipment or by shipping to a waste treatment, recycling or disposal site that accepts hazardous materials.

There is the potential for the increased use of methylene chloride and perchloroethylene in reformulation of consumer products, which are specifically exempt from the definition of VOCs in recognition of their very low ozone forming capabilities. Some manufacturers could use methylene chloride or perchloroethylene in their formulations to reduce the VOC content to meet future limits. CARB has taken steps to mitigate and limit the use of these compounds. These actions include the Air Toxic Control Measure for automotive maintenance and repair activities; aerosol adhesives limits in the consumer products regulation; and reactivity limits in the aerosol coating regulations. CARB also tracks the use of methylene chloride and perchloroethylene in regulated consumer products through yearly manufacturer reporting requirements. Further, CARB staff has proposed VOC limits in the past that were achievable without the increased use of TACs (CARB, 2002). Also, Proposition 65 labeling requirements discourage manufacturers from reformulating consumer products with listed materials (which include methylene chloride and perchloroethylene).

PROJECT-SPECIFIC MITIGATION: No significant water demand impacts were identified for reformulated coatings, solvents, and consumer products so no mitigation measures are required.

Add-On Pollution Control Equipment

PROJECT-SPECIFIC IMPACT: Under the Extreme Ozone Attainment Demonstration Plan, it is expected that facilities will have options to meet emission reductions: install pollution control equipment, make process or other changes. The installation of additional air pollution control equipment could include various equipment such as electrostatic precipitators, air filters, wet scrubbers, water/steam injection, flue gas recirculation, SCR, SNCR, water scrubbers, catalytic incineration, condensation and temperature control.

The control measures that may require add-on control equipment are generally not expected to result in significant adverse water resource impacts from their use. As discussed above, there are typically several control technologies which could be used for compliance with any given control measures. Control Measure E – Small Boilers, Process Heaters and Steam Generators are expected to use combustion modifications and low NOx burners as primary control, which would have no water resource impacts, principally combustion and equipment modifications. Control Measure F – Wineries, and Potential Control Measure K – Brandy Production would be expected to use vapor collection and control systems or carbon adsorption for VOC control as they are generally more efficient and cost effective than water scrubbers for VOC control. Therefore, the use of add-on control technologies to implement the Extreme Ozone Attainment Demonstration Plan is determined not to result in significant adverse hydrology/water quality impacts.

PROJECT-SPECIFIC MITIGATION: No significant adverse hydrology or water quality impacts were identified for the use of add-on control technologies as part of the Extreme Ozone Attainment Demonstration Plan so no mitigation measures are required.

Water Demand

PROJECT-SPECIFIC IMPACT: Increased water consumption may occur due to the reformulation of coatings to aqueous-based materials. Several of the control measures in the Extreme Ozone Attainment Demonstration Plan would propose to control VOC emissions through the reformulation of coatings and products including Control Measure K – Automotive Coating and Control Measure M – Various Coating Rules.

CARB estimated the amount of water use associated with its proposed architectural coatings suggested control measure (CARB, 2000). The primary objective of the CARB's control measure was to set VOC limits and other requirements that are feasible (based on current technology) and that will achieve significant emission reductions in VOC emissions from architectural coatings. CARB estimated that the projected water demand in the San Joaquin area would be about 4.94 million gallons per year by 2010 or about 13,535 gallons per day (water from the San Joaquin River and Tulare Lake) (CARB, 2000). Using CARB's estimate for water demand is expected to be conservative because many of the sources that would use reformulated coatings/solvents have already reformulated some of the coatings/solvents, and the estimate assumes that the only method for compliance would be reformulation. This potential water demand is within the capacity of water supplied from the San Joaquin River and the Tulare Lake Hydrologic Regions (about 22,985 acre feet per year or about 1.72×10^{14} gallons) and is not considered significant compared with current and projected future demand and supply (see Tables 3.3-3 and 3.3-4). While there are projected drought-year shortages in some regions of California, these shortages would occur regardless of the proposed control measures. Therefore, no significant water demand impacts are expected.

PROJECT-SPECIFIC MITIGATION: No significant water demand impacts were identified as part of the proposed project so no mitigation measures are required.

3.3.3.3 Solid/Hazardous Wastes

Table 3.3-11 lists the control measures proposed in the Extreme Ozone Attainment Demonstration Plan with potential solid/hazardous waste impacts.

