California Energy Commission

DRAFT STAFF REPORT

CALIFORNIA ENERGY DEMAND 2014-2024 PRELIMINARY FORECAST

Volume 2: Electricity Demand by Utility Planning Area

CALIFORNIA
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ABSTRACT

The *California Energy Demand 2014-2024 Preliminary Forecast, Volume 2: Electricity Demand by Utility Planning Area* describes the California Energy Commission's preliminary forecasts for 2014–2024 electricity consumption and peak demand for each of five major electricity planning areas and for distinct climate zones within those planning areas. This forecast supports the analysis and recommendations of the *2013 Integrated Energy Policy Report.* The forecast includes three full scenarios: a high energy demand case, a low energy demand case, and a mid energy demand case. The high energy demand case incorporates relatively high economic/demographic growth, relatively low electricity and natural gas rates, and relatively low efficiency program and self-generation impacts. The low energy demand case includes lower economic/demographic growth, higher assumed rates, and higher efficiency program and self-generation impacts. The mid case uses input assumptions at levels between the high and low cases.

Keywords

Electricity, demand, consumption, forecast, weather normalization, peak, self-generation, conservation, energy efficiency, climate zone, investor-owned, public, utilities

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EXECUTIVE SUMMARY

Introduction

The *California Energy Demand 2014-2024 Preliminary Forecast* describes the California Energy Commission's preliminary forecasts for 2014–2024 electricity consumption, peak demand, and natural gas consumption for each of five major electricity planning areas and three major natural gas distribution areas. This forecast supports the analysis and recommendations of the *2013 Integrated Energy Policy Report* and includes three full scenarios: a high energy demand case, a low energy demand case, and a mid energy demand case. The high energy demand case incorporates relatively high economic/demographic growth, relatively low electricity and natural gas rates, and relatively low efficiency program and self-generation impacts. The low energy demand case includes lower economic/demographic growth, higher assumed rates, and higher efficiency program and self-generation impacts. The mid case uses input assumptions at levels between the high and low cases.

This report is organized into two volumes. Volume 1 examines electricity and end-user natural gas consumption as well as peak electricity demand for California as a whole. Also, Volume 1 describes key aspects of the methods used to produce the forecast, including economic and demographic assumptions; historical consumption estimates; electricity and natural gas rate projections; conservation and efficiency impacts; and demand response, distributed generation, electric vehicle, and climate change considerations. Volume 2 presents forecasts of electricity consumption and peak electricity demand for each of five utility planning areas: Los Angeles Department of Water and Power, Pacific Gas and Electric, Southern California Edison, San Diego Gas & Electric, and Sacramento Municipal Utility District.

Stakeholders have expressed a strong interest in a more disaggregated demand forecast to better inform resource and infrastructure-related analyses and decisions. As a first step in this direction, staff developed results at the climate zone level for *CED 2013 Preliminary* in addition to the usual planning area forecasts. Three of the five planning areas discussed in this volume represent multiple climate zones. For those planning areas—Los Angeles Department of Water and Power, Pacific Gas and Electric, and Southern California Edison—results of the climate zone analysis will be presented at the end of each respective chapter.

Electricity Forecast Results

Each chapter in Volume 2 describes electricity forecast results for a particular utility planning area. Forecasts of total consumption and peak loads lead into a discussion of per capita values, load factors, key economic and demographic drivers, and individual sector results. Demand impacts due to electric vehicles, distributed generation, and conservation/energy efficiency are considered at the end of each chapter. For each result, the *California Energy Demand 2014-2024 Preliminary Forecast* values are presented alongside

the adopted *California Energy Demand 2012-2022 Adopted Forecast* mid case, accompanied by an explanation of any significant differences between the two.

Pacific Gas and Electric

Chapter 1 describes the Pacific Gas and Electric planning area and forecast results. Notable features of this forecast include the following.

- Electricity consumption is projected to reach between 115,999 gigawatt hours in the low demand scenario and 125,272 gigawatt hours in the high demand scenario by 2024.
- Peak electricity demand is projected to reach between 24,390 and 26,950 megawatts by 2024.
- The fastest growth in both consumption and peak demand over the forecast period is projected to be inland, in Climate Zones 2 and 3.
- Self-generation is expected to reduce peak demand by 2,125 megawatts in the mid demand case by 2024, more than 1,000 megawatts of which is due to photovoltaic systems.
- Electric vehicles are expected to increase electricity consumption by roughly 2,000 gigawatt hours in the mid demand case by 2024.

Southern California Edison

Chapter 2 describes the Southern California Edison planning area and forecast results. Notable features of this planning area forecast include the following.

- Electricity consumption is projected to reach between 107,929 gigawatt hours in the low demand scenario and 118,193 gigawatt hours in the high demand scenario by 2024.
- Peak electricity demand is projected to reach between 23,499 and 26,602 megawatts by 2024.
- The fastest growth in both consumption and peak demand over the forecast period is projected to be inland, in Climate Zones 7 and 10.
- Self-generation is expected to reduce peak demand by 1,565 megawatts in the mid demand case by 2024, nearly 700 megawatts of which is due to photovoltaic systems.
- Electric vehicles are expected to increase electricity consumption by nearly 2,000 gigawatt hours in the mid demand case by 2024.

San Diego Gas and Electric

Chapter 3 describes the San Diego Gas and Electric planning area and forecast results. Notable features of this planning area forecast include the following.

- Electricity consumption is projected to reach between 23,280 gigawatt hours in the low demand scenario and 26,376 gigawatt hours in the high demand scenario by 2024.
- Peak electricity demand is projected to reach between 5,032 and 5,772 megawatts by 2024.
- Self-generation is expected to reduce peak demand by 380 megawatts in the mid demand case by 2024, of which 270 megawatts is due to photovoltaic systems.
- Electric vehicles are expected to increase electricity consumption by roughly 1,200 gigawatt hours in the mid demand case by 2024.

Sacramento Municipal Utility District

Chapter 4 describes the Sacramento Municipal Utility District planning area and forecast results. Notable features of this planning area forecast include the following.

- Electricity consumption is projected to reach between 11,631 gigawatt hours in the low demand scenario and 12,704 gigawatt hours in the high demand scenario by 2024.
- Peak electricity demand is projected to reach between 3,291 and 3,698 megawatts by 2024.
- Self-generation is expected to reduce peak demand by roughly 55 megawatts in the mid demand case by 2024, almost all of which is due to photovoltaic systems.
- Electric vehicles are expected to increase electricity consumption by nearly 100 gigawatt hours in the mid demand case by 2024.

Los Angeles Department of Water and Power

Chapter 5 describes the Los Angeles Department of Water and Power planning area and forecast results. Notable features of this planning area forecast include the following.

- Electricity consumption is projected to reach between 26,758 gigawatt hours in the low demand scenario and 29,560 gigawatt hours in the high demand scenario by 2024.
- Peak electricity demand is projected to reach between 6,019 and 6,860 megawatts by 2024.
- The fastest growth in both consumption and peak demand over the forecast period is projected to be inland, in Climate Zone 12.

- Self-generation is expected to reduce peak demand by over 300 megawatts in the mid demand case by 2024, nearly 70 megawatts of which is due to photovoltaic systems.
- Electric vehicles are expected to increase electricity consumption by roughly 800 gigawatt hours in the mid demand case by 2024.

CHAPTER 1: Pacific Gas and Electric Planning Area

The Pacific Gas and Electric (PG&E) planning area includes:

- PG&E bundled retail customers.
- Customers served by energy service providers (ESPs) using the PG&E distribution system to deliver electricity to end users.
- Customers of publicly owned utilities and irrigation districts in PG&E's transmission system, with the exception of the Sacramento Municipal Utility District (SMUD). SMUD is treated as its own planning area, as discussed in a later chapter.

For purposes of this chapter, the PG&E planning area forecast includes other members of the SMUD control area, which are not in the SMUD service area. These entities include Roseville, Redding, and the Western Area Power Administration (WAPA).

To support electricity and transmission system analysis, staff uses historical consumption and load data to develop individual forecasts for all medium and large utilities in the planning area. Those results are presented in Forms 1.5a through 1.5c in the statewide forms accompanying this forecast report. The results in this chapter are for the entire PG&E transmission planning area.

This chapter is organized as follows. First, forecasted consumption and peak loads for the PG&E planning area are discussed; both total and per capita values are presented. The *California Energy Demand 2014-2024 Preliminary Forecast* (*CED 2013 Preliminary)* values are compared to the *California Energy Demand 2012-2022 Adopted Forecast* (*CED 2011)* mid scenario, with differences between the two forecasts explained. The forecasted load factors, jointly determined by the consumption and peak load estimates, are also discussed. Second, the chapter presents sector consumption and peak load forecasts. The residential, commercial, industrial, and "other" sector forecasts are compared to those in *CED 2011,* and differences between the two are discussed. Third, the chapter discusses the forecasts of electric vehicles, self-generation, and the impacts of conservation and efficiency programs. Finally, forecasts of electricity consumption and peak demand are presented for each climate zone within the PG&E planning area.

Bay Area Economic and Demographic Outlook

This section provides general information on the economic and demographic outlook for the San Francisco Bay Area using outlooks provided by Moody's, IHS Global Insight, the University of California, Los Angeles (UCLA), the California Department of Finance, and the United States Census Bureau. These outlooks are based on economic data available in January 2013.

The Bay Area was the first region to recover from the recession; its recovery is strengthening. San Francisco and Marin County's recovery is bolstered by technology, rising incomes,

infrastructure spending, and an influx of visitors. San Jose's recovery is based on expanding technology services and rising incomes. Oakland's recovery is the result of infrastructure spending and technology.

Payrolls are growing across the Bay Area. San Francisco and Marin County payrolls increase as a result of service- and visitor-dependent industries, construction, finance, and local government. San Jose technology and the services industry are driving payroll gains. Oakland is experiencing a rise in construction, services, and education services. The unemployment rate has dipped below 7 percent in San Francisco and Marin Counties, 9 percent in Oakland, and 8.5 percent in San Jose.

The housing market is improving. The inventory of homes for sale is decreasing. The median price for existing single-family homes is increasing and the issuance of residential construction permits is rising.

The Bay Area's recovery should continue in 2013. Technology and tourism will be the primary drivers with contribution from financial services. San Jose's biggest contributor to recovery is technology, but growth will expand to other sectors. Oakland's recovery should be strengthened in 2013, but may trail the rest of the Bay Area. Oakland's economic drivers are trade and healthcare.

Longer term, the Bay Area will benefit from its growing cluster of technology and R&D centers, which could help offset slower growth in finance and high business and living costs.

Forecast Results

For this forecast, three demand scenarios were developed. The high demand scenario includes high economic and demographic projections, low energy price projections, and low efficiency impact assumptions. The low demand scenario includes low economic and demographic projections, high energy price projections, and high efficiency impact assumptions. Volume 1 provides more detail on the construction of the demand scenarios.

Table 1-1 presents a comparison of *CED 2013 Preliminary* high, mid, and low demand scenarios with the *CED 2011* mid demand scenario for electricity consumption and peak demand for selected years. Comprehensive results are available electronically as a set of forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/).

In the PG&E planning area, the *CED 2013 Preliminary* mid demand electricity consumption is 6.1 percent lower than *CED 2011* in 2020, the result of a lower than projected level of consumption in 2012 and a lower growth rate over the forecast period. By 2024, the *CED 2013 Preliminary* high demand level is 4.3 percent higher than the mid case while the low demand scenario is 3.4 percent lower. For peak demand, the *CED 2013 Preliminary* high and low scenarios are 4.1 percent higher and 5.8 percent lower, respectively, than the mid case

by 2024. Weather-normalized peak demand in 2012 was 2.3 percent lower than predicted in *CED 2011*.

Table 1-1: PG&E Planning Area Forecast Comparison

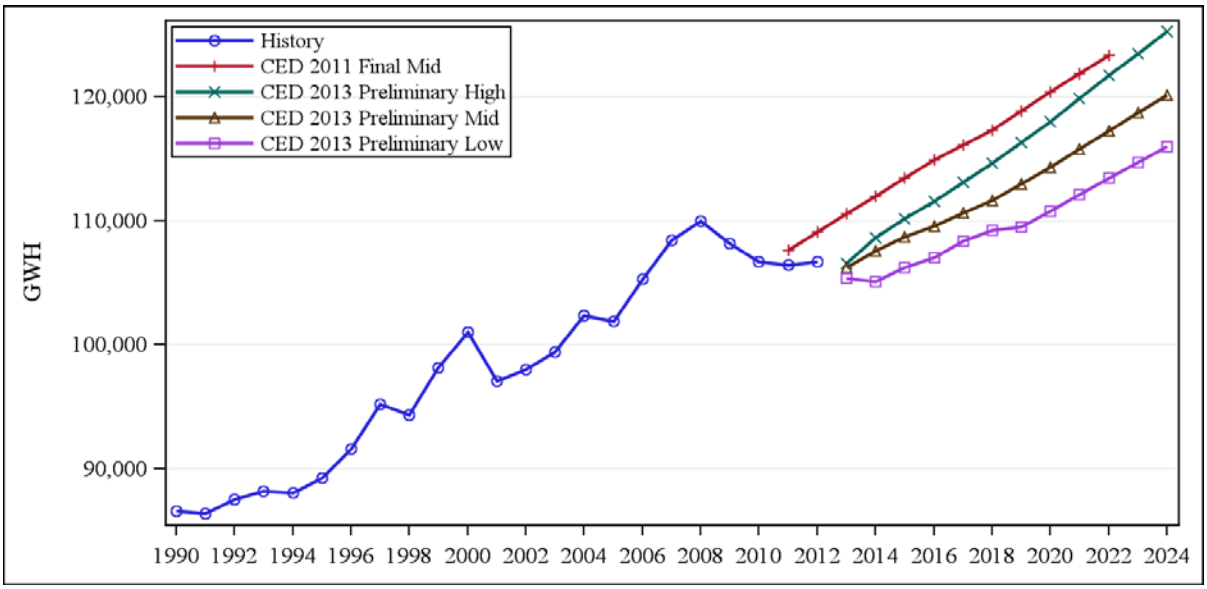
Consumption (GWH)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	86,597	86,596	86,596	86,596
2000	100,878	101,050	101,050	101,050
2012	109,133	106,690	106,690	106,690
2015	113,455	110,148	108,676	106,228
2020	120,372	118,012	114,292	110,809
2024	--	125,272	120,123	115,999
Average Annual Growth Rates				
1990 - 2000	1.54%	1.56%	1.56%	1.56%
2000 - 2012	0.79%	0.54%	0.54%	0.54%
2012 - 2015	1.30%	1.07%	0.62%	-0.14%
2012 - 2020	1.23%	1.27%	0.86%	0.47%
2012 - 2024	--	1.35%	0.99%	0.70%
Peak (MW)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	17,250	17,250	17,250	17,250
2000	20,628	20,628	20,628	20,628
2012	22,840	21,922	21,922	21,922
2012*	22,840	22,303	22,303	22,303
2015	24,060	23,743	23,548	22,598
2020	25,620	25,501	24,816	23,544
2024	--	26,950	25,892	24,390
Average Annual Growth Rates				
1990 - 2000	1.80%	1.80%	1.80%	1.80%
2000 - 2012	1.02%	0.61%	0.61%	0.61%
2012* - 2015	1.75%	2.11%	1.83%	0.44%
2012* - 2020	1.45%	1.69%	1.34%	0.68%
2012* - 2024	--	1.59%	1.25%	0.75%
Historical values are shaded				
*Weather normalized: *CED 2013 Preliminary* uses a weather-normalized peak value derived from the actual 2012 peak for calculating growth rates during the forecast period				

Source: California Energy Commission, Demand Analysis Office, 2013

As shown in **Figure 1-1**, *CED 2013 Preliminary* electricity consumption forecasts are lower at the beginning of the forecast period than projected by *CED 2011*. Consumption dips slightly from 2012 to 2013, due to a combination of slow economic growth, an increase in residential and commercial electricity rates, and the assumption of normal weather (2012 was a particularly warm year). Growth in the mid case is slightly less than CED 2011, due to rate increases and the addition of building and appliance standards. In 2022, all three consumption scenarios remain below the level projected by *CED 2011*.

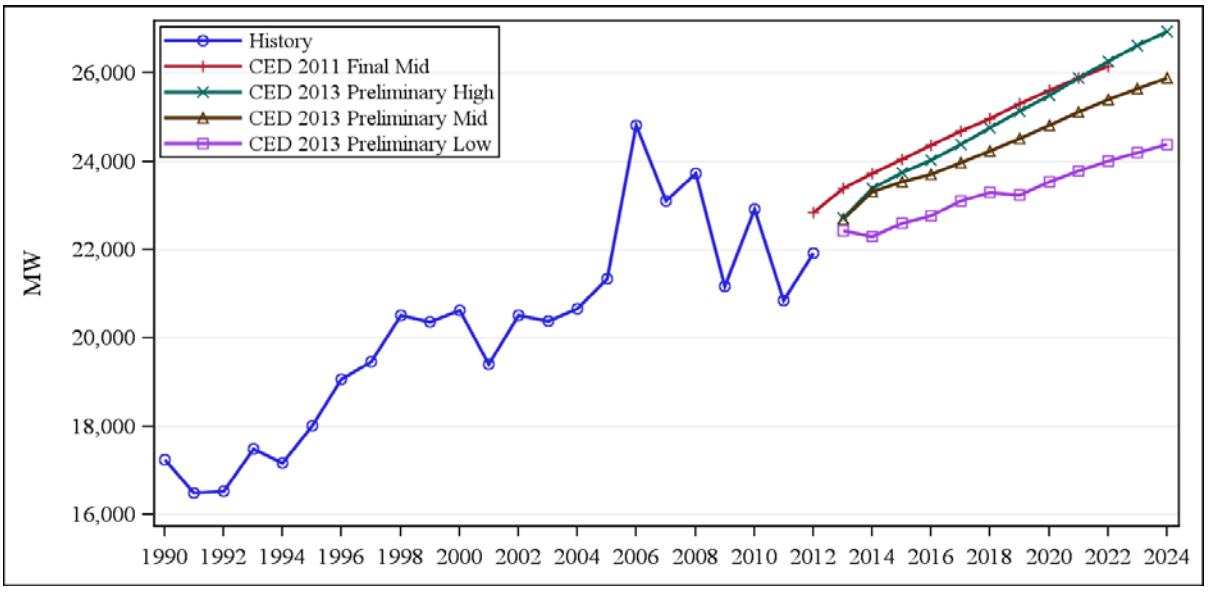
While 2012 was a warm year on average, the PG&E planning area did not experience particularly extreme high temperatures, so actual peak load was only slightly lower than weather normalized peak. The relationship between peak demand scenarios, shown in **Figure 1-2**, follows a similar pattern as the consumption forecast. As with consumption, the peak demand forecast begins at a lower value than projected in *CED 2011* and all three scenarios remain below *CED 2011* values for most of the forecast period. Peak growth is slightly higher than consumption due in part to efficiency considerations—such as increasing lighting efficiency—that have a greater impact on consumption than on peak.

Figure 1-1: PG&E Planning Area Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-2: PG&E Planning Area Peak

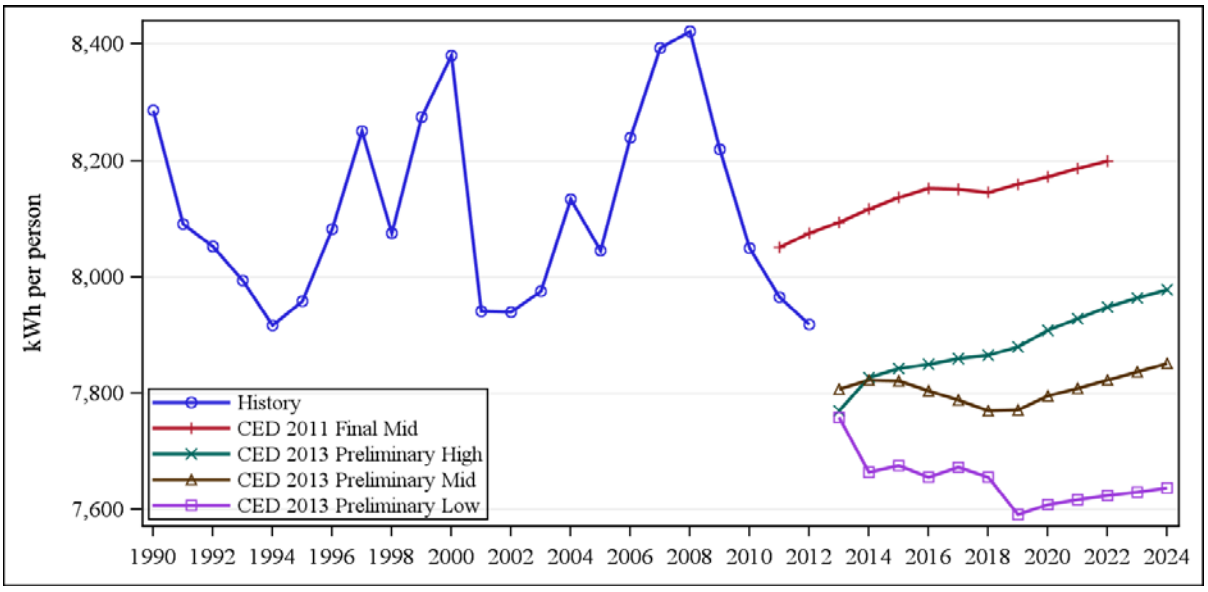


Source: California Energy Commission, Demand Analysis Office, 2013

PG&E's projected peaks reflect staff estimates of future non-event-based demand response committed program impacts incremental to 2012 impacts, including real-time or time-of-use pricing and permanent load shifting. The projected impacts reach around 20 MW in 2024. See Volume 1 for more details.

As **Figure 1-3** shows, per capita electricity consumption is lower in the *CED 2013 Preliminary* demand scenarios throughout the forecast period compared to *CED 2011*. The drop in 2013 shows the combined effect of decreased consumption and increased population. Unlike *CED 2011*, which considered only a single population scenario, *CED 2013 Preliminary* incorporates high, mid, and low population projections. While the high and mid consumption forecasts are nearly identical in 2013, there is some spread between population estimates for that year. As a result, the high per capita consumption scenario shown below actually begins from a lower point than the mid scenario.

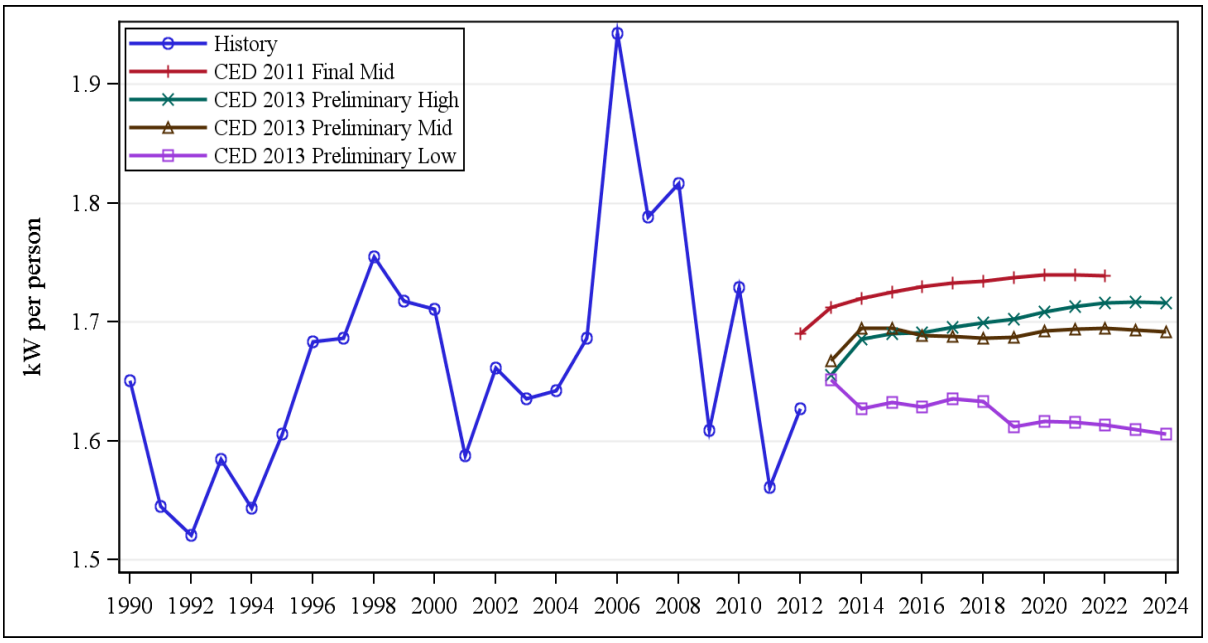
Figure 1-3: PG&E Planning Area Per Capita Electricity Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-4 shows per capita peak demand. *CED 2013 Preliminary* per capita peak scenarios follow the same pattern as the per capita consumption scenarios. The per capita peak values are projected to remain in the range of recent historical levels for all three scenarios.

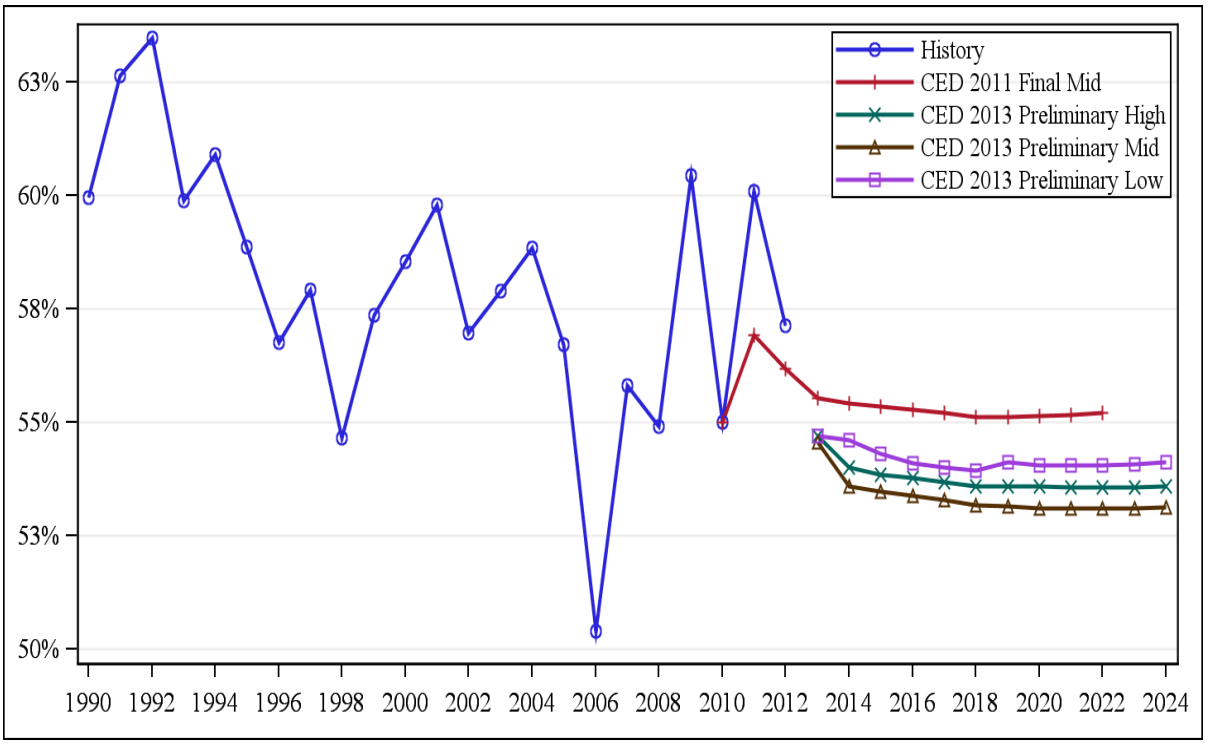
Figure 1-4: PG&E Planning Area per Capita Peak Demand



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-5 compares forecasted load factors. The load factor is a measure of the increase in peak demand relative to annual electricity consumption. Lower load factors indicate "a needle peak"; higher load factors indicate a more stable load. Greater population and economic growth in the PG&E planning area has been taking place in hotter inland areas, leading to a higher saturation of central air conditioning. In addition, recent years have seen a greater use of air conditioning equipment in the cooler Bay Area on warm days. *CED 2013 Preliminary* projects load factors to be relatively constant over the forecast period and slightly lower than *CED 2011*.

Figure 1-5: PG&E Planning Area Load Factors



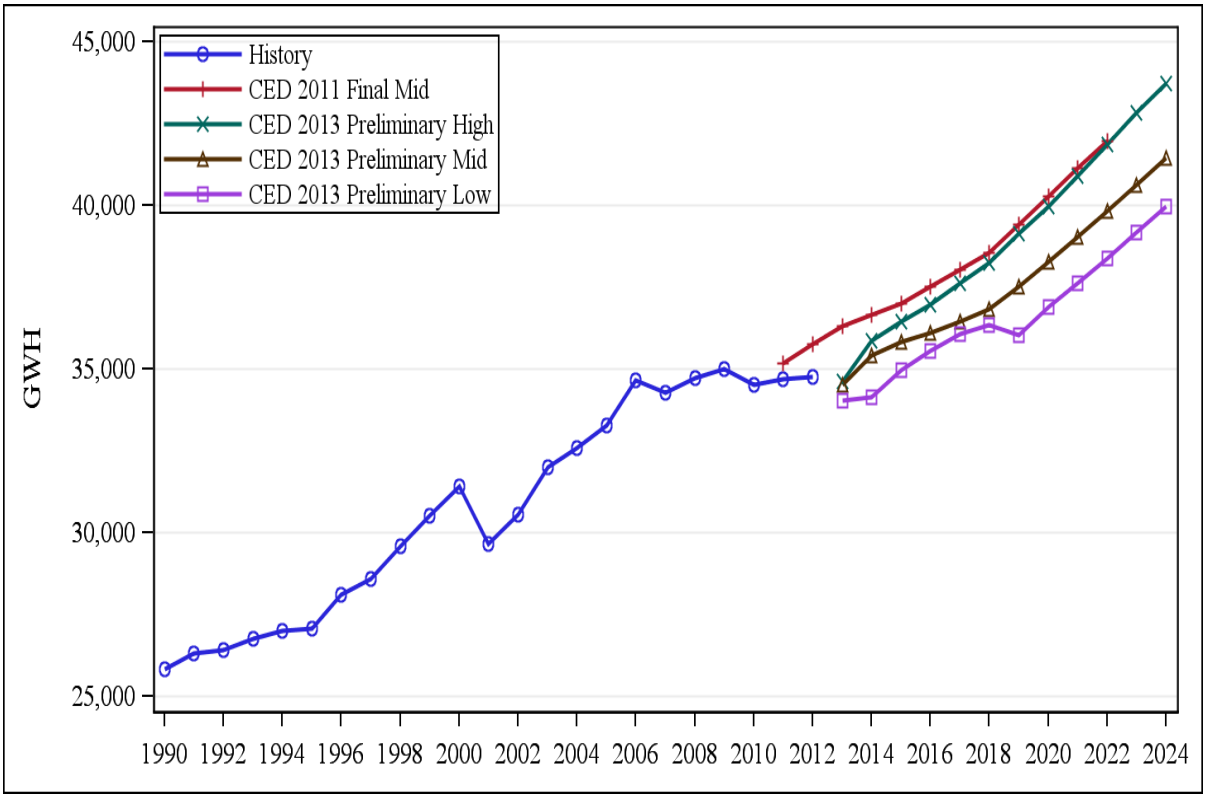
Source: California Energy Commission, Demand Analysis Office, 2013

Sector Level Results and Input Assumptions

Residential Sector

Figure 1-6 compares *CED 2013 Preliminary* and *CED 2011* PG&E planning area residential forecasts. All three *CED 2013 Preliminary* forecast scenarios are lower through the end of the forecast period, mainly due to continued slow economic recovery and lower number-of-household projections. The low demand scenario also has a small decline in 2019 due to changes in household incomes.

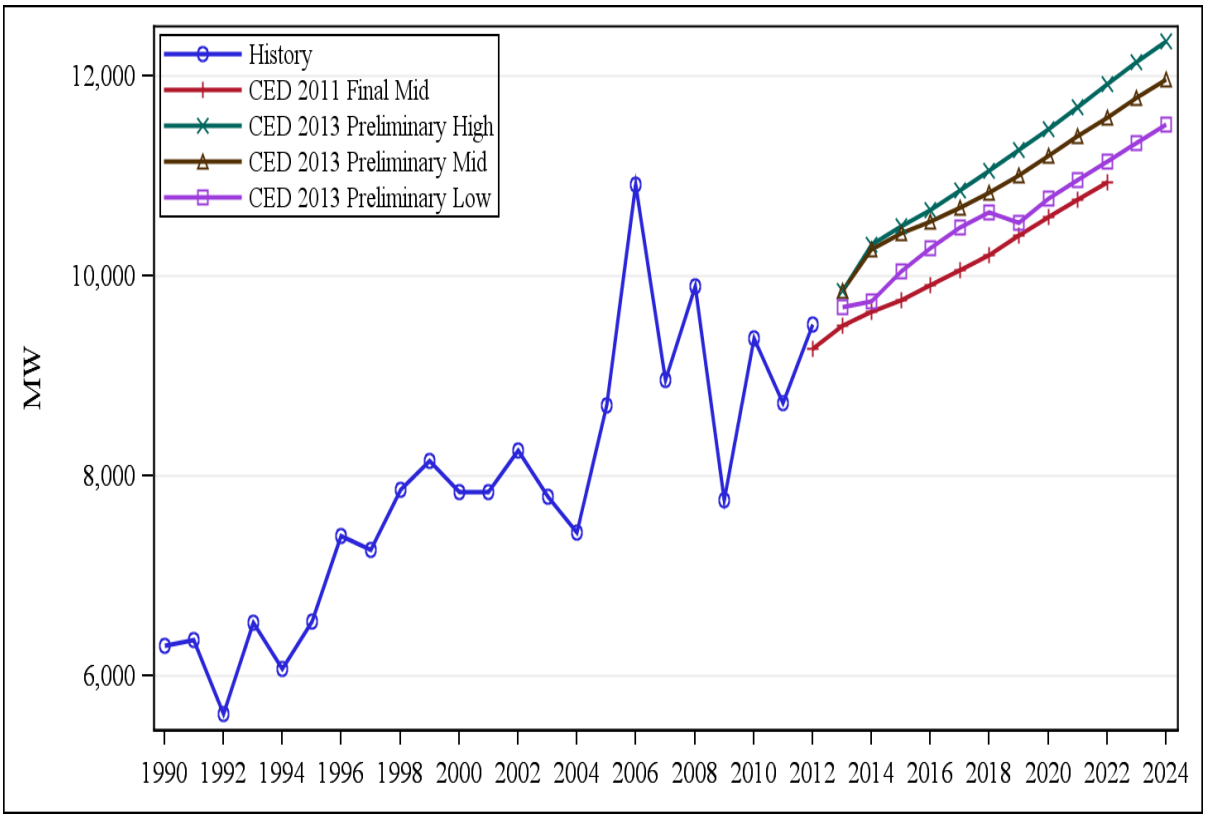
Figure 1-6: PG&E Planning Area Residential Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-7 compares *CED 2013 Preliminary* and *CED 2011* residential peak demand forecasts. The *CED 2013 Preliminary* residential peak forecasts are higher than the *CED 2011* forecast due to a higher 2012 actual residential peak. The differences between peak forecasts follow a similar pattern to differences in the consumption forecasts since the peak forecasts are driven primarily by electricity consumption. Updated inputs to the peak evaluation result in small differences from the *CED 2011* near-term historic peak values.

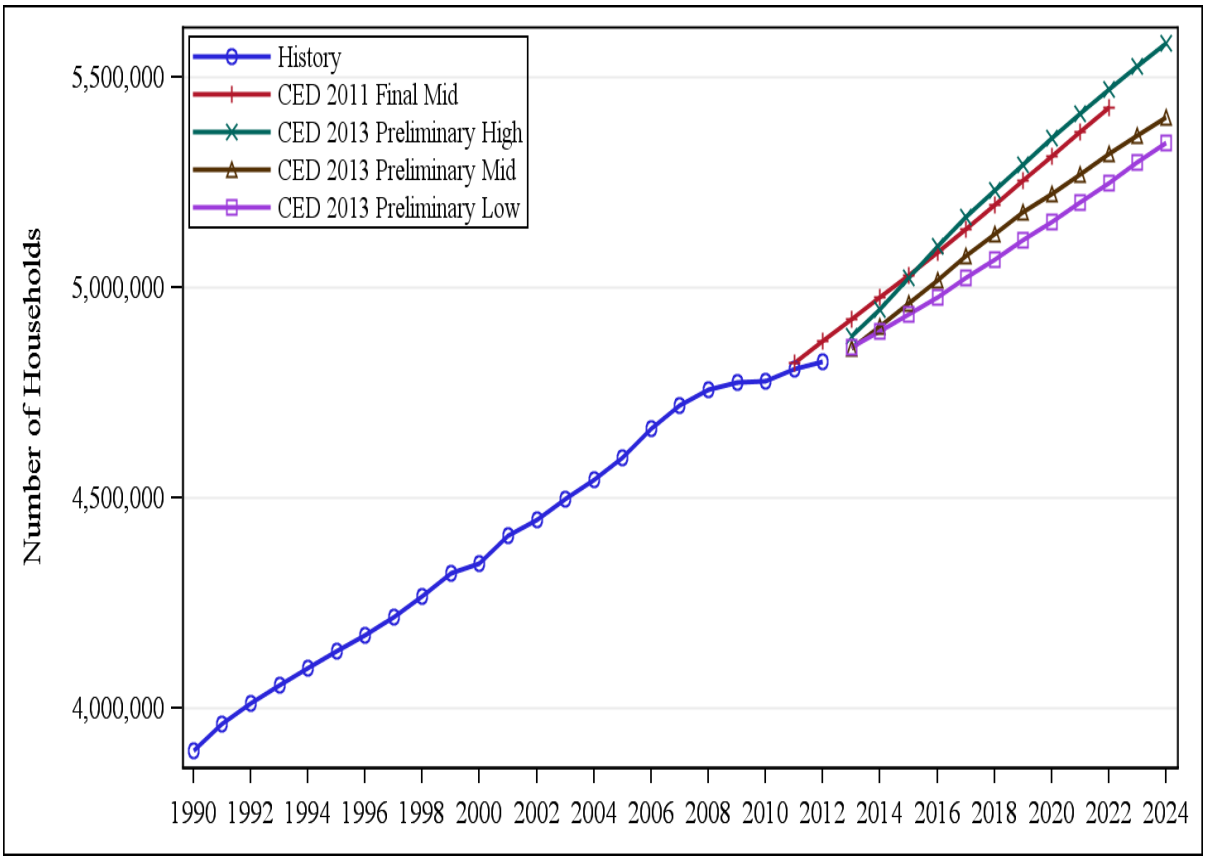
Figure 1-7: PG&E Planning Area Residential Peak



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-8 Figure 1-8**, Figure 1-9**, and **Figure 1-10** compare residential drivers used in *CED 2013 Preliminary* with those used for *CED 2011*. **Figure 1-8** shows total households. The *CED 2013 Preliminary* mid and low demand scenarios are lower than the previous forecast because of lower near-term number-of-household values and moderate rates of growth. The *CED 2013 Preliminary* forecast includes the most recent updated county population and household estimates from the California Department of Finance, which incorporates information from the 2010 U.S. Census.

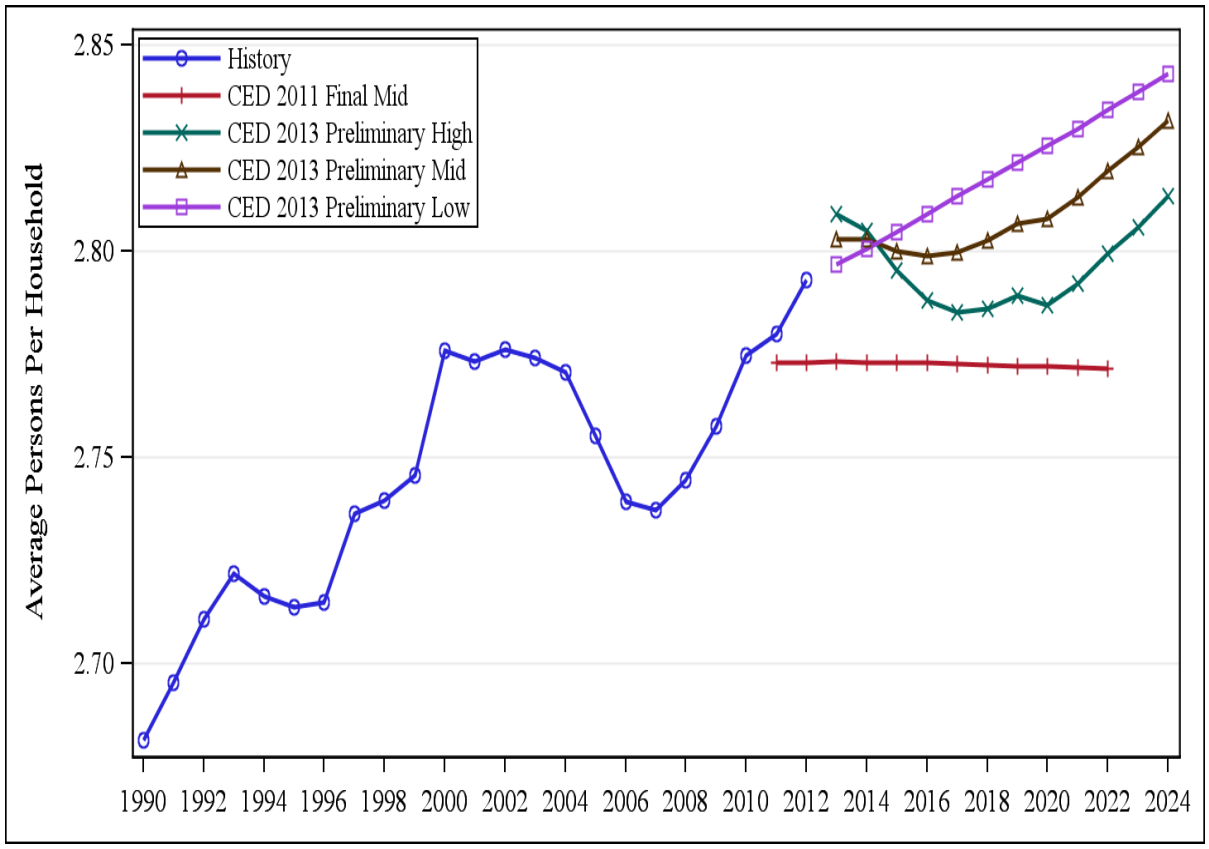
Figure 1-8: PG&E Planning Area Residential Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

The household scenarios are based on persons-per-household changes, shown in **Figure 1-9**. The high demand scenario uses a lower persons-per-household projection (more households) and the low demand scenario uses a higher persons-per-household projection (fewer households). The *CED 2013 Preliminary* mid demand scenario persons-per-household continues to grow fairly steadily after 2016. Longer term, persons-per-household continue the recent trend and increase in all three scenarios.

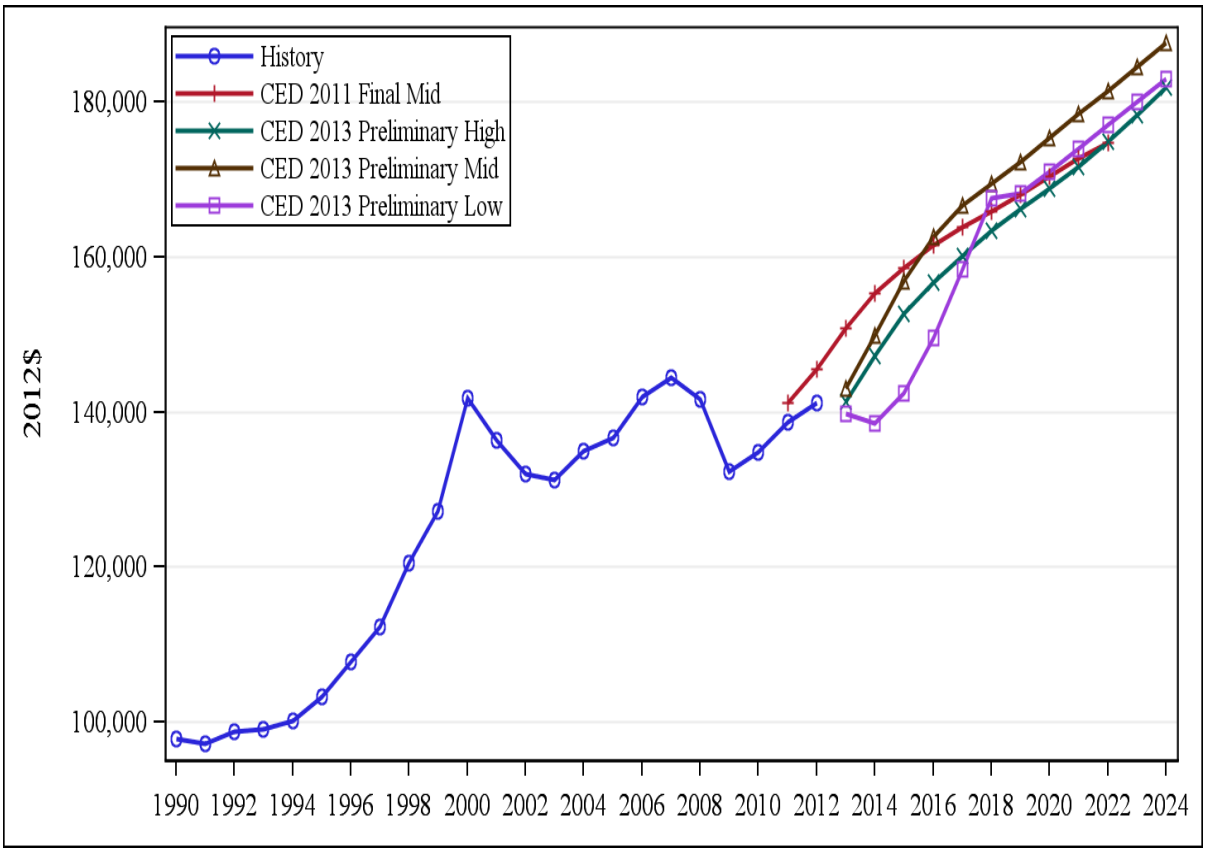
Figure 1-9: PG&E Planning Area Persons per Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-10 compares average household income (per capita income multiplied by persons per household) in the two forecasts. The mid and high *CED 2013 Preliminary* scenario household income estimates are roughly equal at the end of the forecast period to *CED 2011*. However, the near-term values of the low scenario are significantly lower than the *CED 2011* reflecting the lagged economic recovery included in the low demand scenario. The difference between scenarios is a function of the variation in per capita income and persons per household used to define the scenarios.