TABLE 3.3-11

Control Measures with Potential Utilities/Service Systems Impacts
Solid and Hazardous Wastes

Control Measures	Control Measure Description	Control Methodology	Impact
2004 – 2007 Control Measures			
C	Fleet Rule – School Buses	Replacing existing buses, replacing older engines, retrofitting emission controls, use cleaner-burning diesel or alternate fuels.	Increase scrapping of diesel engines and vehicles, increase waste from spent catalyst, and impacts due to handling of collected particulate matter.
E	Small Boilers, Process Heaters, and Steam Generators (2-5 mmBtu/hr)	Combustion modifications include low excess air, low NOx burners, water/steam injection, flue gas recirculation, SCR, and SNCR.	Potential impact on solid and hazardous waste.
F	Wineries – Fermentation	Use of vapor collection and control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation and temperature control.	Potential increase in carbon and catalysts.
G	Solid Fuel Fired Boiler, Steam Generators and Process Heaters	Low excess air, low NOx burners, SNCR, SCR and thermal de-NOx.	Potential increase in catalysts.
H	Stationary IC Engines	Use electric motors, replace old engines, retrofit older engines with add-on control devices, use cleaner-burning diesel or alternate fuels.	Increase scrapping of diesel engines and vehicles, increase waste from spent catalyst, and impacts due to handling of collected particulate matter.
J	Composting/Biosolids Operations	Vapor collection and control systems, forced aeration, and windrow of material.	Potential increase in solid wastes.
K	Automotive Coating	VOC limits, application equipment, and add-on control devices.	Potential increase in solid wastes.
L	Concentrated Animal Feeding Operations	Removal and disposal of livestock wastes.	Potential increase in solid wastes.

TABLE 3.3-11 (cont.)

Control Measures	Control Measure Description	Control Methodology	Impact
M	Various Coating Rules	VOC limits, application equipment, and add-on control devices.	Potential increase in solid and hazardous wastes.
N	Water Heaters	Acceleration of replacement or retro-fit of old heaters.	Potential increase in solid wastes.
P	Soil Decontamination	Thermal destruction, biofiltration beds, carbon adsorption, condensation, and burial in sealed drums or in impermeable landfills.	Potential increase in solid and hazardous waste.
Q	Open Burning	Phase out open burning.	Increase in disposal of agricultural wastes.
R	Polymeric Foam Manufacturing	Alternative, non-VOC blowing agent, add-on controls.	Potential increase in solid wastes.
S	Stationary Gas Turbines	Use water or steam injection, low NOx burners, SCR, or some combination of these technologies.	Potential increase in catalyst use.
U	Aviation Fuel Transfer (Phase 1)	Pressure-vacuum relief valves on storage tanks, submerged fill tubes to reduce splashing, vapor recovery destruction systems.	Potential increase in solid waste.
Potential Control Measures Requiring Further Study			
A	Portable Equipment Registration	Diesel oxidation catalyst, catalyzed diesel particulate filters, early retirement of older portable engines.	Potential increase in solid or hazardous waste, increase waste from engine scrapping.
B	Asphalt Plant Dryers/Heaters	Use clean fuel and low NOx burners for the heaters, capture and controls for blue smoke emissions and catalytic particulate filters.	Potential increase in solid wastes.
C	Sumps, Pits, and Wastewater Processing Equipment	Additional VOC controls on sumps.	Potential increase in solid wastes.
E	Adhesives	VOC limits, application equipment, and add-on controls.	Potential increase in solid and hazardous wastes.
F	Graphic Arts	VOC limits on coating material, solvent VOC limits, allowable application equipment, evaporative loss minimization practices, and add-on controls.	Potential increase in solid waste.

TABLE 3.3-11 (concluded)

Control Measures	Control Measure Description	Control Methodology	Impact
G	Cutback Asphalt Application	Close-fitting lids on kettles, controlled operating temperatures, and after burners.	Potential increase in solid waste due to early retirement of kettles.
H	Restaurants, Under-fired Charbroilers	Add on control equipment, equipment modification, (e.g., Smokeless broiler, grease extraction hoods, electrostatic precipitator or water scrubber, adsorption filter system or afterburner, catalyst filters).	Potential increases in solid waste.
J	Furnaces	Clean burning fuel, low NOx burners, catalytic filters.	Potential increase in solid waste.
K	Brandy Production	Use of vapor control systems, carbon adsorption, water scrubbers, catalytic incineration, condensation, and additional temperature control.	Potential increase in solid wastes.
District Incentive Programs			
	Heavy-Duty Engine Incentive Program	Funds new purchases, engine re-powers, add-on controls, or retrofits.	Potential increase in solid waste.
	Light and Medium-Duty Vehicle Incentive Program	Encourage the use of alternative fuel vehicles and low to zero emission vehicles.	Potential increase is waste due to vehicle scrapping.

This subchapter identifies potential solid/hazardous waste impacts that may be generated by implementing the Extreme Ozone Attainment Demonstration Plan. The potential impacts to the generation of solid and hazardous waste associated with the implementation of the Plan.

The analysis of solid/hazardous waste impacts assumes that safety and disposal procedures required by various agencies in the state of California will provide reasonable precautions against the improper disposal of hazardous wastes in a municipal waste landfill. Because of state and federal requirements, some facilities are attempting to reduce or minimize the generation of solid and hazardous waste by incorporating source reduction technologies to reduce the volume or toxicity of waste generated, including improving operating procedures, using less hazardous or non-hazardous substitute materials, and upgrading or replacing inefficient processes.

<u>Potential Solid Waste Impacts due to Air Pollution Control Technologies</u>

PROJECT-SPECIFIC IMPACT: Table 3.3-11 identifies those proposed control measures that may have potential project specific impacts on solid waste due to the addition of pollution control equipment which may need disposal and replacement. It is difficult to quantify the number of facilities that would employ these types of equipment, the rate of disposal necessary to maintain the equipment, type of waste generated by the equipment (i.e., hazardous or non-hazardous) and the timing by which these technologies would come into use.

Particulate matter collected on filters and from electrostatic precipitators is expected to be small. Diesel particulate filters are estimated to collect about 10 to 150 grams of material per vehicle per year (CARB, 2002) which is expected to be considered as hazardous waste. The amount of material collected from these types of control equipment is expected to be minor as described in the following paragraphs and could be handled within the capacity of existing disposal facilities.

The diesel PM10 filter system consists of a filter positioned in the exhaust stream designed to collect a significant fraction of the PM10 emissions while allowing the exhaust gases to pass through the system. Since the volume of PM10 generated by a diesel engine is sufficient to fill up and plug a reasonably sized filter over time, some means of disposing of this trapped PM10 must be provided. The most promising means of disposal is to burn or oxidize the PM10 in the filter, thus regenerating, or cleansing, the filter.

A complete filter system consists of the filter and the means to facilitate the regeneration if not of the disposable type. The exhaust temperature of diesels is not always sufficient to initiate regeneration in the filter. A number of techniques are available to bring about regeneration of filters. It is not uncommon for some of these various techniques to be used in combination. Some of these methods include:

- Using a catalyst coated on the filter element. The application of a base or precious metal coating applied to the surface of the filter reduces the ignition temperature necessary for oxidation of the particulate;

- Using a NOx conversion catalyst upstream of the filter to facilitate oxidation of NO to NO_2 which adsorbs on the collected PM10, substantially reducing the temperature required to regenerate the filter;

- Using fuel-borne catalysts to reduce the temperature required for ignition of the accumulated material;

- Throttling the air intake to one or more of the cylinders, thereby increasing the exhaust temperature;

- Using fuel burners, electrical heaters, or combustion of atomized fuel by catalyst to heat the incoming exhaust gas to a temperature sufficient to ignite the PM10;

- Using periodically compressed air flowing in the opposite direction of the PM10 from the filter into a collection bag which is periodically discarded or burned; and

- Throttling the exhaust gas downstream of the filter. This method consists of a butterfly valve with a small orifice in it. The valve restricts the exhaust gas flow, adding back pressure to the engine, thereby causing the temperature of the exhaust gas to rise and initiating combustion.

Based on the above considerations no significant adverse solid/hazardous waste impacts are anticipated to occur from the use of particulate traps.