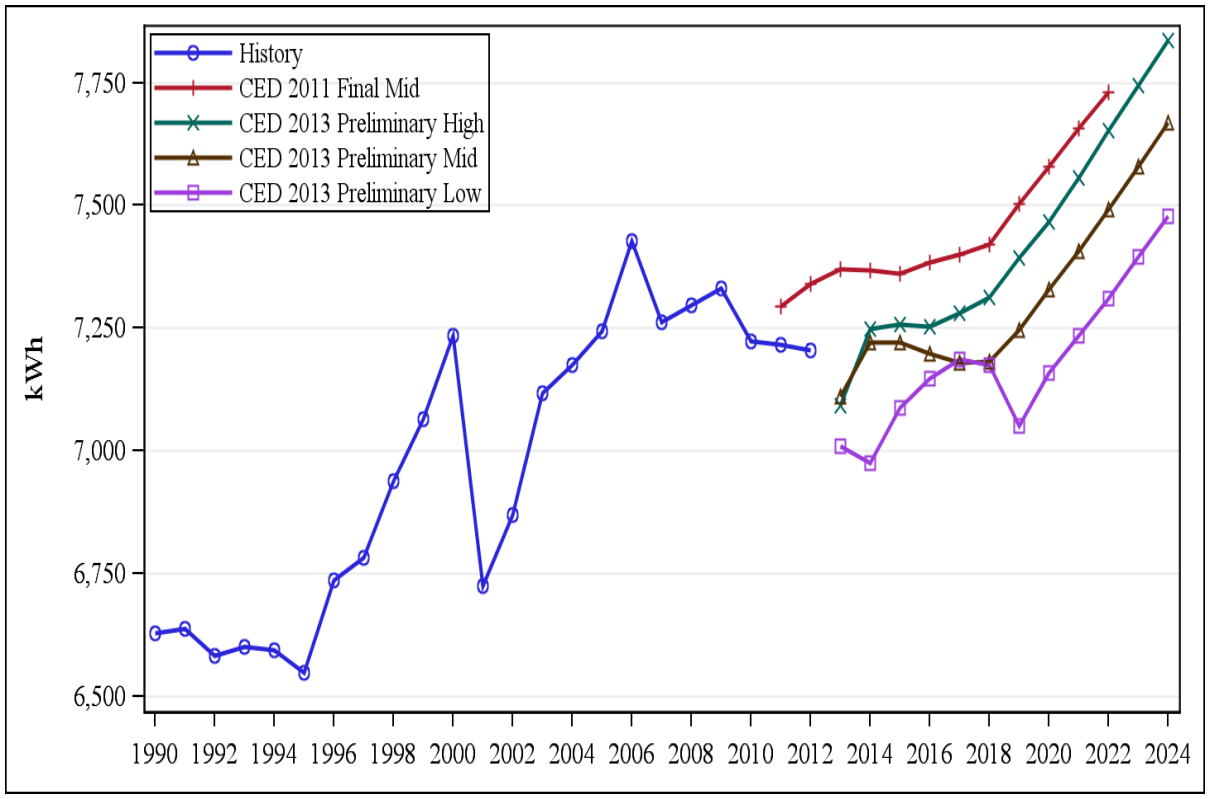
Figure 1-10: PG&E Planning Area Average Household Income Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-11 gives a comparison of annual electricity consumption per household. *CED 2013 Preliminary* mid and high demand scenario growth rates are similar to *CED 2011* beyond 2018, though lower throughout the forecast period. This is caused by differences in the underlying economic and demographic assumptions. The low demand scenario has a significant drop in 2019 caused by the underlying low scenario economic and demographic assumptions. As with *CED 2011* most of the growth in use per household after 2015 is caused by increased numbers of electric vehicles in the residential sector. Without the inclusion of electric vehicle charging, residential use would not grow as rapidly over the forecast period after the economic recovery.

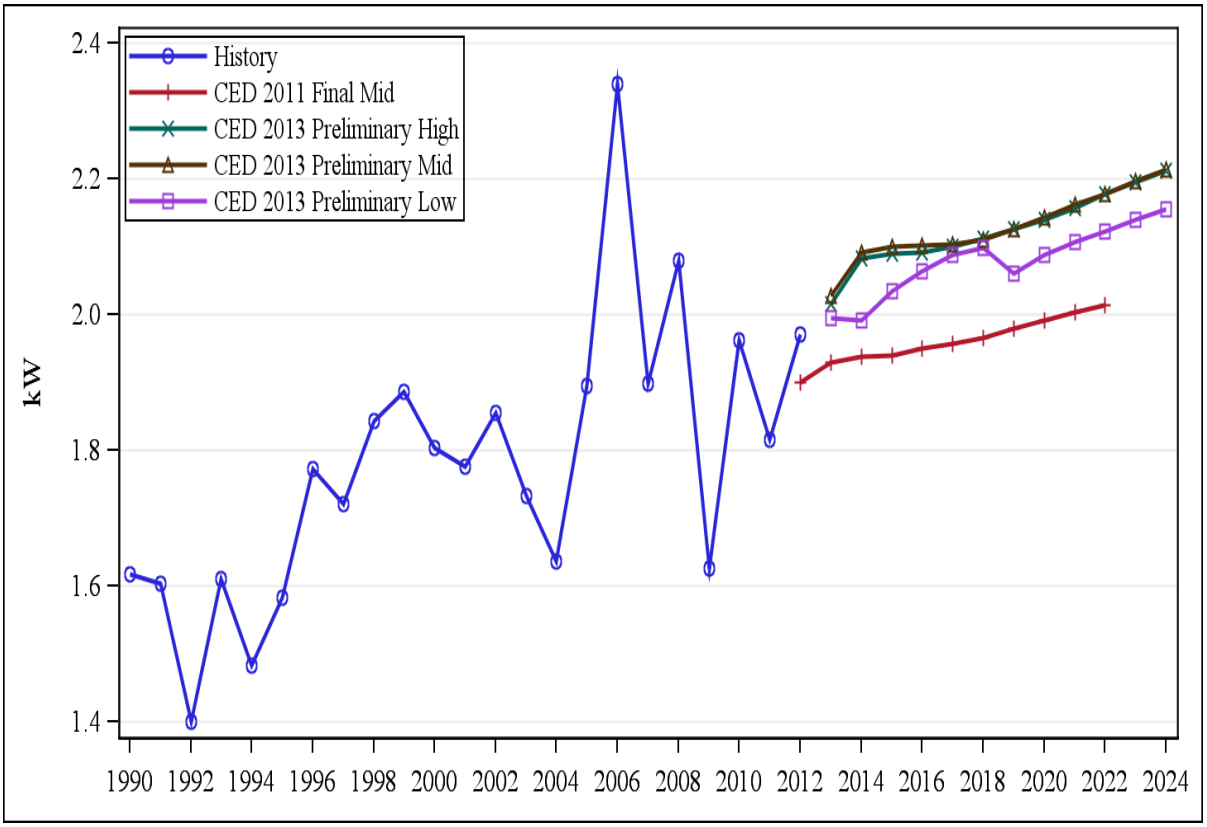
Figure 1-11: PG&E Planning Area Consumption per Household



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-12 shows forecasts of peak use per household. The *CED 2013 Preliminary* projections grow modestly over the forecast period in a pattern similar to but at slightly higher levels than the *CED 2011* forecast. The increase in level is caused by higher recent historical estimates of residential peak. When compared to consumption per household, the forecast of peak per household shows relatively little impact from electric vehicle adoption. This is due to the assumption that personal electric vehicles will be charged primarily during off-peak hours.

Figure 1-12: PG&E Planning Area Peak Use per Household

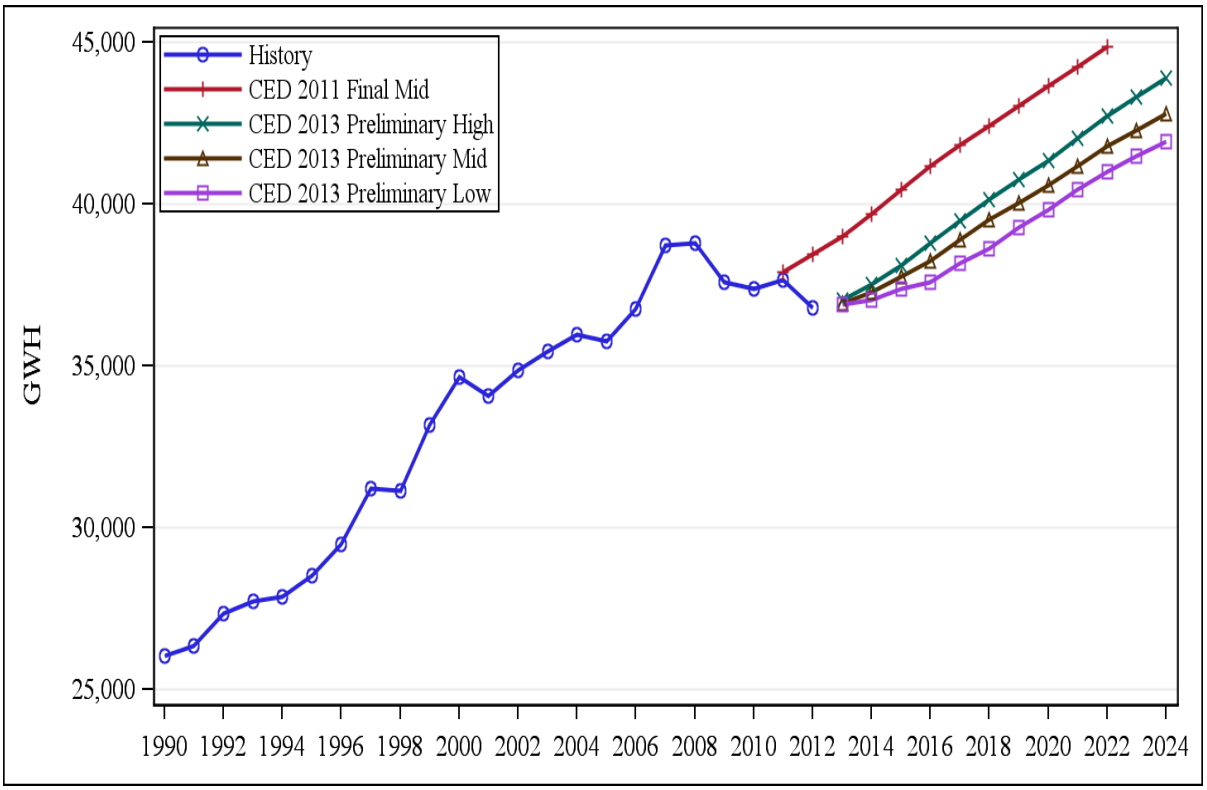


Source: California Energy Commission, Demand Analysis Office, 2013

Commercial Sector

Figure 1-13 compares the PG&E commercial sector electricity consumption forecasts. The *CED 2013 Preliminary* consumption scenarios are lower than *CED 2011* forecast throughout the forecast period. The differences are primarily caused by a lower starting point due to lower estimates of recent historical commercial consumption. The growth rate of each of the consumption scenarios is similar to the *CED 2011* forecast.

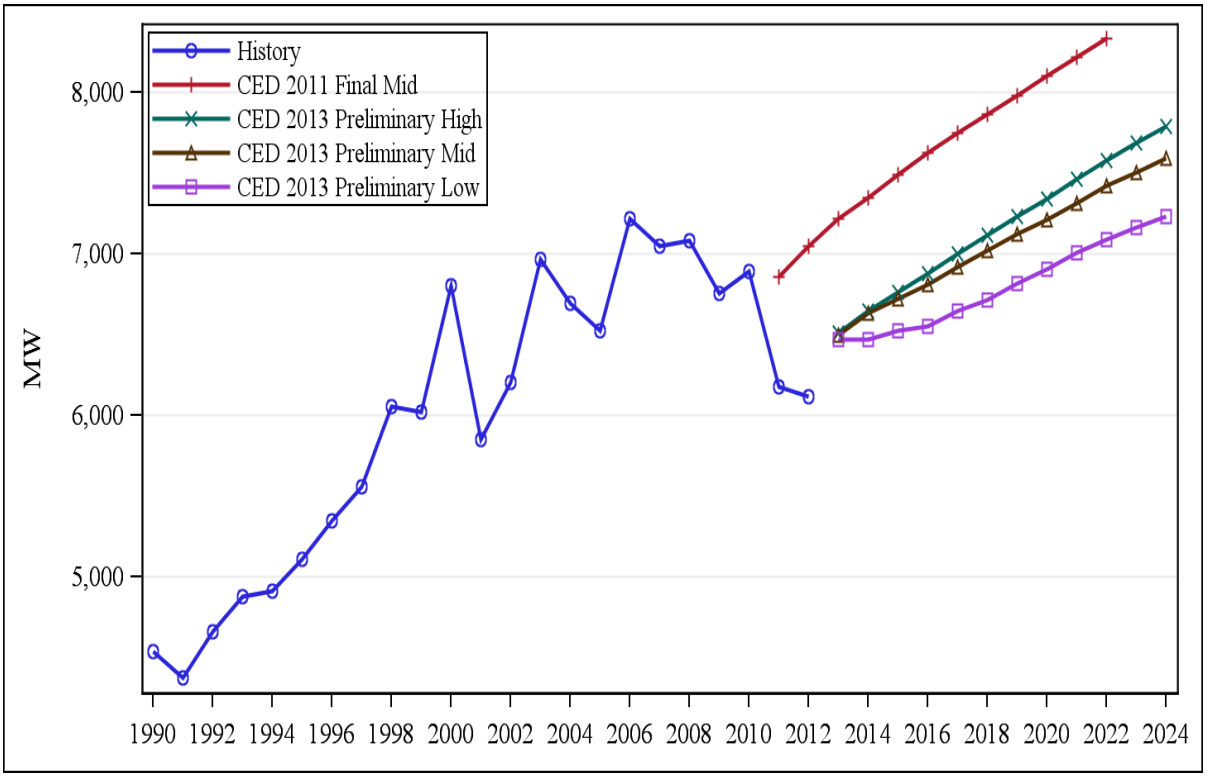
Figure 1-13: PG&E Planning Area Commercial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-14 compares the PG&E commercial sector peak demand forecasts. Growth in the *CED 2013 Preliminary* peak scenarios is driven by the underlying electricity consumption forecast, which exhibits a similar pattern. The *CED 2013* low case scenario produces a slightly lower peak forecast due to slower growth in projected floor space.

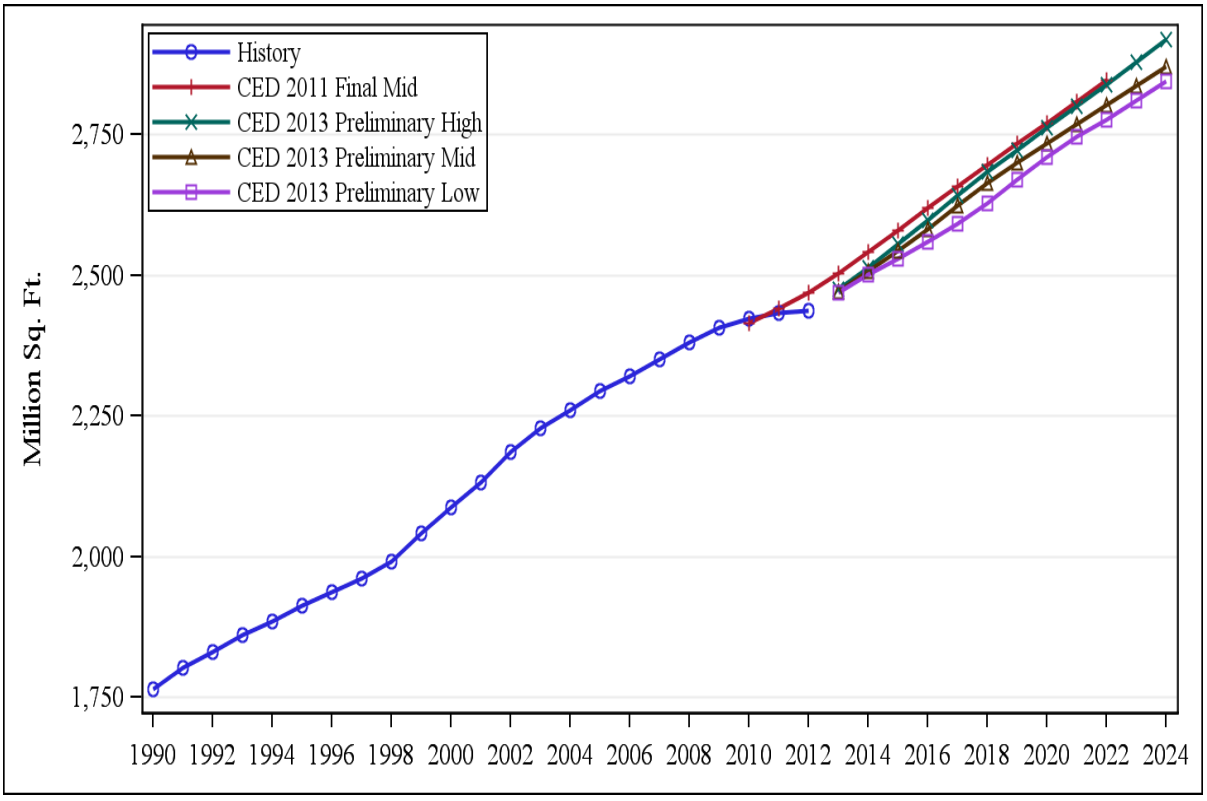
Figure 1-14: PG&E Planning Area Commercial Sector Peak



Source: California Energy Commission, Demand Analysis Office, 2013

In staff's commercial building sector forecasting model, floor space by building type (such as retail, offices, and schools) is the key driver. **Figure 1-15** compares PG&E commercial floor space projections. *CED 2013 Preliminary* low and mid case floor space projections are somewhat lower over the forecast period than those used in the previous forecast due to a lower starting point. However, the *CED 2013 Preliminary* high case floor space projection increases to *CED 2011* toward the end of the forecast period.

Figure 1-15: PG&E Planning Area Commercial Floor Space

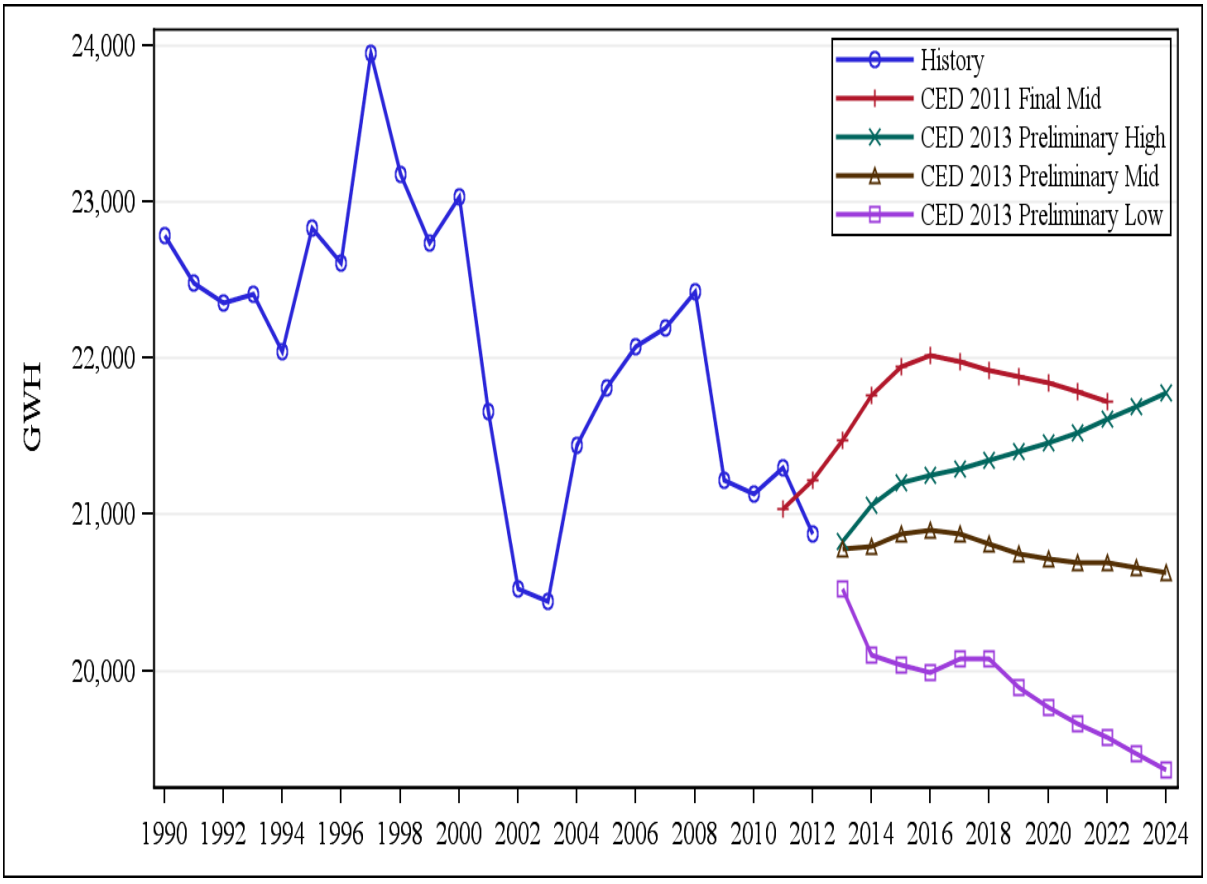


Source: California Energy Commission, Demand Analysis Office, 2013

Industrial Sector

Figure 1-16 compares the PG&E planning area industrial sector electricity consumption forecasts. *CED 2013 Preliminary* industrial consumption forecast scenarios are all lower than the *CED 2011* forecast in the short term. However, projected growth in the high case is higher near the end of the forecast term than the *CED 2011* forecast due to more optimistic economic projections. The growth rate for all three *CED 2013 Preliminary* scenarios in the beginning of the forecast period is lower than the *CED 2011* forecast due to differences in economic output.