The goal of the Extreme Ozone Attainment Demonstration Plan is to improve air quality, some types of air pollution control equipment have the potential to create cross-media impacts. For example, removing pollutants from equipment exhaust streams may produce liquid or solid wastes that may require further treatment or disposal to POTWs or landfills, respectively. Specifically, hazardous and non-hazardous waste maybe generated by some types of air pollution control equipment such as electrostatic precipitators, carbon adsorption, oxidation devices, wet scrubbers, baghouse, and filtration equipment. Several control measures have been proposed in the Plan, which may require the use of these types of pollution control equipment (see Table 3.3-11).

State law requires hazardous waste generators to attempt to recycle their wastes before disposing them. OEHHA has implemented a hazardous waste exchange program to promote the use reuse and exchange of hazardous wastes. The program is designed to assist generators of hazardous wastes to recycle their wastes and encourage the reuse of the wastes. The DTSC also publishes a directory catalog of industrial waste recyclers annually so that industries will know where to buy, sell, or exchange their wastes.

PROJECT-SPECIFIC MITIGATION: No significant solid/hazardous waste impacts were identified for solid waste impacts due to air pollution control technologies as part of the Extreme Ozone Attainment Demonstration Plan so no mitigation measures are required.

Carbon Adsorption

The proposed control measures may generate additional solid or hazardous waste in the form of carbon used to control organic emissions, should facilities choose to comply using activated carbon filters. The additional volume of carbon is not expected to be significant since carbon is usually collected and regenerated so that little additional solid waste would be expected. Further, the most probable choice for achieving the proposed emission standard is likely to be extended purging either using steam or chemical agents so that significant volumes of carbon are not expected to be generated as waste.

PROJECT-SPECIFIC IMPACT: Several control measures could encourage the use of carbon adsorption as air pollution control equipment including Control Measure F – Wineries, Control Measure J – Composting/Biosolids Operations, Control Measure M – Carious Coating Rules, Control Measure R – Polymeric Foam Manufacturing, Control Measure U – Aviation Fuel Transfer, as well as some on the Potential Control Measures

Requiring Further Study. The amount of solid waste, which may be generated by the carbon adsorption process would depend on the number of carbon adsorbers installed, the operating characteristics, and the frequency of carbon replacement. Most of the control measures have alternative methods of compliance, e.g., reformulation of materials, so that all facilities would not be expected to use carbon adsorption to comply.

If carbon adsorption systems are used, the amount of hazardous waste generated on an annual basis is expected to be minimal. Most activated carbon used in carbon adsorption control devices is reclaimed and reactivated, resulting in negligible impacts on solid waste disposal facilities. Activated carbon can have a lifetime of five to 10 years; however, the operating characteristics of the control device may result in a shorter lifetime.

Spent carbon is usually recycled and reused rather than disposed in landfills. Most facilities contract out with vendors that take the spent carbon and deliver regenerated carbon. Another alternative to the land disposal of regenerated carbon is to burn the spent carbon in a thermal incinerator. With thermal incineration, the organic materials contained in the carbon are oxidized to carbon dioxide, water, and in most cases, harmless combustion by-products. Incineration destroys the toxic constituents and significantly reduces the volume of carbon to be disposed of, thus reducing solid waste impacts. The disadvantage of incineration is that without additional add-on control devices, there may be an increase in criteria pollutant emissions. Further, it is not expected that carbon adsorption will be used in every case where it is listed as a control option. It is expected that facilities will continue to choose other more cost-effective options to comply with control measures. Therefore, the solid waste impacts resulting from the use of carbon adsorption are expected to be less than significant.

PROJECT-SPECIFIC MITIGATION: No significant impacts due to the use of carbon are expected so no mitigation measures are required. However, it is recommended that recycling and reusing activated carbon should be required to minimize the amount of spent carbon waste being transferred to landfills.

Particulate Traps/Prefilters/Filter/HEPA Filters

PROJECT-SPECIFIC IMPACT: Several control measures in the Extreme Ozone Attainment Demonstration Plan could require the collection and disposal of additional particulate matter including Control Measure C – Fleet Rules, School Buses and Control Measure H – Stationary IC Engines. These measures could result in increased collection of particulate matter that would then need to be disposed.

Baghouses, prefilters, filters, and HEPA filters collect particulate emissions from stationary and mobile sources of particulate emissions. These types of filtration control equipment can effectively remove particulate matter, including heavy metals, asbestos, as well as other toxic and nontoxic compounds.

Polytetrafluoroethylene (PTFE) membranes or HEPA filters can increase a system's removal efficiency up to 99.9 percent. In general, as particulate size decreases, the surface area to volume ratio increases, thus increasing the capacity of these filters to adsorb smaller particles (including hazardous materials). An increase in the use of membranes and filters may increase solid waste requiring disposal in landfills over what would be produced if the Plan were not adopted. In some cases, the waste generated will be hazardous (e.g., the collection of toxic emissions). The increase in the amount of waste generated from the use of filters and the collection of additional particulate matter are expected to be small as the amount of material collected is small. Therefore, the potential impacts of the use of additional filtration equipment on solid/hazardous waste generation are less than significant.

PROJECT-SPECIFIC MITIGATION: No significant solid/hazardous waste impacts were identified for solid waste impacts due to filtration control technologies as part of the Extreme Ozone Attainment Demonstration Plan so no mitigation measures are required.

Early Retirement of Equipment

PROJECT-SPECIFIC IMPACT: Control Measure C – Fleet Rule, School Buses may result in the scrapping of diesel engines and buses. Control Measure H – IC Engines may result in the scrapping of diesel IC engines. Control Measure N – Water Heaters may result in the scrapping of old water heaters. Potential Control Measure Requiring Further Study A – Portable Equipment Registration may result in early retirement of older portable engines.

Approximately 80 percent of a retired vehicle can be recycled and reused in another capacity. Batteries, catalytic converters, tires, and other recoverable materials (e.g., metal components) are removed and the rest of the vehicle is shredded. The shredded material is then sent for recovery of metal content. Therefore, the amount of solid waste landfilled as a result of the proposed measures would be smaller than the size of the vehicle. Additionally, there are a limited number of vehicles that can be scrapped per year. It is expected that diesel engines could also be recycled for metal content, or rebuilt and sold to other areas. These vehicles would be scrapped in the near future, regardless of the control measures as they are older vehicles or have older components. Further, these control measures are not expected to mandate that older vehicle, engines, or other equipment be scrapped. The control measures are expected to allow a number of different control methods to comply with the required emission reductions. The most cost effective control measures would be expected to be implemented. Control measures that would require new equipment will generally require that it occur as the life of the old equipment is exhausted and new equipment is put into service. Based on the above, the increase in solid waste is expected to be within the District's permitted capacity of over 31,000 tons per day so that no significant impacts would be expected.

The California Integrated Waste Management Act of 1989 (AB 939) requires cities and counties in California to reduce the amount of solid waste disposed in landfills by 25 percent by 1995 and by 50 percent by 2000, through source reduction, recycling and composting activities. Many cities and counties have not met these waste reduction goals. The generation of additional waste could impact the abilities of cities and counties to further reduce wastes. However, as discussed above the increase in solid waste that is expected to be diverted to a landfill is small and many of the waste streams are recyclable. Therefore, the proposed project is not expected to have adverse impacts on landfills.

PROJECT-SPECIFIC MITIGATION: No significant impacts on solid/hazardous waste associated with the early retirement of equipment were identified so no mitigation measures are required.

<u>Reject Low VOC Content Coatings</u>

PROJECT-SPECIFIC IMPACTS: Several of the control measures in the Extreme Ozone Attainment Demonstration Plan would include controlling VOC emissions through the reformulation of coatings including Control Measure K – Automotive Coating; and Control Measure M – (Various Coating Rules; and potential control measures E and F which would reformulate adhesives and graphic art supplies. Emission reductions are expected to be achieved through the use of near-zero and zero VOC formulations. There is the potential for compliant lower VOC coatings:

- to not have the same freeze-thaw capabilities as existing coatings;
- to have shorter shelf lives and "go bad" sooner than conventional coatings; and
- to result in a shorter pot life compared to conventional coatings.

The above conditions could result in an increased generation of materials that would require disposal. CARB evaluated the potential impact of these conditions to increase the generation of waste (CARB, 2000) and their evaluation is summarized below.