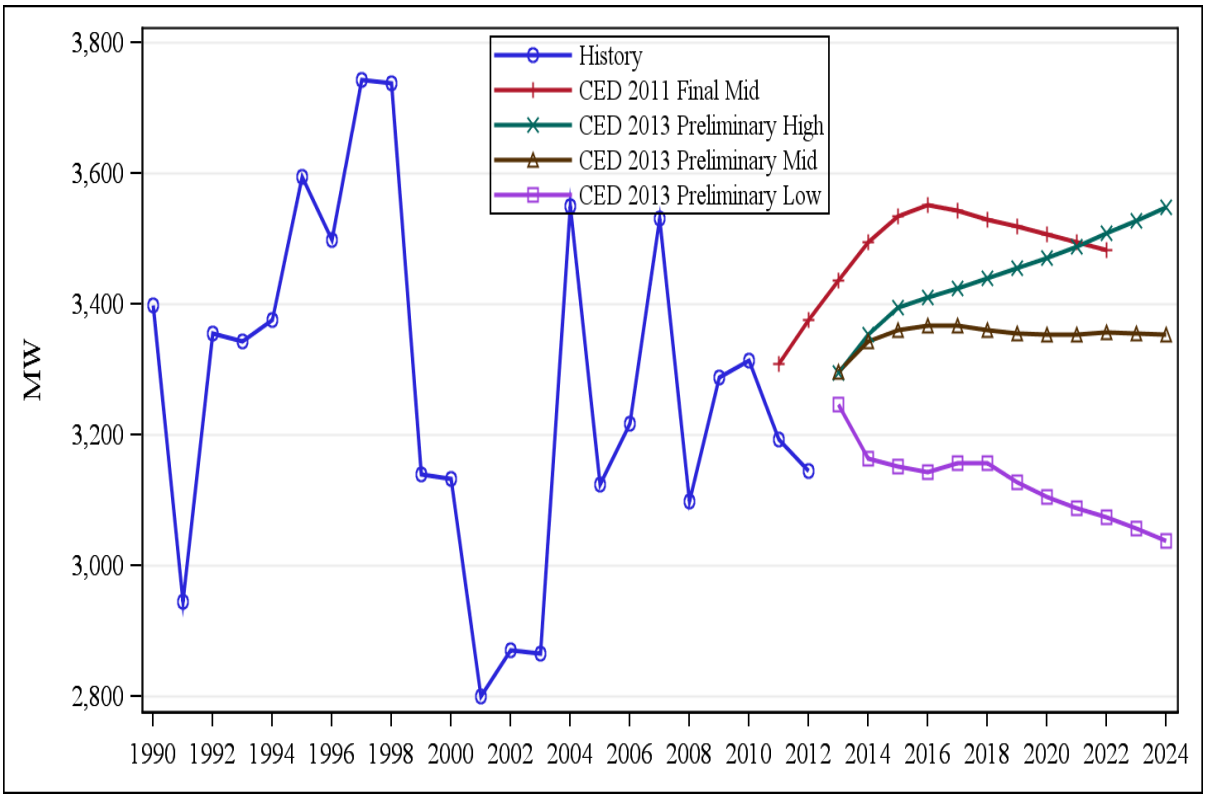
Figure 1-16: PG&E Planning Area Industrial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-17 compares the PG&E industrial sector peak forecasts. The *CED 2013 Preliminary* industrial peak forecasts follow the same pattern as the industrial consumption forecasts.

Figure 1-17: PG&E Planning Area Industrial Sector Peak

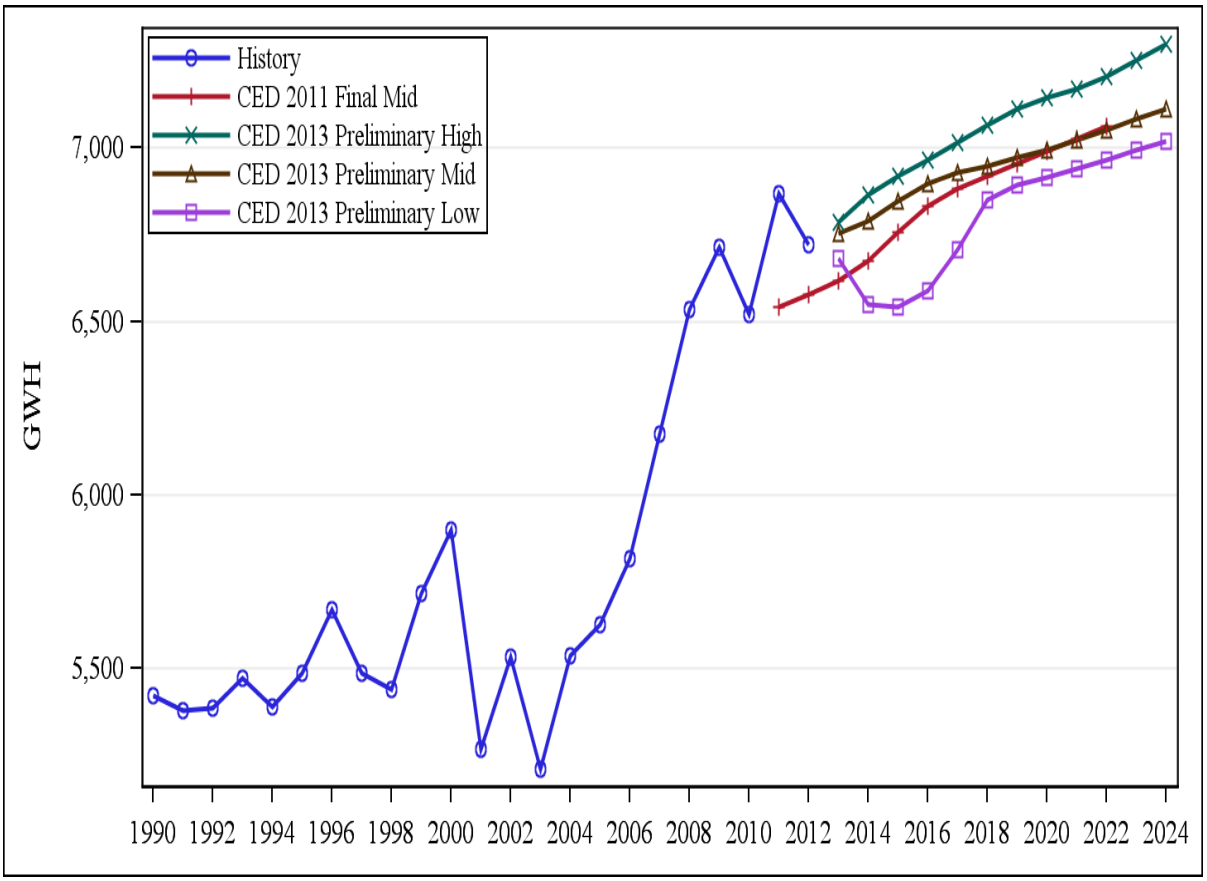


Source: California Energy Commission, Demand Analysis Office, 2013

Other Sectors

Figure 1-18 compares the electricity consumption forecasts for the transportation, communications, and utilities (TCU) sector, which includes street lighting. *CED 2013 Preliminary* mid starts higher than *CED 2011* but the two forecasts eventually trend together in the mid and long term. In the recession scenario modeled in the low case, electricity consumption bottoms out in 2015 and is subsequently followed by a strong recovery though 2018 where growth resumes at a rate similar to that of the mid case.

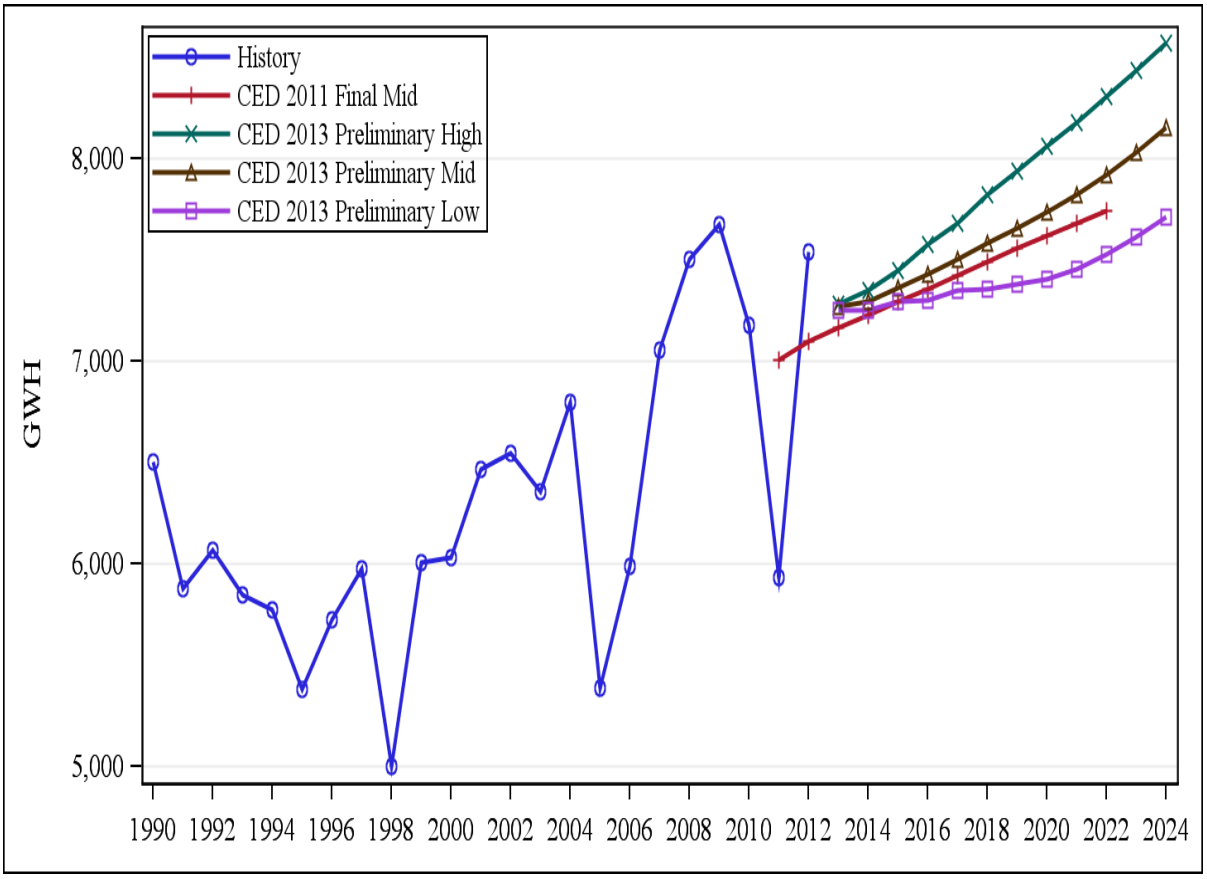
Figure 1-18: PG&E Planning Area Transportation, Communication, Utilities, and Street Lighting Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-19 compares the electricity consumption forecasts for the agriculture and water pumping sectors. The *CED 2013 Preliminary* mid starts slightly higher than *CED 2011* and has similar growth rates until the end of the forecast period where the newer forecast begins to grow slightly faster. All three demand scenarios are projected to grow over time because of a projected increase in ground-water pumping.

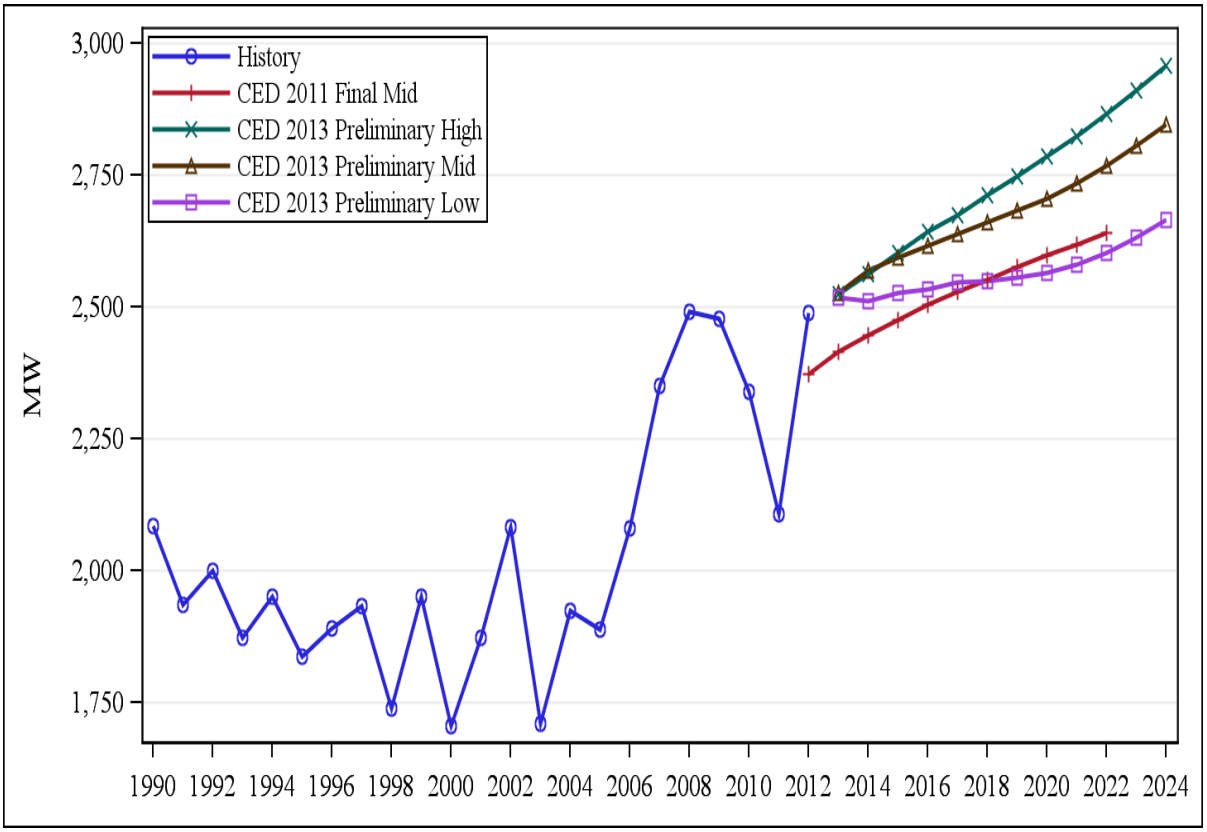
Figure 1-19: PG&E Planning Area Agriculture and Water Pumping Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-20 compares projected combined peak for the transportation, communication, utilities, street lighting, agriculture, and water pumping sectors. *CED 2013 Preliminary* is higher over the entire forecast period for both the mid and high cases compared to *CED 2011* because of a higher starting point. The *CED 2013 Preliminary* mid growth rate over the entire forecast period is similar to that of the *CED 2011* and is approximately 108 MW higher in 2018.

Figure 1-20: PG&E Planning Area Other Sector Peak

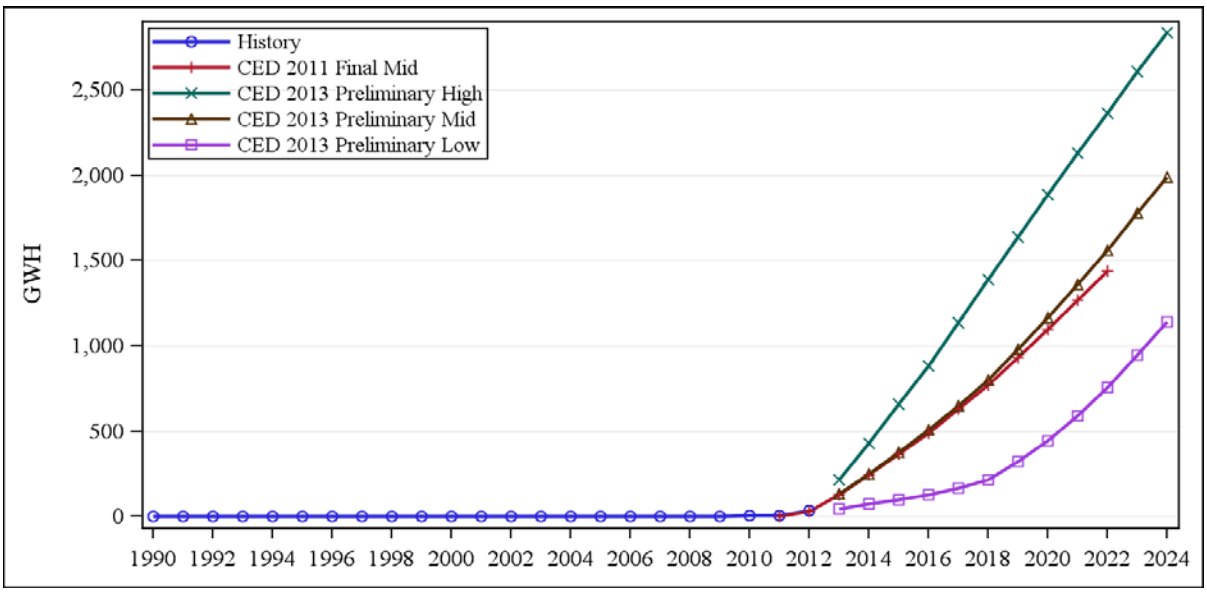


Source: California Energy Commission, Demand Analysis Office, 2013

Electric Vehicles

Consumption by electric vehicles in the PG&E planning area is expected to increase to more than 800 GWh by 2018. By the end of the forecast period, consumption by electric vehicles is projected to reach more than 1,100 GWh in the low demand scenario and nearly 2,800 GWh in the high demand scenario. Staff assumes most recharging would occur during off-peak hours, so peak impacts are projected to be relatively small—just 49 MW in the low case and 121 MW in the high case by 2024. **Figure 1-21** presents the PG&E planning area electric vehicle consumption forecast for each of the demand scenarios.

Figure 1-21: PG&E Electricity Consumption by Electric Vehicles



Source: California Energy Commission, Demand Analysis Office, 2013

Self-Generation

The peak demand forecast is reduced by the projected impacts of distributed photovoltaics (PV), solar thermal, and combined heat and power systems, including the effects of the Self-Generation Incentive Program (SGIP), California Solar Initiative (CSI), and other programs, as discussed in Appendix B to Volume 1. The effects of these programs are forecast based on a combination installation trend analysis and predictive modeling. **Table 1-2** shows the forecast of peak impacts from PV and non-PV self-generation. Staff projects between 584 and 707 MW of peak reduction from PV systems by 2024. Peak reductions are based on installed PV system capacities ranging from 2,144 MW by 2024 in the high demand case to 2,443 MW by 2024 in the low demand case.

Table 1-2: PG&E Planning Area Self-Generation Peak Impacts (MW)

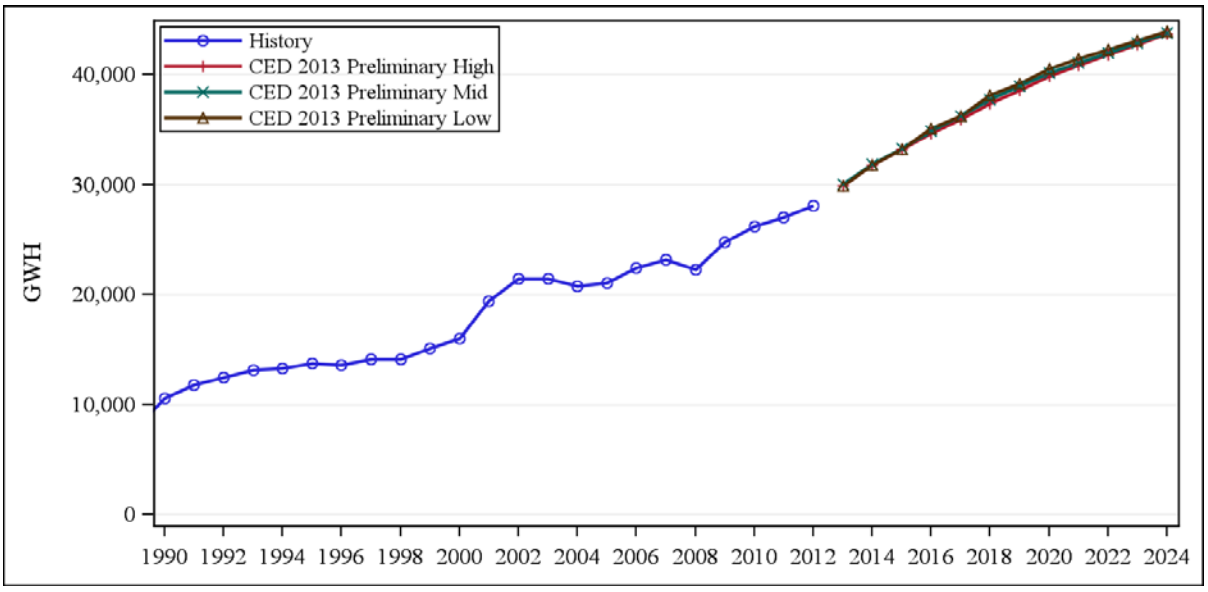
Scenario	Technology	1990	2000	2012	2015	2020	2024
Low Demand	Photovoltaic	0.0	0.4	348.3	637.8	819.9	1121.4
	Non-Photovoltaic	597.4	670.9	928.7	982.5	1037.0	1078.0
	Total	597.4	671.3	1277.0	1620.3	1856.9	2199.4
Mid Demand	Photovoltaic	0.0	0.4	348.3	621.9	785.4	1047.9
	Non-Photovoltaic	597.4	670.9	928.7	982.4	1036.8	1077.9
	Total	597.4	671.3	1277.0	1604.3	1822.2	2125.8
High Demand	Photovoltaic	0.0	0.4	348.3	603.9	750.3	975.4
	Non-Photovoltaic	597.4	670.9	928.7	981.9	1034.6	1075.2
	Total	597.4	671.3	1277.0	1585.8	1785.0	2050.6

Source: California Energy Commission, Demand Analysis Office, 2013

Conservation/Efficiency Impacts

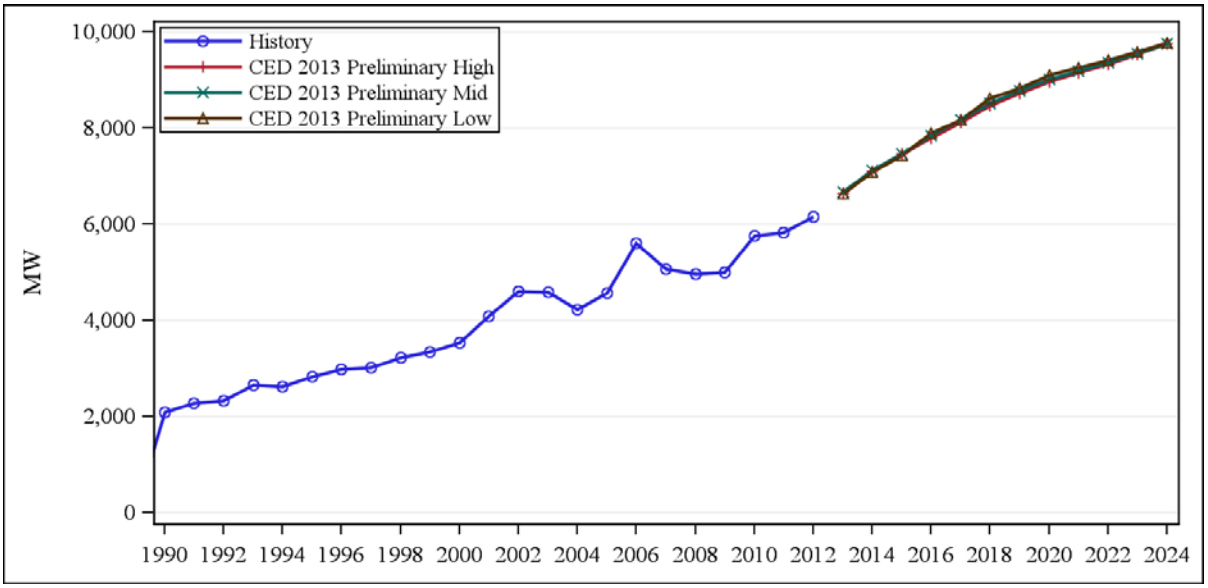
Figure 1-22 and **Figure 1-23** show committed electricity consumption and peak efficiency savings estimates from all sources, including building and appliance standards; utility programs implemented through 2014; and price and other effects, or savings associated with rate changes and certain market trends not directly related to programs or standards. Projected savings impacts are highest in the low demand scenario, since price and program effects are inversely related to the demand outcome. Within the demand scenarios, higher demand yields more standards savings since new construction and appliance usage increase, while lower demand is associated with more program savings and higher rates (and therefore more price effects). The net result is that savings totals among the scenarios are very similar.