CARB evaluated the coating product data sheets and determined that all categories of low-VOC coatings except quick dry primers, sealers, and undercoaters have comparable or even longer shelf lives than conventional coatings. However, low VOC industrial maintenance and floor coatings had average pot lives that were shorter (one the order of about one-half) than those of conventional coatings. The NTSs Study showed that there are compliant water-borne coatings that pass freeze-thaw stability tests. Furthermore, manufacturers have indicated that the addition of surfactants will help to overcome freeze-thaw problems.

CARB assumed that about five percent of all affected coatings that currently do not comply with the lower VOC limits would be landfilled due to freeze-thaw prooblems, one percent of all affected coatings would be landfilled due to a shorter shelf life, and 10 percent of all industrial maintenance and floor coatings would be landfilled as a result of a shorter pot life (CARB, 2000). According to California law, coatings that have solidified are not considered hazardous waste and may be disposed of in municipal landfills. Liquid coatings must be sent to a hazardous waste treatment facility.

Therefore, the only coatings that would solidify and be considered nonhazardous waste would be industrial maintenance and floor coatings. The empty containers of failed (but still liquid) coatings due to freeze-thaw and shelf-life problems were included in the solid waste analysis. Table 3.3-12 shows the estimated nonhazardous material that may be landfilled in the counties that make up the SJVUAPCD. Table 3.3-12 shows that landfilling of nonhazardous material will account for less than one percent of the permitted throughput capacity of any county and is considered less than significant.

TABLE 3.3-12
Projected Solid Waste Impacts Associated with Low VOC Coatings in the SJVUAPCD

County	Permitted Throughput tons/day(1)	Freeze-Thaw Disposal tons/day (2010) (2)	Shelf-life Disposal tons/day (2010) (2)	Pot Life Disposal tons/day (2010)(2)	Total Disposal tons/day (2010)(2)	Total Impact (% of Permitted Throughput)
Fresno	3,154	0.077	0.013	0.150	0.240	0.008
Kern	8,692	0.069	0.012	0.135	0.216	0.002
Kings	1,700	0.012	0.002	0.024	0.039	0.002
Madera	395	0.014	0.002	0.028	0.044	0.011
Merced	2,300	0.021	0.004	0.042	0.066	0.003
San Joaquin	10,933	0.058	0.010	0.114	0.183	0.002
Stanislaus	1,500	0.047	0.008	0.092	0.147	0.010
Tulare	2,714	0.038	0.006	0.074	0.118	0.004
TOTAL	19,599	0.315	0.053	0.617	0.987	

(1) See Appendix D for additional information.
(2) Source: CARB, 2000.

To estimate the amount of liquid hazardous waste that would be generated due to implementation of low VOC content coatings, it was assumed that five percent and one percent per year of all coatings would be disposed due to freeze-thaw and shelf-life problems, respectively. In order to provide a conservative estimate of waste generation, it was also assumed that all coatings, including existing solvent-borne formulations, would be reformulated as waterborne coatings. The amount of hazardous waste generated in the San Joaquin Valley was estimated by assuming that the amount of hazardous waste generated within the District was the same percentage of solid waste as compared to the state total. (About 9.7 percent of the projected amount of solid wastes generated from low VOC coatings in the state would be generated in the San Joaquin Valley.) As shown in Table 3.3-13, the increased amount of coatings that would be disposed of in hazardous waste landfills is not expected to be significant. Further, there are incentives to the manufacturers to reduce the amount of coatings generated and, therefore, the amount disposed of, because it costs to manufacture the coating and to dispose of the material. Therefore, as these coatings become more common and there is more experience with their manufacture and use, fewer coatings are expected to be disposed.

TABLE 3.3-13

Projected Hazardous Waste Impacts Associated with Low VOC Coatings in the SJVUAPCD(1)

Facility	Remaining Capacity cubic yards	Estimated Remaining Years	Freeze-Thaw Disposal cubic yards	Shelf-Life Disposal cubic yards	Total Disposal Cubic yard	Total Impact (% of Remaining Capacity)
Chem Waste Management, Kettleman Hills	9 million	15	7,489	1,506	8,995	0.1
Safety Kleen	9 million	40	120	17	137	0.002

(1) Source: CARB 2000

PROJECT-SPECIFIC MITIGATION: No significant impacts due to reject low VOC content coatings so no mitigation measures are required.