Figure 1-22: PG&E Planning Area Electricity Consumption Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-23: PG&E Planning Area Electricity Peak Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Table 1-3 presents estimated savings for building and appliance standards in the mid demand case for selected years. Total standards impacts are higher in the high demand case by 1.5-2.0 percent due to higher home and commercial floor space construction and 1.5-2.0 percent lower in the low demand case. The standards savings estimates include the 2010 revision to Title 24 building standards as well as Assembly Bill 1109 (Huffman, Chapter 534, Statutes of 2007) lighting savings and television standard savings, just as they were in *CED 2011*. For *CED 2013 Preliminary*, new standards savings impacts were included for the 2013 Title 24 standards update and impacts from standards affecting battery chargers. Savings are measured against a baseline before 1975, so they incorporate more than 30 years of impacts. Volume 1, Chapter 3 provides more detail on staff work related to energy efficiency and conservation.

Table 1-3: PG&E Planning Area Standards Savings Estimates

Electricity Consumption Savings (GWH)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	1,101	813	1,914	419	235	655	2,568
2000	2,633	2,902	5,536	953	710	1,663	7,198
2012	3,353	7,312	10,665	1,828	1,282	3,110	13,776
2015	3,581	9,336	12,916	2,237	1,582	3,819	16,736
2020	4,085	11,717	15,802	3,161	2,026	5,187	20,989
2024	4,457	12,755	17,212	3,881	2,283	6,165	23,377
Electricity Peak Demand Savings (MW)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	267	197	464	73	41	115	579
2000	653	720	1,373	188	140	328	1,701
2012	869	1,895	2,764	335	235	570	3,334
2015	951	2,481	3,432	415	293	708	4,140
2020	1,085	3,112	4,197	587	376	964	5,161
2024	1,164	3,331	4,495	722	425	1,147	5,643

Source: California Energy Commission, Demand Analysis Office, 2013

Climate Zone Forecasts

For *CED 2013 Preliminary*, staff developed electricity consumption and peak demand forecasts for individual climate zones (see Volume 1, Chapter 1 for more details). The PG&E planning area has five climate zones, each with a designated weather station, as shown in **Table 1-4**.

Table 1-4: PG&E Planning Area Climate Zones

Climate Zone Number	Weather Station	Description
1	Ukiah	PG&E planning area not covered in Climate Zones 2-5
2	Fresno	San Joaquin Valley and Northern Sacramento Valley
3	Sacramento	Southern Sacramento Valley
4	San Jose	Rest of Bay Area not covered in Climate Zone 5, central coast to Santa Barbara, Santa Rosa, Napa
5	San Francisco	San Francisco, Oakland, Marin County

Source: California Energy Commission, Demand Analysis Office, 2013

Table 1-5 shows the forecast results for electricity consumption and peak demand by climate zone for each demand scenario. To better show forecast trends and to avoid mischaracterizing average annual growth because of 2012-specific weather impacts, growth rates are provided relative to 2013. Full climate zone results are shown in the forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/#05302013).

The fastest growth in both consumption and peak demand over the forecast period is projected to be inland, in Climate Zones 2 and 3. These results reflect expected resumption of migration from coastal to inland areas, migration that decreased during the recent recession. For example, growth in population from 2013-2024 in the mid demand case is projected to be 21 and 23 percent, respectively, for Climate Zones 2 and 3, compared to 8 and 4 percent for Climate Zones 4 and 5. Potential climate change impacts contribute to faster peak demand growth in Climate Zone 3; projected increases in annual maximum temperature are highest in this climate zone in both the mid and high demand cases.

Table 1-5: PG&E Planning Area Climate Zone Forecast Results

		Consumption by Climate Zone (GWh)					Peak Demand by Climate Zone (MW)				
		1	2	3	4	5	1	2	3	4	5
High Demand Case	2013	4,760	10,079	30,285	34,432	27,018	1,277	1,958	5,010	8,096	6,369
	2015	4,889	10,521	31,281	35,581	27,876	1,322	2,075	5,264	8,462	6,620
	2020	5,155	11,631	33,793	37,989	29,444	1,350	2,255	5,674	9,151	7,072
	2024	5,431	12,652	36,097	40,210	30,882	1,375	2,403	6,025	9,712	7,434
	Avg. Growth 2013-2020	1.00%	1.81%	1.38%	1.24%	1.08%	0.70%	1.78%	1.57%	1.54%	1.32%
	Avg. Growth 2013-2024	1.10%	1.91%	1.47%	1.30%	1.12%	0.62%	1.72%	1.55%	1.53%	1.30%
Mid Demand Case	2013	4,753	10,045	30,181	34,340	26,945	1,279	1,950	5,009	8,089	6,371
	2015	4,842	10,373	30,934	35,073	27,453	1,321	2,043	5,247	8,373	6,563
	2020	5,059	11,229	32,943	36,678	28,384	1,375	2,193	5,665	8,786	6,796
	2024	5,327	12,078	34,917	38,390	29,411	1,420	2,321	6,011	9,144	6,995
	Avg. Growth 2013-2020	0.78%	1.40%	1.10%	0.83%	0.65%	0.91%	1.48%	1.55%	1.04%	0.81%
	Avg. Growth 2013-2024	0.96%	1.55%	1.22%	0.93%	0.73%	0.88%	1.46%	1.53%	1.03%	0.78%
Low Demand Case	2013	4,707	9,947	29,910	34,066	26,758	1,266	1,921	4,940	8,002	6,305
	2015	4,739	10,068	30,225	34,301	26,896	1,279	1,946	5,025	8,047	6,301
	2020	4,971	10,832	32,111	35,396	27,500	1,369	2,092	5,479	8,260	6,345
	2024	5,263	11,631	33,970	36,810	28,324	1,447	2,217	5,824	8,488	6,414
	Avg. Growth 2013-2020	0.68%	1.07%	0.89%	0.48%	0.34%	0.98%	1.07%	1.30%	0.40%	0.08%
	Avg. Growth 2013-2024	0.94%	1.31%	1.07%	0.65%	0.48%	1.12%	1.20%	1.38%	0.49%	0.14%

Source: California Energy Commission, Demand Analysis Office, 2013

CHAPTER 2: Southern California Edison Planning Area

The Southern California Edison (SCE) planning area includes:

- SCE bundled retail customers.
- Customers served by energy service providers (ESPs) using the SCE distribution system to deliver electricity to end users.
- Customers of the various Southern California municipal and irrigation district utilities with the exception of Imperial Irrigation District and the cities of Los Angeles, Pasadena, Glendale, and Burbank. Also excluded from the SCE planning area are San Diego County and the southern portion of Orange County, served by San Diego Gas & Electric (SDG&E).

To support electricity and transmission system analysis, staff uses historical consumption and load data to develop individual forecasts for all medium and large utilities in the planning area. Those results are presented in Forms 1.5a through 1.5c in the statewide forms accompanying this forecast report. The results in this chapter are for the entire SCE transmission planning area.

This chapter is organized as follows. First, forecasted consumption and peak loads for the SCE planning area are discussed; both total and per capita values are presented. The *CED 2013 Preliminary* values are compared to the adopted *CED 2011* mid scenario, with differences between the two forecasts explained. The forecasted load factors, jointly determined by the consumption and peak load estimates, are also discussed. Second, the chapter presents sector consumption and peak load forecasts. The residential, commercial, industrial, and "other" sector forecasts are compared to those in *CED 2011,* and differences between the two are discussed. Third, the chapter discusses the forecasts of electric vehicles, self-generation, and the impacts of conservation and efficiency programs. Finally, forecasts of electricity consumption and peak demand are presented for each climate zone within the SCE planning area.

Los Angeles Area Economic and Demographic Outlook

This section provides general information on the economic and demographic outlook for the Los Angeles Area using outlooks provided by Moody's, IHS Global Insight, the University of California, Los Angeles (UCLA), the California Department of Finance, and the United States Census Bureau. These outlooks are based on economic data available in January 2013.

Los Angeles County's recovery is broadening as local and out-of-area visitors increase their spending and film production takes off. Orange County's recovery continues as increased spending bolsters tourism and the hard-hit housing-related industries strengthen. Riverside and San Bernardino County's recovery is driven by increased consumer spending, expanding trade industries, and newfound stability in state government spending.

All counties in the Los Angeles region have shown improvements in employment. In Los Angeles County, payrolls are being lifted by retail, entertainment, and visitor-dependent industries. In Orange County, job gains are widespread and local government payrolls are stabilizing. Riverside and San Bernardino County's growth in retail, transportation, warehousing, accommodations, state government, and education employment reflect improving conditions. The improving labor market has caused the unemployment rate to fall below 11 percent in Los Angeles County, 12 percent in Riverside and San Bernardino County, and 7.5 percent in Orange County.

Housing market conditions in the Los Angeles region are improving throughout all counties. The median price for a single-family existing house is rising as the inventory of houses for sale dwindles. The issuance of residential construction permits continues to edge upward.

The Los Angeles region should continue to recover in 2013. The recovery in Los Angeles County is expected to be fueled by building of public infrastructure, trade flows, and a growing footprint of entertainment attractions. Orange County's recovery will be strengthened in 2013 because of technology, tourism, and housing. Riverside and San Bernardino County's recovery will be boosted by trade and transportation, housing, and tourism.

Forecast Results

For this forecast, three demand scenarios were developed. The high demand scenario includes high economic and demographic projections, low energy price projections, and low efficiency impact assumptions. The low demand scenario includes low economic and demographic projections, high energy price projections, and high efficiency impact assumptions. Volume 1 provides more detail on the construction of the demand scenarios.

Table 2-1 presents a comparison of *CED 2013 Preliminary* high, mid, and low demand scenarios with the *CED 2011* demand scenario for electricity consumption and peak demand for selected years. Comprehensive results are available electronically as a set of forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/).

In the SCE planning area, the *CED 2013 Preliminary* mid demand electricity consumption is 2.3 percent lower than *CED 2011* in 2020, the result of a lower than projected level of consumption in 2012 and a lower growth rate over the forecast period. By 2024, the *CED 2013 Preliminary* high demand level is 4.8 percent higher than the mid case while the low demand scenario is 4.3 percent lower. For peak demand, the *CED 2013 Preliminary* high and

low scenarios are 5.2 percent higher and 7.0 percent lower, respectively, than the mid case by 2024. Weather-normalized peak demand in 2012 was 3.3 percent lower than predicted in *CED 2011*.

Table 2-1: SCE Planning Area Forecast Comparison

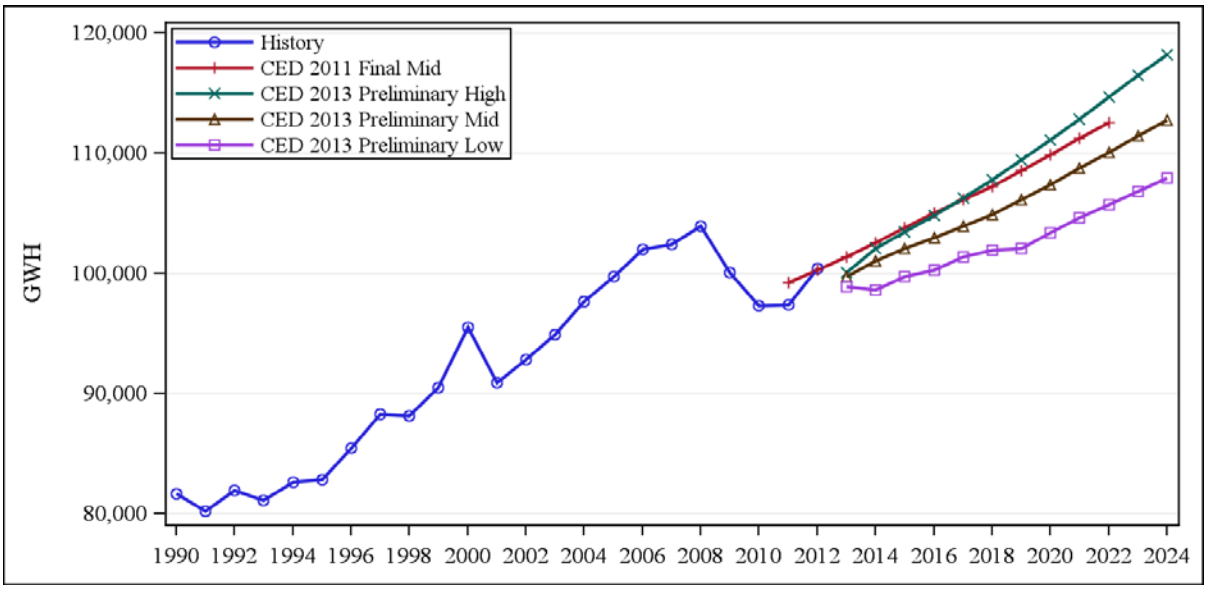
Consumption (GWH)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	81,671	81,671	81,671	81,671
2000	96,811	95,515	95,515	95,515
2012	100,292	100,398	100,398	100,398
2015	103,791	103,472	102,080	99,703
2020	109,888	111,097	107,368	103,392
2024	--	118,193	112,729	107,929
Average Annual Growth Rates				
1990 - 2000	1.72%	1.58%	1.58%	1.58%
2000 - 2012	0.35%	0.50%	0.50%	0.50%
2012 - 2015	1.15%	1.01%	0.56%	-0.23%
2012 - 2020	1.15%	1.27%	0.84%	0.37%
2012 - 2024	--	1.37%	0.97%	0.60%
Peak (MW)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	17,647	17,647	17,647	17,647
2000	19,506	19,506	19,506	19,506
2012	22,340	22,082	22,082	22,082
2012*	22,340	21,606	21,606	21,606
2015	23,484	22,988	22,754	21,796
2020	25,054	24,954	24,141	22,691
2024	--	26,602	25,277	23,499
Average Annual Growth Rates				
1990 - 2000	1.01%	1.01%	1.01%	1.01%
2000 - 2012	1.37%	1.25%	1.25%	1.25%
2012* - 2015	1.68%	2.09%	1.74%	0.29%
2012* - 2020	1.44%	1.82%	1.40%	0.61%
2012* - 2024	--	1.75%	1.32%	0.70%
Historical values are shaded				
*Weather normalized: *CED 2013 Preliminary* uses a weather-normalized peak value derived from the actual 2012 peak for calculating growth rates during the forecast period				

Source: California Energy Commission, Demand Analysis Office, 2013

As shown in **Figure 2-1**, *CED 2013 Preliminary* electricity consumption forecasts are lower at the beginning of the forecast period than projected by *CED 2011*. Consumption dips slightly from 2012 to 2013, due to a combination of slow economic growth, an increase in average electricity rates, and the assumption of normal weather (2012 was a particularly warm year). Growth in the mid case is less than *CED 2011*, due to rate increases and the addition of building and appliance standards.

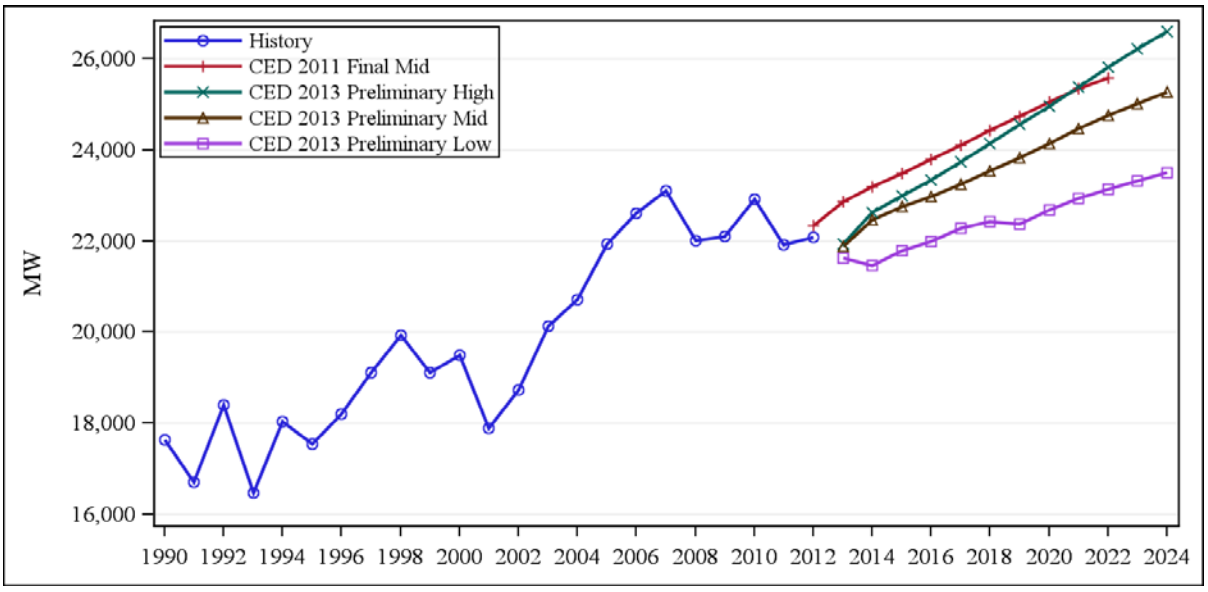
The SCE planning area experienced warmer than usual temperatures in 2012, so actual peak load was higher than weather normalized peak. The relationship between peak demand scenarios, shown in **Figure 2-2**, follows a similar pattern as the consumption forecast. As with consumption, the peak demand forecast begins at a lower value than projected in *CED 2011* and all three scenarios remain below *CED 2011* values for most of the forecast period. Peak growth is slightly higher than consumption due in part to efficiency considerations—such as increasing lighting efficiency—that have a greater impact on consumption than on peak.

Figure 2-1: SCE Planning Area Electricity Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-2: SCE Planning Area Peak

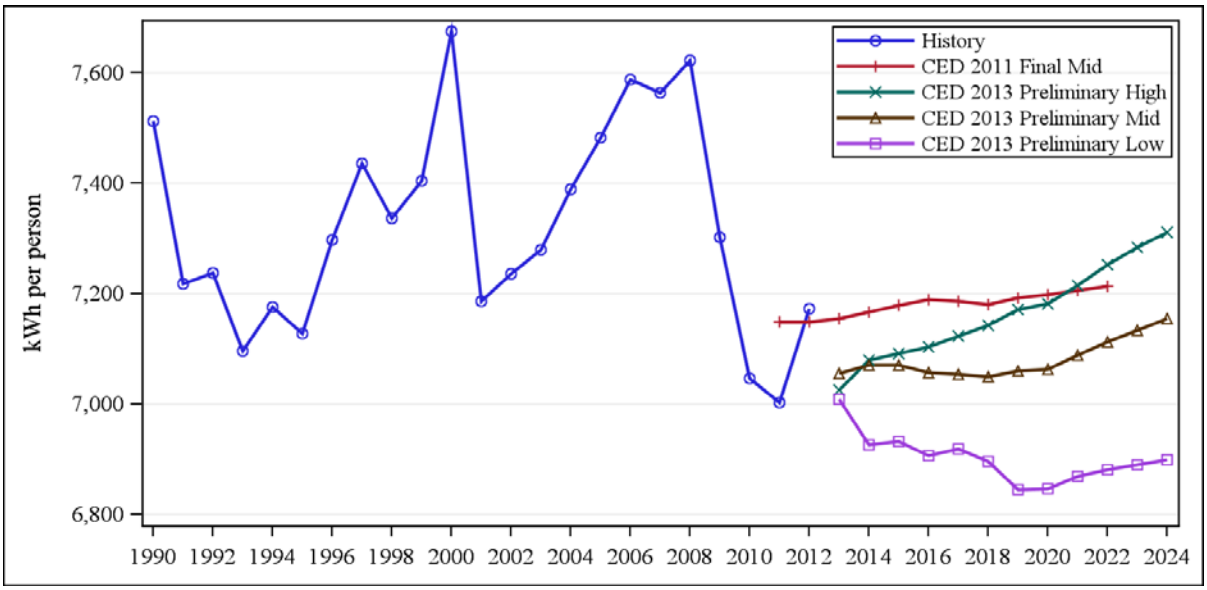


Source: California Energy Commission, Demand Analysis Office, 2013

SCE's projected peaks reflect staff estimates of future non-event-based demand response committed program impacts incremental to 2012 impacts, including real-time or time-of-use pricing and permanent load shifting. The projected impacts reach around 33 MW in 2024. See Volume 1 for more details.

As **Figure 2-3** shows, per capita electricity consumption is lower in the *CED 2013 Preliminary* demand scenarios throughout most of the forecast period compared to *CED 2011*. The drop in 2013 shows the combined effect of decreased consumption and increased population. Unlike *CED 2011*, which considered only a single population scenario, *CED 2013 Preliminary* incorporates high, mid, and low population projections. While the high and mid consumption forecasts are nearly identical in 2013, there is some spread between population estimates for that year. As a result, the high per capita consumption scenario shown below actually begins from a lower point than the mid scenario.

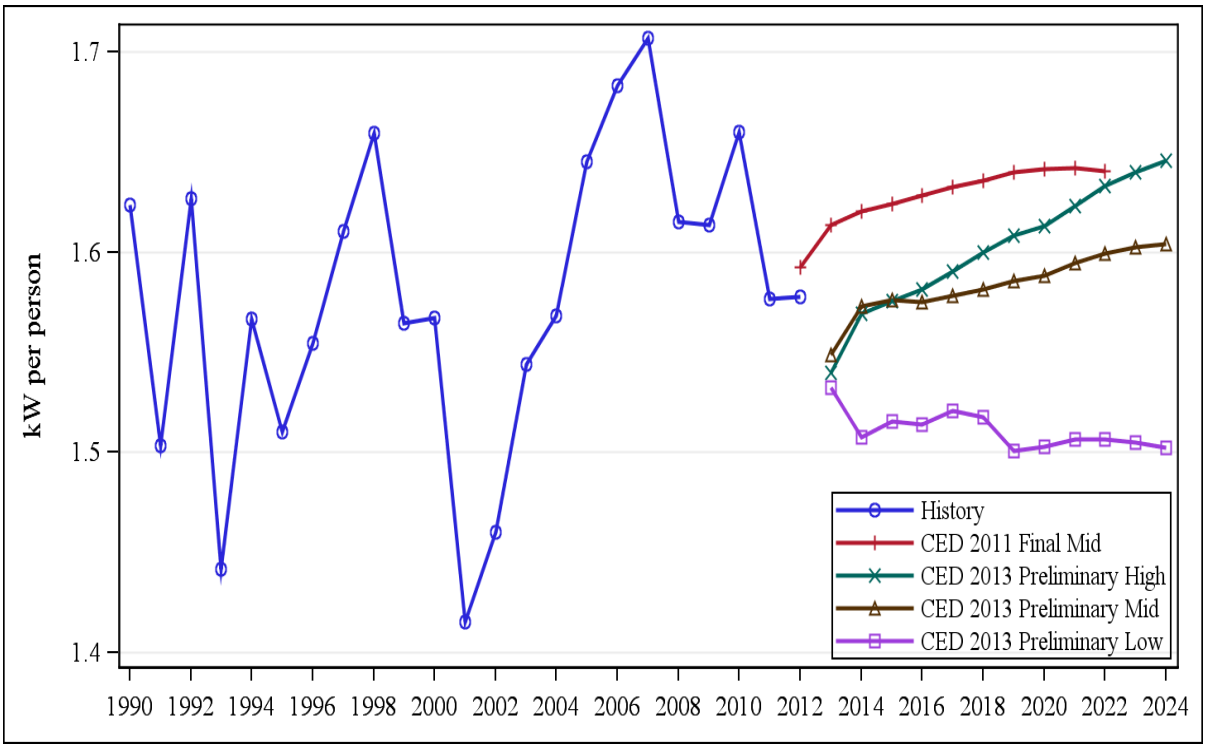
Figure 2-3: SCE Planning Area Per Capita Electricity Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-4 shows per capita peak demand. *CED 2013 Preliminary* per capita peak scenarios follow the same pattern as the per capita consumption scenarios. The per capita peak values are projected to remain in the range of recent historical levels for all three scenarios.

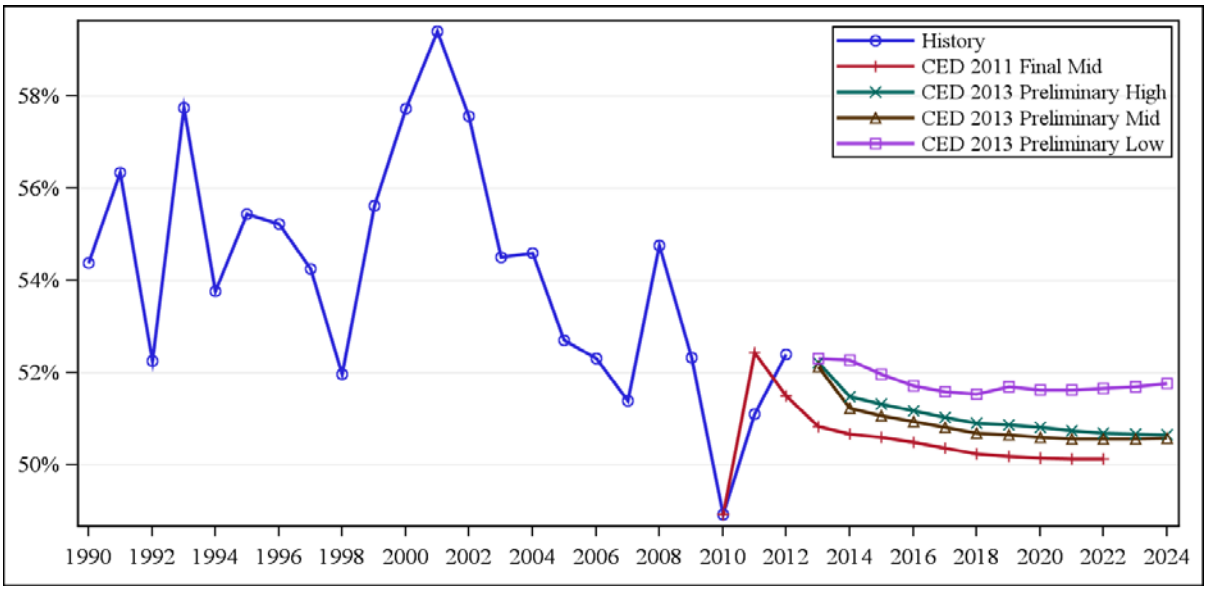
Figure 2-4: SCE Planning Area per Capita Peak Demand



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-5 compares forecasted load factors. The load factor is a measure of the increase in peak demand relative to annual electricity consumption. Lower load factors indicate "a needle peak"; higher load factors indicate a more stable load. Greater population and economic growth in the SCE planning area has been taking place in hotter inland areas, leading to a higher saturation and use of central air conditioning. *CED 2013 Preliminary* projects load factors to decline slightly in the initial years of the forecast as additional efficiency measures reduce consumption with little impact on peak. This trend tapers off in the latter half of the forecast period as electric vehicle use increases consumption with little impact on peak.

Figure 2-5: SCE Planning Area Load Factors



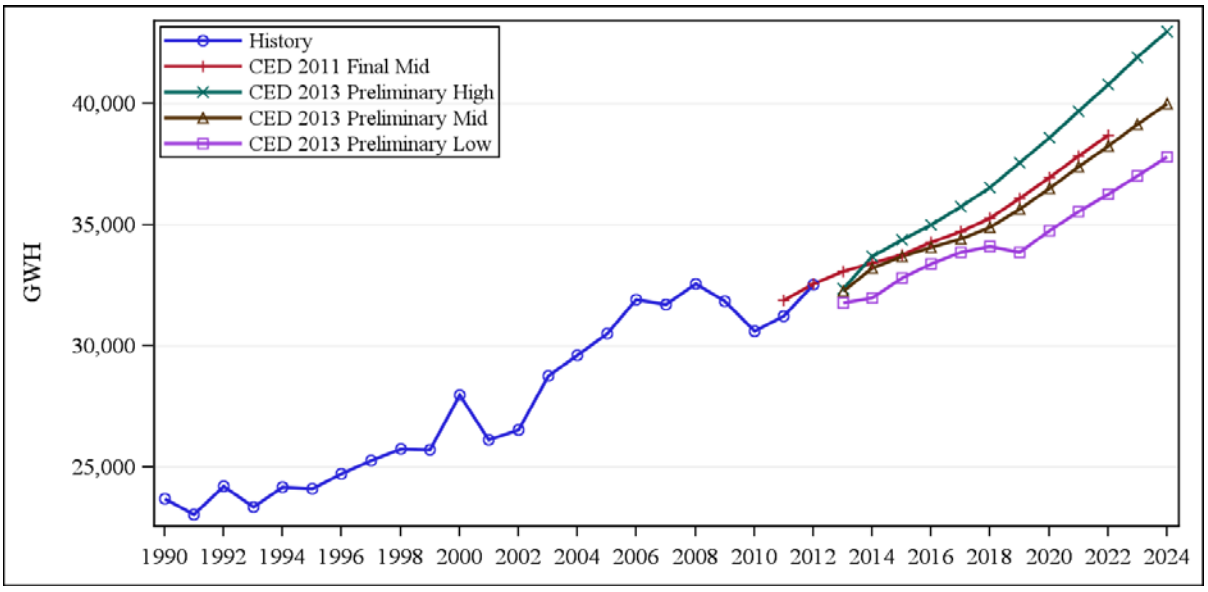
Source: California Energy Commission, Demand Analysis Office, 2013

Sector Level Results and Input Assumptions

Residential Sector

Figure 2-6 Compares *CED 2013 Preliminary* and *CED 2011* SCE planning area residential forecasts. The mid demand scenario consumption after 2014 is roughly equal to *CED 2011*. Low and high demand scenarios bound the mid case reflecting differences in underlying economic and demographic assumptions.

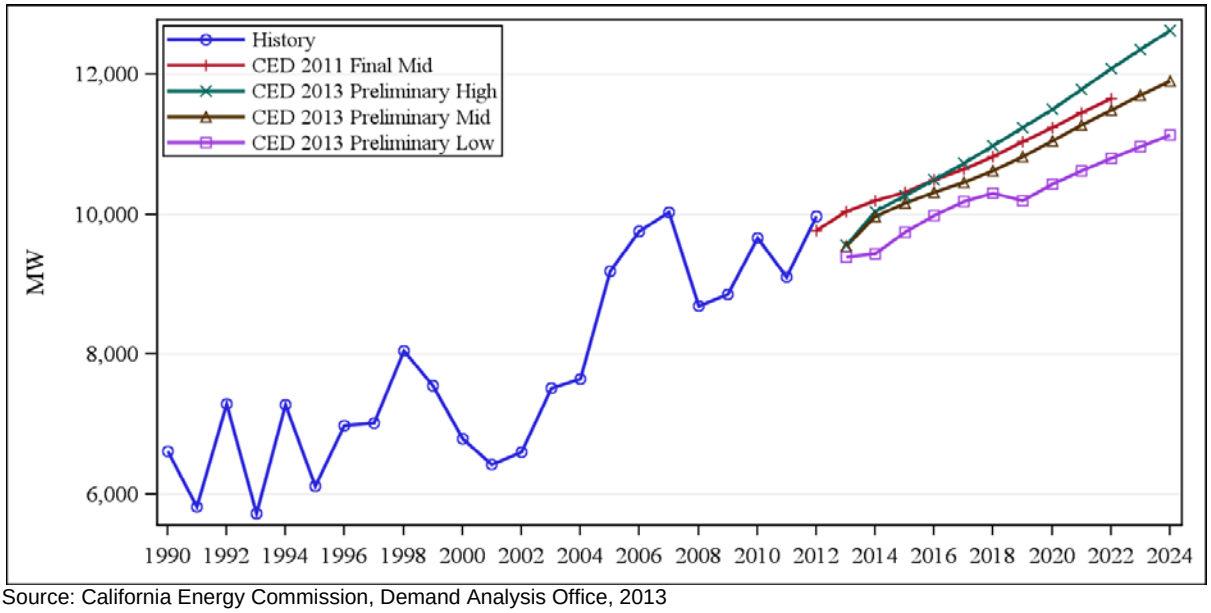
Figure 2-6: SCE Planning Area Residential Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-7 Compares *CED 2013 Preliminary* and *CED 2011* residential peak demand forecasts. The differences between peak forecasts follow a similar pattern to differences in the consumption forecasts since the peak forecasts are driven primarily by electricity consumption with lower peak demand resulting from consistently lower consumption in the low and mid scenarios.

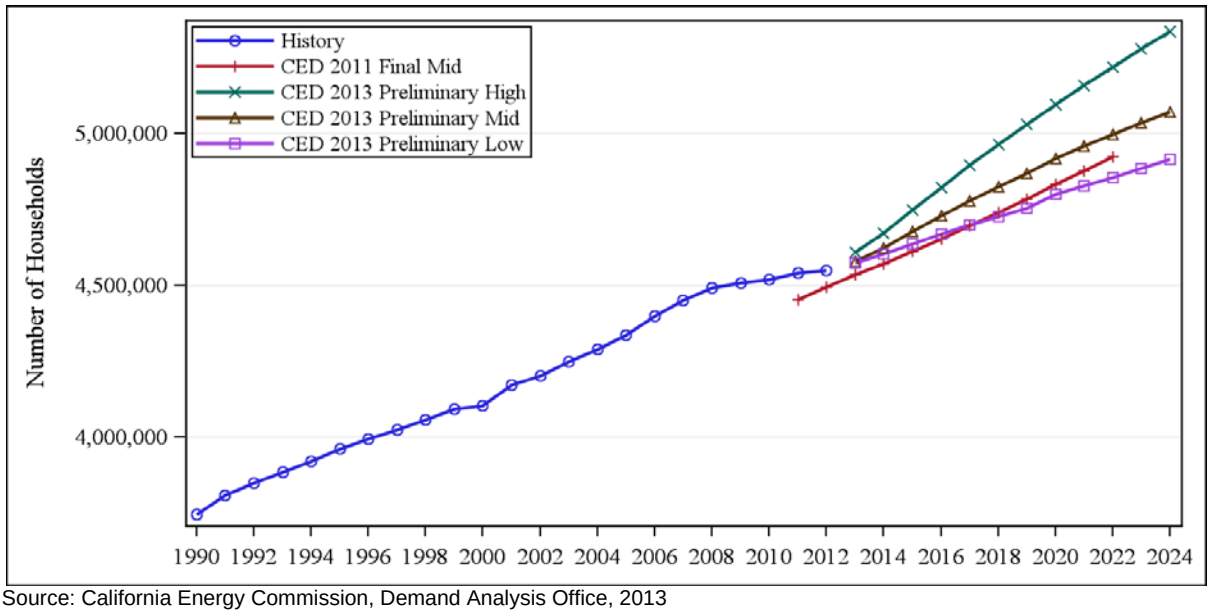
Figure 2-7: SCE Planning Area Residential Peak



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-8, **Figure 2-9**, and **Figure 2-10** compare the residential drivers used in *CED 2013 Preliminary* with those used in *CED 2011*. **Figure 2-8** compares total household projections. All *CED 2013 Preliminary* scenarios begin higher than the previous forecast due primarily to a change in the household projection methodology. The *CED 2013 Preliminary* forecast includes the most recent updated county population and housing estimates from the California Department of Finance, which incorporates information from the 2010 U.S. Census.

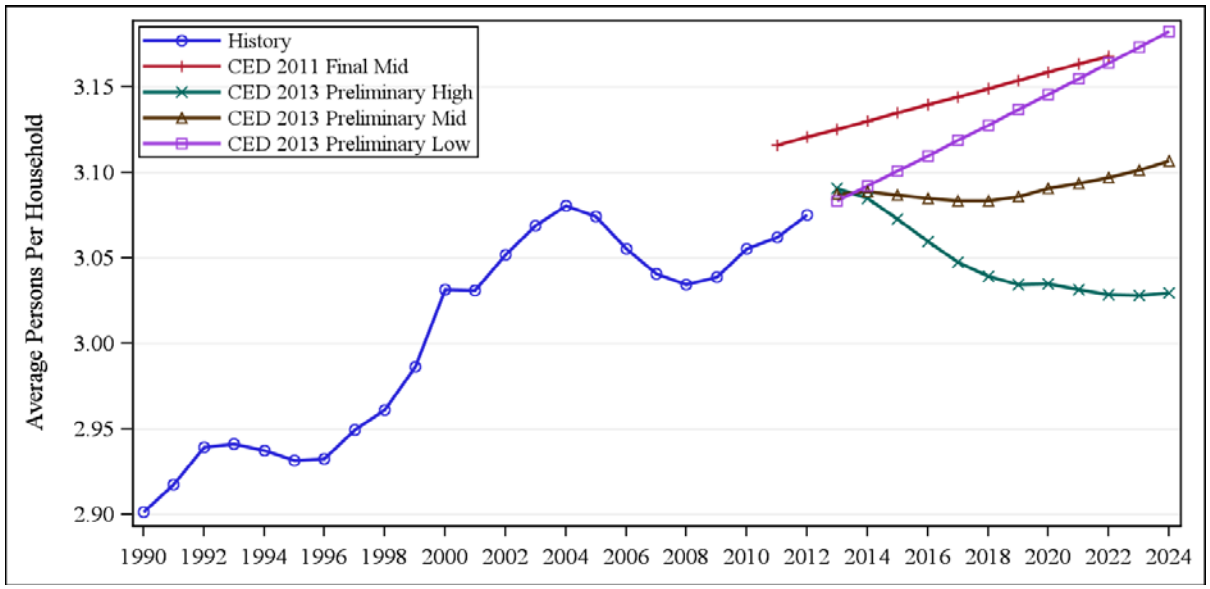
Figure 2-8: SCE Planning Area Residential Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

The household scenarios are based on persons-per-household estimates shown in **Figure 2-9** and total population. The high demand scenario uses a lower persons-per-household projection (more households), and the low demand scenario uses a higher persons-per-household projection (fewer households). The mid demand scenario assumes growth in persons-per-household similar to the projection used in the *CED 2011* forecast.

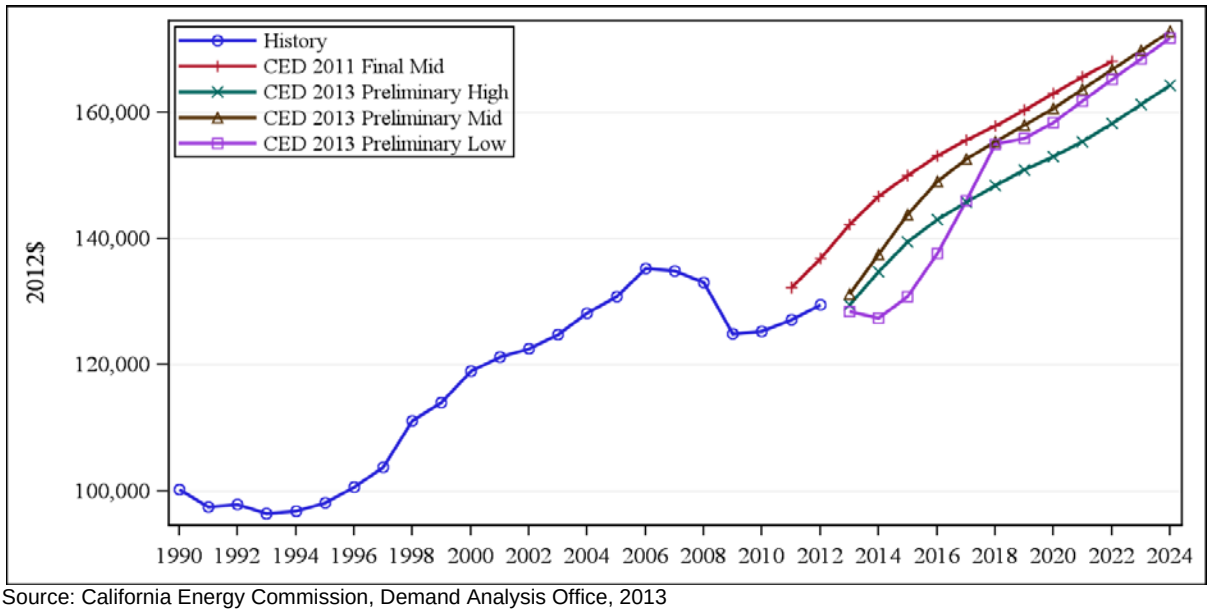
Figure 2-9: SCE Planning Area Persons per Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-10 compares average household income (per capita income multiplied by persons per household) between the two forecasts. *CED 2013 Preliminary* estimates of household income growth are lower than *CED 2011*. This is caused by lower persons per household values. The difference between scenarios is a function of the variation in per capita income and persons per household used to define the scenarios. In the case of the low demand scenario, the per capita income assumptions are significantly different than the mid and high scenarios.

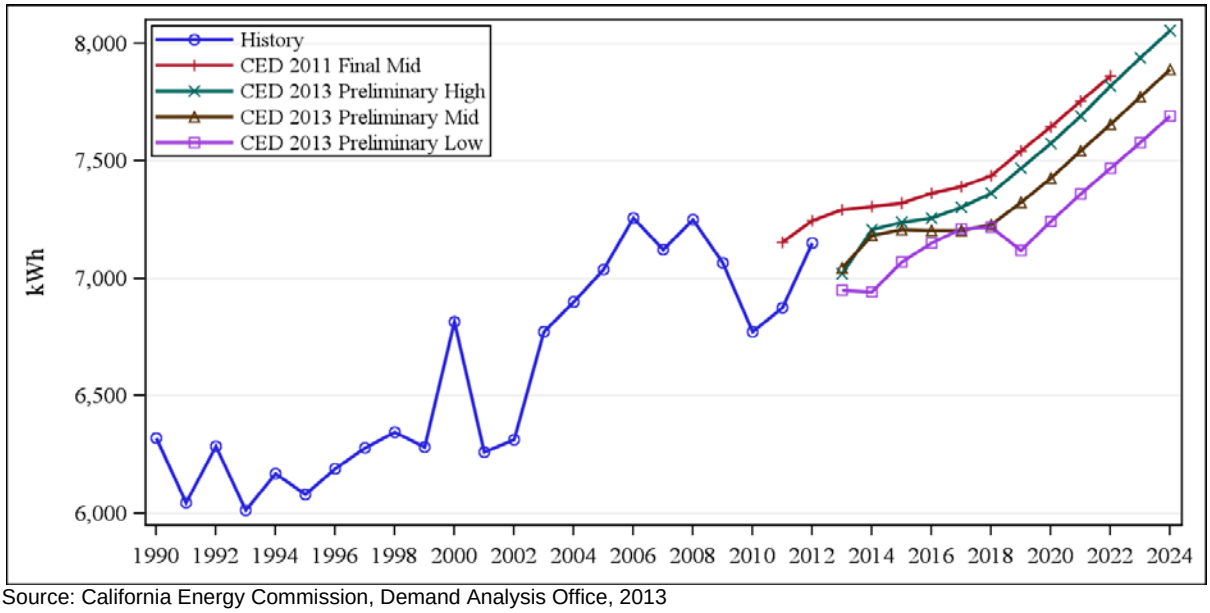
Figure 2-10: SCE Planning Area Average Household Income Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-11 shows annual electricity consumption per household. *CED 2013 Preliminary* consumption per household in all demand scenarios is lower than *CED 2011*. This is caused by differences in the underlying economic and demographic assumptions, including changes in the housing projection methodology. The low demand scenario has a significant drop in 2019 caused by the underlying low scenario economic and demographic assumptions. Most of the growth in use per household after 2015 is caused by increasing numbers of electric vehicles in the residential sector. Without the inclusion of electric vehicle charging, residential use would not grow as rapidly over the forecast period after the economic recovery.

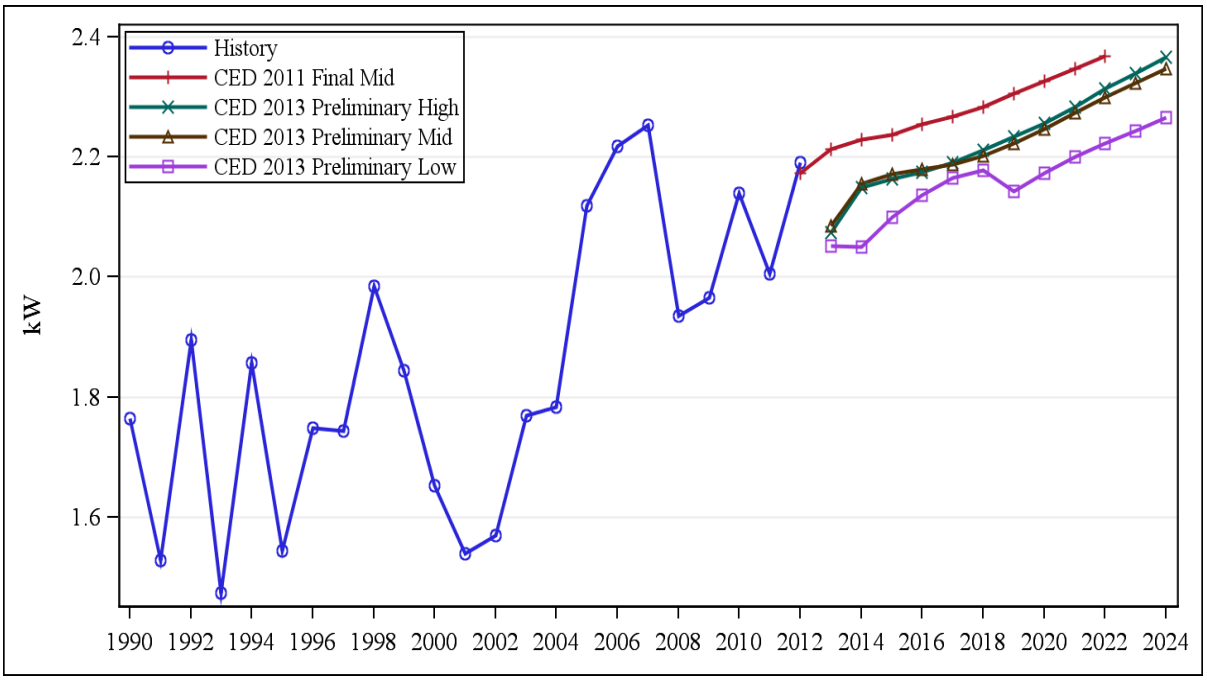
Figure 2-11: SCE Planning Area Use per Household



Source: California Energy Commission, Demand Analysis Office, 2013

CED 2013 Preliminary peak use per household, presented in **Figure 2-12**, is also lower in all demand cases than projected in *CED 2011*. This is in part driven by the short-term difference in energy forecasts and the housing projection methodology changes. The general growth trend over the forecast is similar to *CED 2011* in the mid and high demand scenarios. The difference in forecast level is caused mainly by the difference in the starting point with the exception of the low demand scenario which includes significantly different economic and demographic assumptions.