3.3.4. CUMULATIVE UTILITIES AND SERVICE SYSTEM IMPACTS

Energy

The analysis of adverse cumulative impacts to energy resources is different than the comparable analysis for other impacts areas for several reasons. First, it is difficult to quantify past energy impacts relative to implementation of the past control measures because it is difficult to determine an actual link between past business practices (and associated energy demand) and compliance with District rules and regulations. There is no methodology to estimate past energy demand relative to past control measures. A second difficulty inherent in evaluating cumulative energy resources impacts is that it is difficult to predict if an affected facility will alter its energy demand in the future or switch to a different resource as a result of complying with a control measure or because of other business considerations. For example, an affected facility owner might switch to an alternative clean fuel if equipment using that alternative clean fuel is much more efficient than the old equipment using conventional fuels. This decision could have been made for a variety of reasons such as cost savings, increased production capacity, etc., and may not be related to the Plan, yet there is currently no way for an analysis to make this distinction.

The energy impacts associated with implementation of the Extreme Ozone Attainment Demonstration Plan are analyzed relative to future baseline energy projections. The future baselines are based upon existing baselines, which is essentially past energy resource utilization plus future energy resource utilization. The estimated future energy resource demand from the Extreme Ozone Attainment Demonstration Plan is present energy demand plus future anticipated demand. Therefore, the project-specific energy resource impacts evaluated in preceding sections are equivalent to a cumulative impact analysis. Therefore, since no project-specific energy resource impacts were identified, no significant adverse cumulative energy resources are anticipated.

Additional energy impacts may be expected with implementation of the CARB SIP control measures which are designed, among other reasons, to reduce emissions from mobile sources by using alternative energy sources. These control measures could require additional electricity generation due to electrification of additional sources, e.g., motor vehicles. The amount of electricity generation will depend on the penetration of electric vehicles and other such control measures into the market.

Southern California Edison has estimated that it will need to add about 200 megawatts of capacity by 2008 to accommodate the increase in electric vehicles in southern California (SCAQMD, 2003). The population in southern California is much greater than the San Joaquin Valley, about 16.5 million compared to 3 million (U.S. Census, 2004). Therefore, the estimated increase in electricity associated with the increase in electric vehicles in San Joaquin would be about 36 megawatts. This increase in electrical use is within the capacity of the existing electrical system.

The increase need for electricity would also result in an increase in natural gas to generate electricity. The natural gas supplies are abundant and require the transportation of the material (usually via pipeline) to reach its destination. Recent projects in the San Joaquin Valley have resulted in increased and better distribution of natural gas. Therefore, sufficient supplies of natural gas are expected to be available.

On a cumulative basis, implementation of the CARB measures as well as the regional transportation agency measures would reduce the use of petroleum fuels by reducing the vehicle miles traveled, reducing the use of cars with internal combustion engines, reducing the use of diesel fuels and so forth.

Based on the above, the cumulative impacts on energy are expected to be less than significant.

Water

The use of these alternative fuels is not expected to result in greater adverse water quality impacts than the use of regular diesel fuels. Therefore, the use of alternative fuels is expected to be less than significant and not greater than adverse water quality impacts from the use of petroleum fuels.

Implementation of the Extreme Ozone Attainment Demonstration Plan will have only minor incremental impacts on water quality and water demand compared to water demand impacts due to population growth and is not considered significant. Implementation of control measures proposed by CARB or the regional transportation agencies are not expected to require additional water use. No cumulative impacts have been identified for water demand.

Solid/Hazardous Wastes

The proposed Extreme Ozone Attainment Demonstration Plan is not expected to result in significant, cumulative adverse impacts on solid or hazardous waste. Recycling of carbon adsorption material was recommended to limit the impact of control measures of landfills. Recycling of carbon material is common.

The control measures are expected to allow a number of different control methods to comply with required emission reductions. The most cost effective control measures would be expected to be implemented. Control measures that would require new equipment will generally require that it occur as the life of the old equipment is exhausted and new equipment is put into service. Further, recycling and reuse of old vehicles and vehicle parts is common and expected to continue. Therefore, the increase in solid waste is expected to be within the permit capacity so that no significant cumulative impacts would be expected.

CUMULATIVE UTILITIES/SERVICE SYSTEMS MITIGATION: No significant cumulative impacts were identified for utilities/service systems so no mitigation measures are proposed.

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