Figure 2-12: SCE Planning Area Peak Use per Household

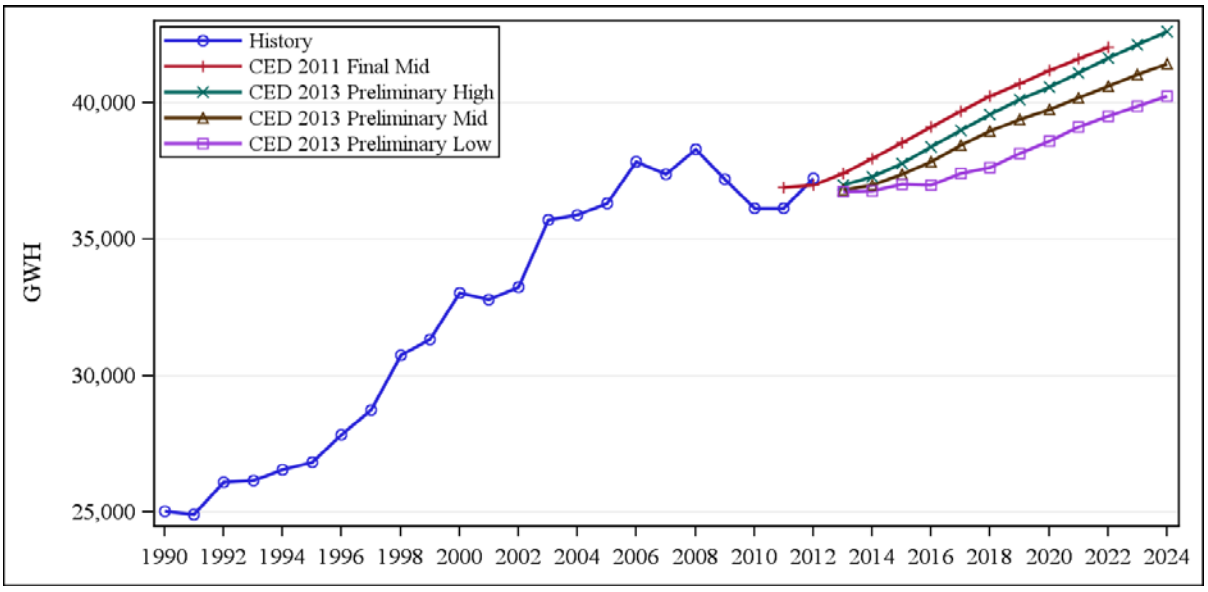


Source: California Energy Commission, Demand Analysis Office, 2013

Commercial Sector

Figure 2-13 compares the SCE commercial sector electricity consumption forecasts. The *CED 2013 Preliminary* consumption scenarios are lower than *CED 2011* throughout the forecast period. The differences are primarily caused by a lower starting point due to lower estimates of recent historical commercial consumption. The growth rate of the *CED 2013 Preliminary* high case is slightly higher than in *CED 2011* because of faster growth in projected floor space in the longer term. The growth rate of the mid and low scenarios is similar to the *CED 2011* forecast.

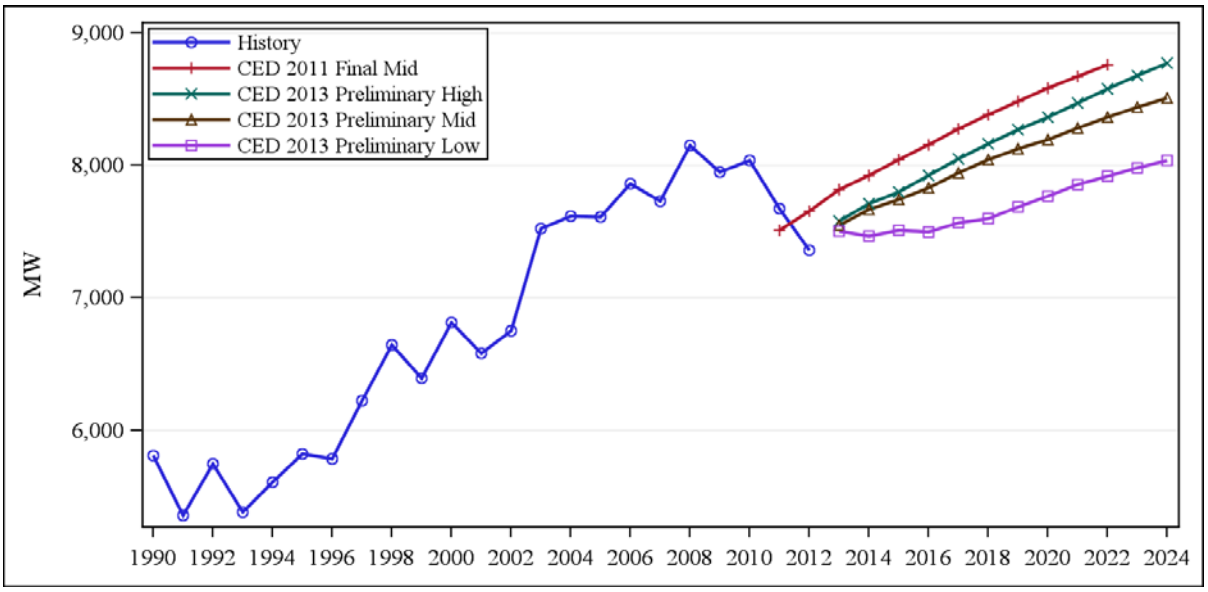
Figure 2-13: SCE Planning Area Commercial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-14 compares the SCE commercial sector peak demand forecasts. Growth in both forecasts is driven by the underlying electricity consumption forecast, which exhibits a similar pattern. The *CED 2013 Preliminary* low demand scenario is lower throughout the forecast period due to lower floor space projections.

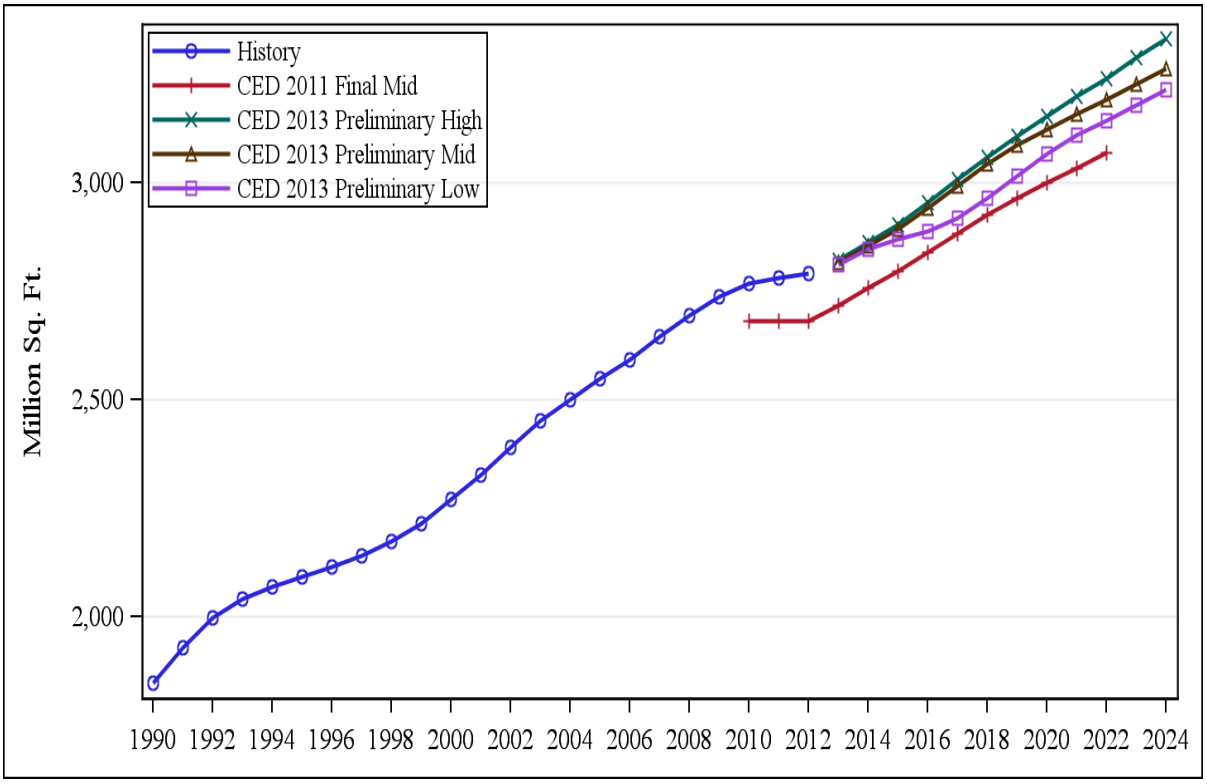
Figure 2-14: SCE Planning Area Commercial Peak



Source: California Energy Commission, Demand Analysis Office, 2013

In staff's commercial building sector forecasting model, floor space by building type (such as retail, offices, and schools) is the key driver. **Figure 2-15** compares SCE commercial floor space projections. *CED 2013 Preliminary* floor space projections are higher over the forecast period than those used in the previous forecast due to a higher starting point. However, the growth rate in the high case *CED 2013 Preliminary* scenario is slightly higher than in *CED 2011*.

Figure 2-15: SCE Planning Area Commercial Floor Space

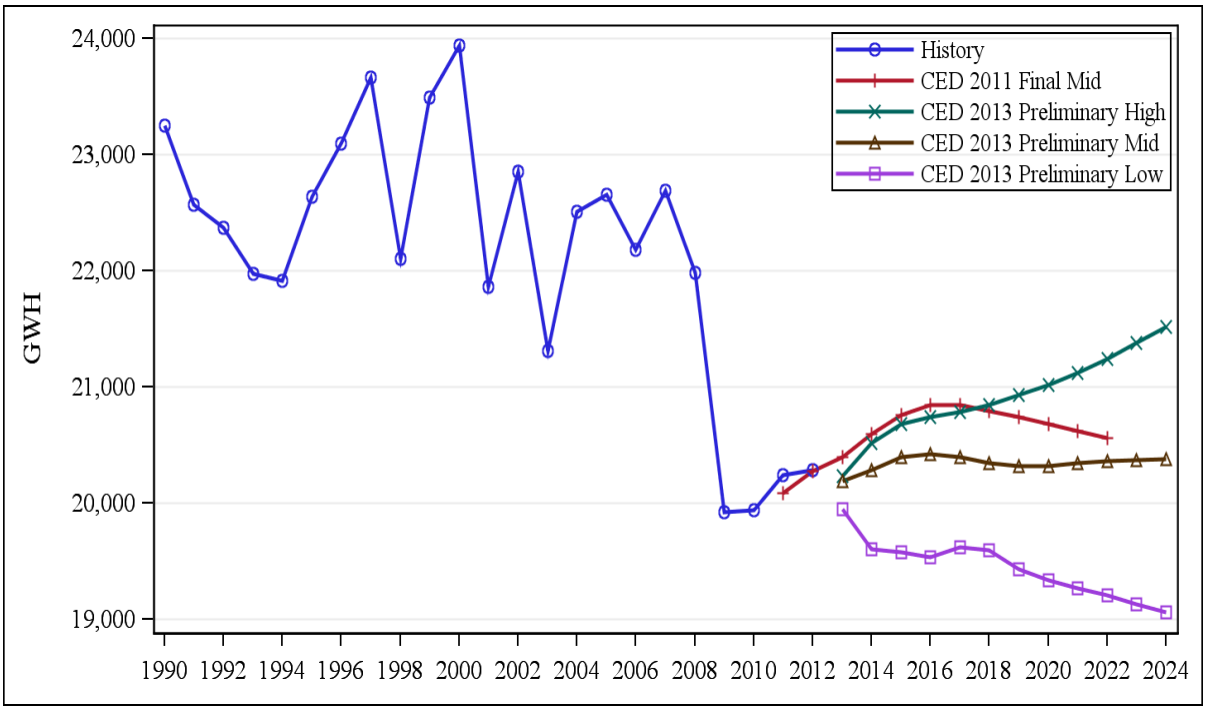


Source: California Energy Commission, Demand Analysis Office, 2013

Industrial Sector

Figure 2-16 compares the SCE planning area industrial sector electricity consumption forecasts. *CED 2013 Preliminary* industrial consumption scenario forecasts are all lower than the *CED 2011* forecast in the short term. However, projected growth in the high demand case is higher in the longer term than was projected in the *CED 2011* forecast due to more optimistic economic projections.

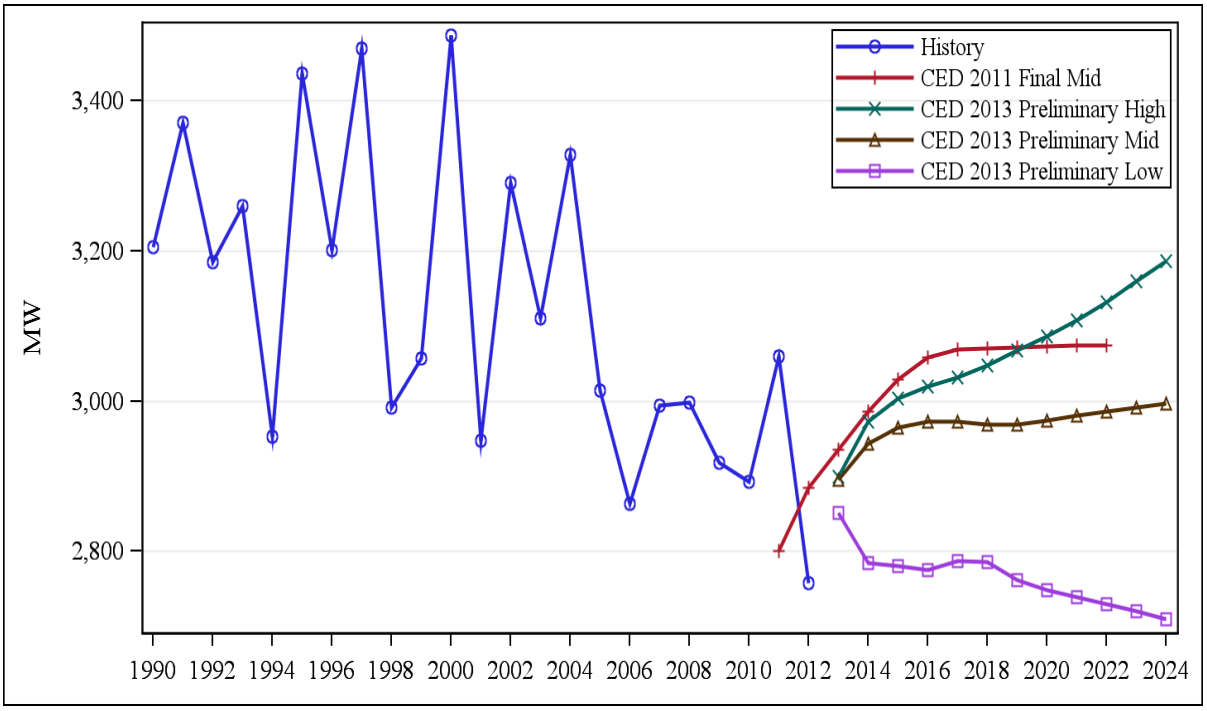
Figure 2-16: SCE Planning Area Industrial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-17 compares the SCE industrial sector peak forecasts. The *CED 2013 Preliminary* industrial peak forecasts follow the same pattern as the consumption forecasts.

Figure 2-17: SCE Planning Area Industrial Sector Peak

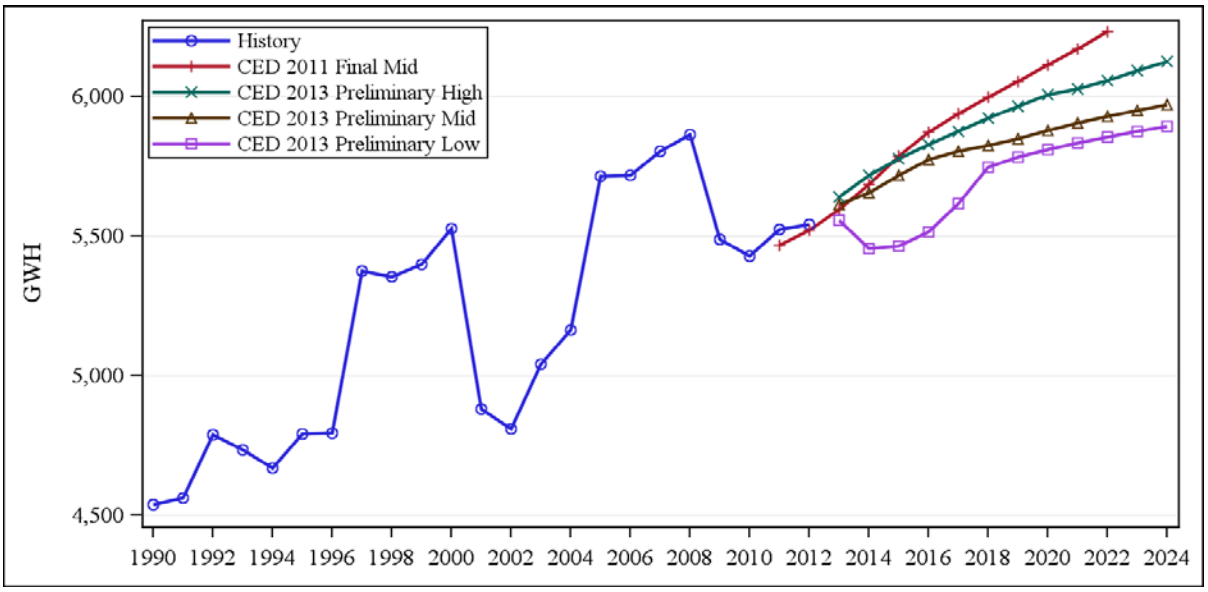


Source: California Energy Commission, Demand Analysis Office, 2013

Other Sectors

Figure 2-18 compares the electricity consumption forecasts for the TCU sector, which includes street lighting. Although both forecasts are nearly identical in 2013, by 2015 all three *CED 2013 Preliminary* scenarios are lower than *CED 2011* and continue to grow at a slower pace over the forecast period. In the recession scenario modeled in the low case, electricity consumption bottoms out in 2015 and is subsequently followed by a strong recovery though 2018 where growth resumes at a rate similar to that of the mid case.

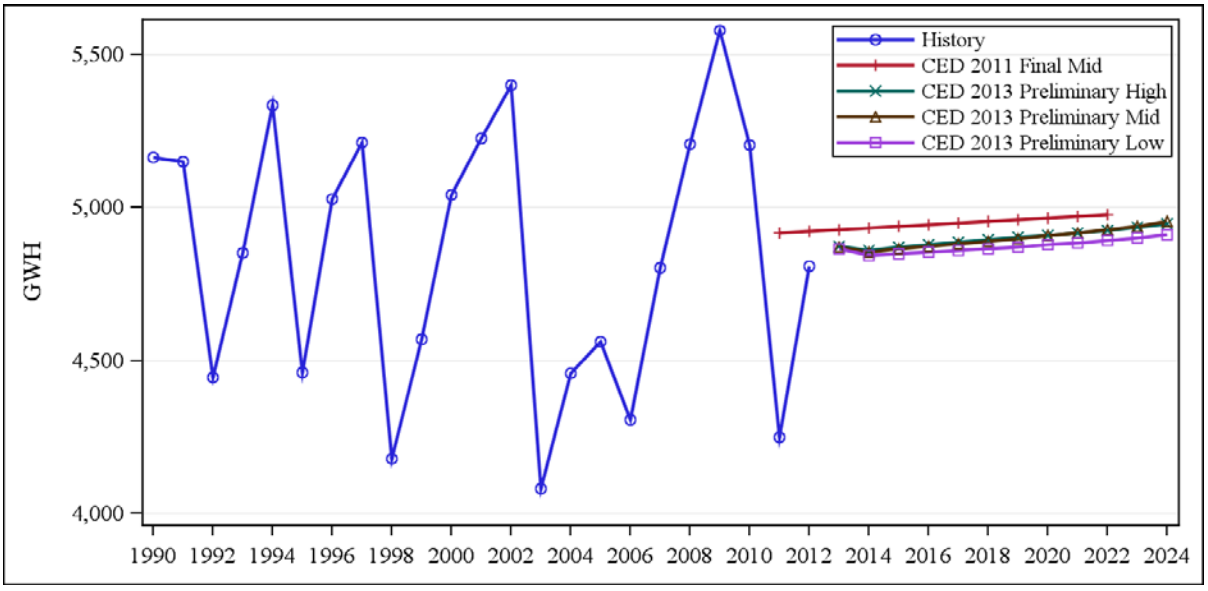
Figure 2-18: SCE Planning Area Transportation, Communication, Utilities, and Street Lighting Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-19 compares the electricity consumption forecasts for the agriculture and water pumping sectors. All three *CED 2013 Preliminary* scenarios start slightly lower than *CED 2011* and have similar growth rates over the forecast period. All three demand scenarios are projected to slightly grow over time because of a small projected increase in ground-water pumping.

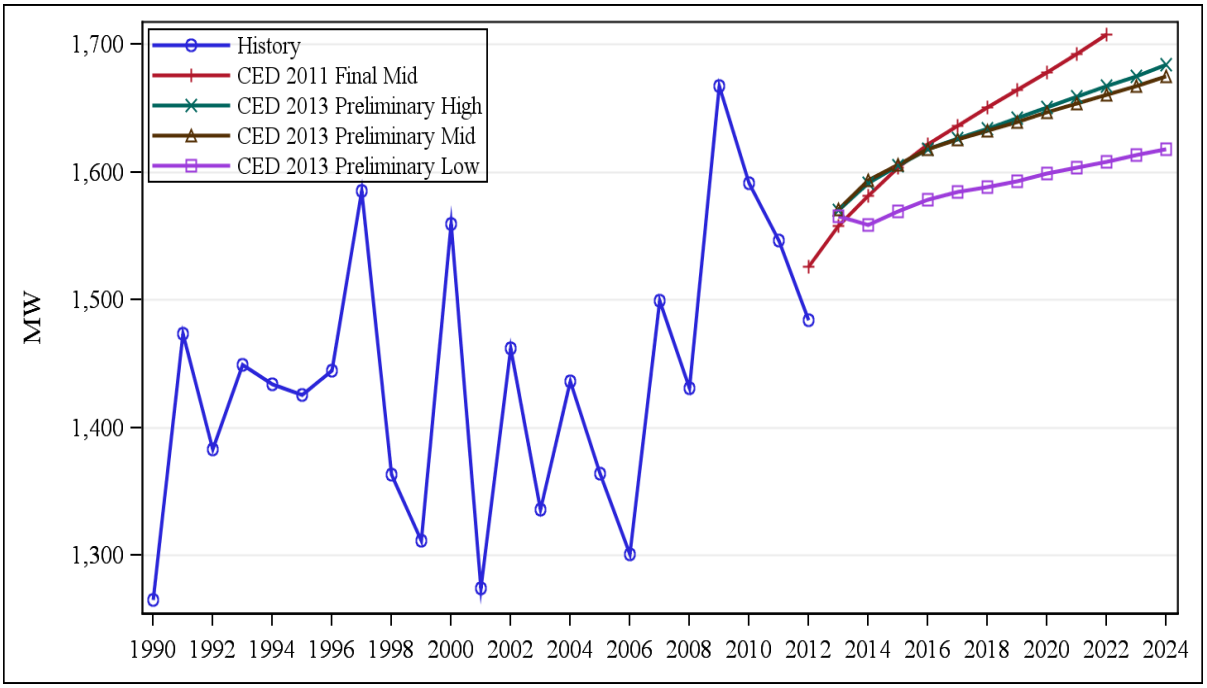
Figure 2-19: SCE Planning Area Agriculture and Water Pumping Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-20 compares projected combined peak for the transportation, communication, utilities, street lighting, agriculture, and water pumping sectors. Although both forecasts are nearly 1560 MW in 2013, the *CED 2013 Preliminary* mid case grows at a slower rate compared to *CED 2011* so that by 2022, the newer forecast is 47 MW lower.

Figure 2-20: SCE Planning Area Other Sector Peak

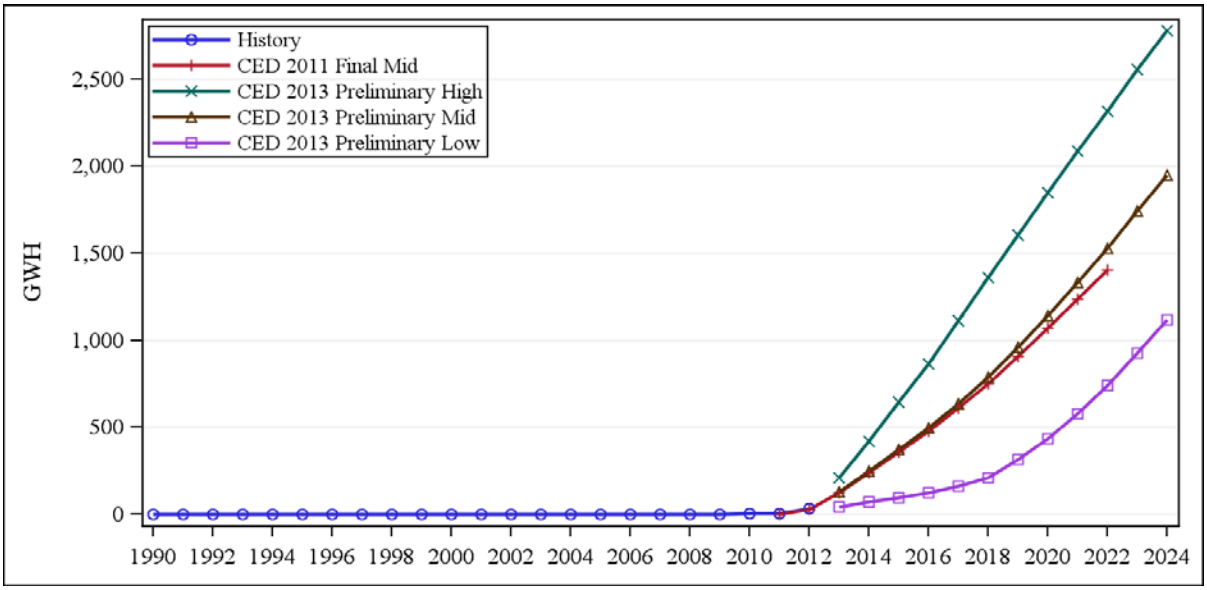


Source: California Energy Commission, Demand Analysis Office, 2013

Electric Vehicles

Consumption by electric vehicles in the SCE planning area is expected to increase to more than 780 GWh by 2018. By the end of the forecast period, consumption by electric vehicles is projected to reach more than 1,100 GWh in the low demand scenario and nearly 2,800 GWh in the high demand scenario. Staff assumes most recharging would occur during off-peak hours, so peak impacts are projected to be relatively small—just 48 MW in the low case and 119 MW in the high case by 2024. **Figure 2-21** presents the SCE planning area electric vehicle consumption forecast for each of the demand scenarios.

Figure 2-21: SCE Electricity Consumption by Electric Vehicles



Source: California Energy Commission, Demand Analysis Office, 2013

Self-Generation

The peak demand forecast is reduced by the projected impacts of distributed PV, solar thermal, and combined heat and power systems, including the effects of the SGIP, CSI, and other programs, as discussed in Volume 1. The effects of these programs are forecast based on a combination installation trend analysis and predictive modeling. **Table 2-2** shows the forecast of peak impacts from PV and non-PV self-generation. Staff projects between 628 and 742 MW of peak reduction from PV systems by 2024. Peak reductions are based on installed PV system capacities ranging from 1,371 MW by 2024 in the high demand case to 1,604 MW by 2024 in the low demand case.

Table 2-2: SCE Planning Area Self-Generation Peak Impacts (MW)

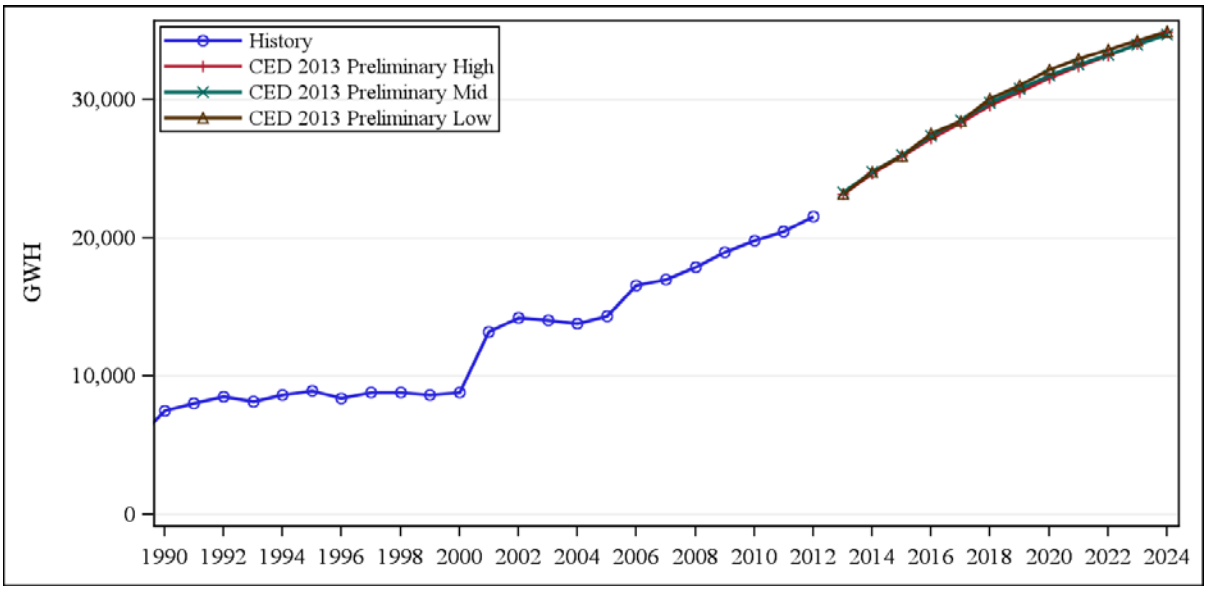
Scenario	Technology	1990	2000	2012	2015	2020	2024
Low Demand	Photovoltaic	0.0	0.3	228.3	436.0	540.1	742.2
	Non-Photovoltaic	489.7	517.3	821.8	873.6	886.0	891.5
	Total	489.7	517.6	1050.1	1309.7	1426.1	1633.7
Mid Demand	Photovoltaic	0.0	0.3	228.3	423.3	509.4	674.0
	Non-Photovoltaic	489.7	517.3	821.8	873.4	885.7	891.3
	Total	489.7	517.6	1050.1	1296.7	1395.1	1565.3
High Demand	Photovoltaic	0.0	0.3	228.3	413.5	493.2	627.8
	Non-Photovoltaic	489.7	517.3	821.8	872.9	885.1	891.1
	Total	489.7	517.6	1050.1	1286.5	1378.3	1518.9

Source: California Energy Commission, Demand Analysis Office, 2013

Conservation/Efficiency Impacts

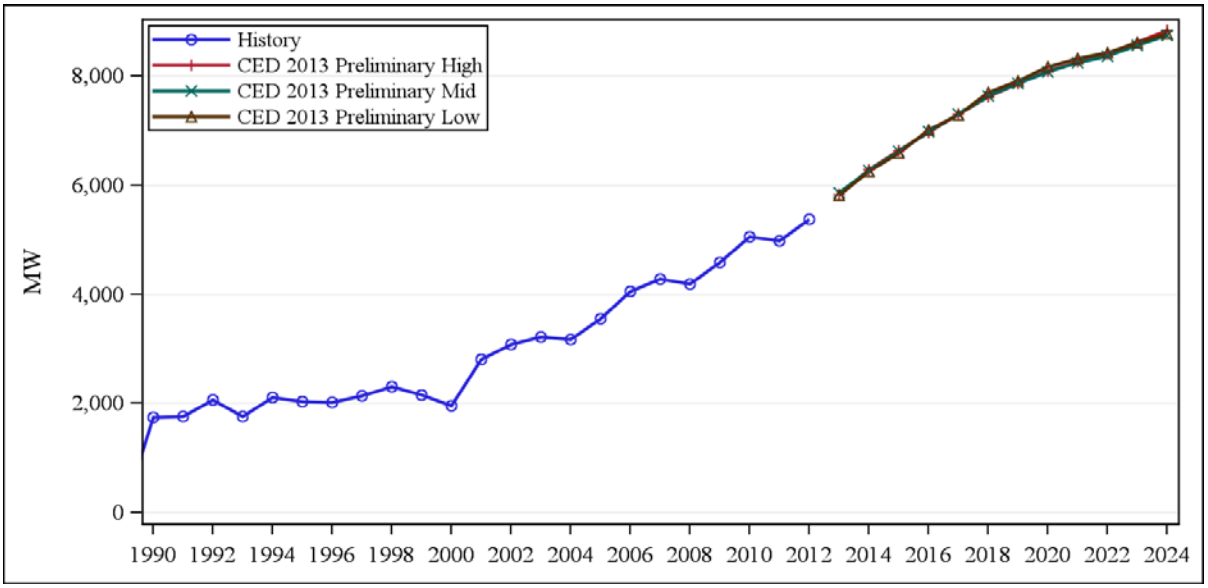
Staff spent a great deal of time refining methods to account for energy efficiency and conservation impacts while preparing recent forecasts. **Figure 2-22** and **Figure 2-23** show committed electricity consumption and peak efficiency savings estimates from all sources, including building and appliance standards; utility programs implemented through 2014; and price and other effects, or savings associated with rate changes and certain market trends not directly related to programs or standards. Projected savings impacts are highest in the low demand scenario, since price and program effects are inversely related to the demand outcome. Within the demand scenarios, higher demand yields more standards savings since new construction and appliance usage increase, while lower demand is associated with more program savings and higher rates (and therefore more price effects). The net result is that savings totals among the scenarios are very similar.

Figure 2-22: SCE Planning Area Electricity Consumption Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 2-23: SCE Planning Area Electricity Peak Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Table 2-3 presents estimated savings for building and appliance standards in the mid demand case for selected years. Total standards impacts are higher in the high demand case by 1.5-2.0 percent due to higher home and commercial floor space construction and 1.5-2.0 percent lower in the low demand case. The standards savings estimates include the 2010 revision to Title 24 building standards as well as Assembly Bill 1109 (Huffman, Chapter 534, Statutes of 2007) lighting savings and television standard savings, just as they were in *CED 2011*. For *CED 2013 Preliminary*, new standards savings impacts were included for the 2013 Title 24 standards update and impacts from standards affecting battery chargers. Savings are measured against a baseline before 1975, so they incorporate more than 30 years of impacts. Volume 1, Chapter 3 provides more detail on staff work related to energy efficiency and conservation.

Table 2-3: SCE Planning Area Standards Savings Estimates

Electricity Consumption Savings (GWH)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	1,245	811	2,056	536	364	901	2,956
2000	1,674	2,462	4,136	1,462	1,051	2,513	6,649
2012	2,791	6,579	9,370	3,001	1,941	4,942	14,312
2015	3,082	8,322	11,404	3,431	2,263	5,694	17,098
2020	3,700	10,324	14,024	4,531	2,844	7,375	21,399
2024	4,127	11,189	15,316	5,321	3,154	8,474	23,790
Electricity Peak Demand Savings (MW)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	341	222	563	126	86	212	775
2000	389	572	961	300	215	515	1,476
2012	844	1,989	2,832	623	403	1,026	3,858
2015	958	2,586	3,543	720	474	1,194	4,737
2020	1,147	3,200	4,346	950	596	1,546	5,892
2024	1,254	3,400	4,654	1,116	661	1,777	6,431

Source: California Energy Commission, Demand Analysis Office, 2013

Climate Zone Forecasts

For *CED 2013 Preliminary*, staff developed electricity consumption and peak demand forecasts for individual climate zones (see Volume 1, Chapter 1 for more details). The SCE planning area has four climate zones, each with a designated weather station, as shown in **Table 2-4**.

Table 2-4: SCE Planning Area Climate Zones

Climate Zone Number	Weather Station	Description
7	Fresno	Southern San Joaquin Valley
8	Long Beach	Long Beach, Orange County, Ventura County
9	Burbank	Inland Los Angeles Basin
10	Riverside	Riverside, San Bernardino Counties

Source: California Energy Commission, Demand Analysis Office, 2013

Table 2-5 shows the forecast results for electricity consumption and peak demand by climate zone for each demand scenario. To better show forecast trends and to avoid mischaracterizing average annual growth because of 2012-specific weather impacts, growth rates are provided relative to 2013. Full climate zone results are shown in the forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/#05302013).

The fastest growth in both consumption and peak demand over the forecast period is projected to be inland, in Climate Zones 7 and 10. These results reflect expected resumption of migration from coastal to inland areas, migration that decreased during the recent recession. For example, growth in population from 2013-2024 in the mid demand case is projected to be 28 and 19 percent, respectively, for Climate Zones 7 and 10, compared to 5 and 9 percent for Climate Zones 8 and 9. Potential climate change impacts contribute to faster peak demand growth in Climate Zone 7 in the mid demand scenario; projected increases in annual maximum temperature are highest in this climate zone.

Table 2-5: SCE Planning Area Climate Zone Forecast Results

		Consumption by Climate Zone (GWh)				Peak Demand by Climate Zone (MW)			
		7	8	9	10	7	8	9	10
High Demand Case	2013	6,063	42,263	25,343	26,430	989	8,385	6,810	5,756
	2015	6,288	43,390	26,242	27,552	1,058	8,744	7,138	6,047
	2020	6,866	45,574	28,230	30,427	1,177	9,393	7,743	6,641
	2024	7,415	47,668	30,031	33,078	1,281	9,981	8,213	7,127
	Avg. Growth 2013-2020	1.57%	0.95%	1.36%	1.78%	2.19%	1.43%	1.62%	1.80%
	Avg. Growth 2013-2024	1.69%	1.01%	1.42%	1.89%	2.18%	1.46%	1.57%	1.80%
Mid Demand Case	2013	6,042	42,079	25,280	26,349	988	8,368	6,795	5,743
	2015	6,231	42,764	25,918	27,167	1,055	8,647	7,054	5,998
	2020	6,709	43,969	27,367	29,323	1,179	9,014	7,477	6,471
	2024	7,174	45,362	28,765	31,428	1,281	9,359	7,785	6,851
	Avg. Growth 2013-2020	1.32%	0.55%	1.00%	1.35%	2.22%	0.93%	1.20%	1.50%
	Avg. Growth 2013-2024	1.44%	0.63%	1.08%	1.48%	2.19%	0.94%	1.14%	1.48%
Low Demand Case	2013	5,992	41,746	25,056	26,108	975	8,271	6,710	5,665
	2015	6,110	41,816	25,289	26,488	1,015	8,297	6,747	5,738
	2020	6,543	42,302	26,333	28,214	1,140	8,416	7,024	6,111
	2024	6,974	43,358	27,529	30,068	1,244	8,603	7,232	6,419
	Avg. Growth 2013-2020	1.11%	0.17%	0.62%	0.97%	1.98%	0.22%	0.57%	0.95%
	Avg. Growth 2013-2024	1.27%	0.32%	0.79%	1.18%	2.06%	0.33%	0.63%	1.05%

Source: California Energy Commission, Demand Analysis Office, 2013

CHAPTER 3: San Diego Gas and Electric Planning Area

The SDG&E planning area includes SDG&E bundled retail customers and customers served by various energy service providers using the SDG&E distribution system to deliver electricity to end users.

This chapter is organized as follows. First, forecasted consumption and peak loads for the SDG&E planning area are discussed; both total and per capita values are presented. The *CED 2013 Preliminary* values are compared to the adopted *CED 2011* mid scenario, with differences between the two forecasts explained. The forecasted load factors, jointly determined by the consumption and peak load estimates, are also discussed. Second, the chapter presents sector consumption and peak load forecasts. The residential, commercial, industrial, and "other" sector forecasts are compared to those in *CED 2011*, and differences between the two are discussed. Third, the chapter discusses the forecasts of electric vehicles, self-generation, and the impacts of conservation and efficiency programs.

San Diego Area Economic and Demographic Outlook

This section provides general information on the economic and demographic outlook for the San Diego Area using outlooks provided by Moody's, IHS Global Insight, the University of California, Los Angeles (UCLA), the California Department of Finance, and the United States Census Bureau. These outlooks are based on economic data available in January 2013.

San Diego's recovery is gaining momentum as formerly hard-hit industries stabilize or show signs of renewed life. Payrolls are being boosted by banking, shipyards, temporary employment, and higher education. The unemployment rate is below 9 percent in spite of a growing labor force.

San Diego's housing market indicators are improving. House prices are rising as the inventory of homes for sale declines. The issuance of multifamily residential permits is increasing.

San Diego's recovery will continue in 2013. Growth is driven by expanding high technology, services, tourism, and expanding construction. In the longer term, San Diego is well positioned to take advantage of high-value-added tech, R&D, and the Pentagon's reorientation toward the Pacific Rim.

Forecast Results

For this forecast, three demand scenarios were developed. The high demand scenario includes high economic and demographic projections, low energy price projections, and low

efficiency impact assumptions. The low demand scenario includes low economic and demographic projections, high energy price projections, and high efficiency impact assumptions. Volume 1 provides more detail on the construction of the demand scenarios.

Table 3-1 presents a comparison of *CED 2013 Preliminary* high, mid, and low demand scenarios with the mid demand scenario from *CED 2011* for electricity consumption and peak demand for selected years. Comprehensive results are available electronically as a set of forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/).

In the SDG&E planning area, the *CED 2013 Preliminary* mid demand electricity consumption is 7.2 percent lower than *CED 2011* in 2020, the result of a lower than projected level of consumption in 2012 and a lower growth rate over the forecast period. By 2024, the *CED 2013 Preliminary* high demand level is 6.8 percent higher than the mid case while the low demand scenario is 5.8 percent lower. For peak demand, the *CED 2013 Preliminary* high and low scenarios are 6.3 percent higher and 7.4 percent lower, respectively, than the mid case by 2024.

Weather-normalized peak demand in 2012 was 7.0 percent lower than predicted in *CED 2011*.

Table 3-1: SDG&E Planning Area Forecast Comparison

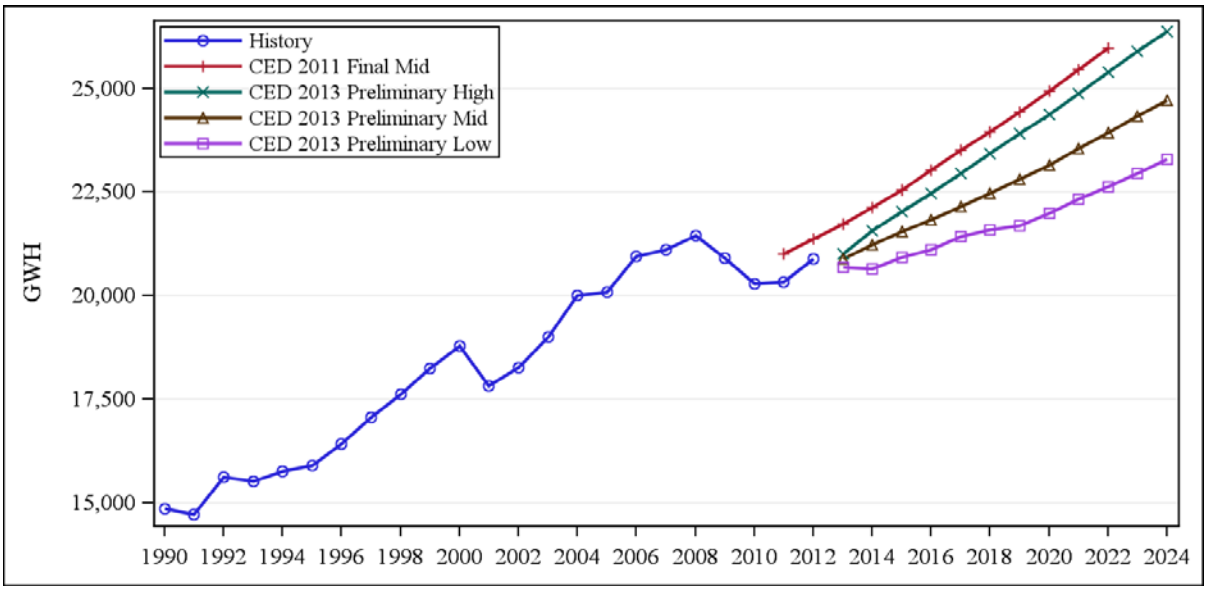
Consumption (GWH)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	14,863	14,857	14,857	14,857
2000	19,125	18,784	18,784	18,784
2012	21,363	20,889	20,889	20,889
2015	22,550	22,024	21,553	20,935
2020	24,943	24,369	23,157	21,994
2024	--	26,376	24,706	23,280
Average Annual Growth Rates				
1990 - 2000	2.55%	2.37%	2.37%	2.37%
2000 - 2012	1.11%	1.07%	1.07%	1.07%
2012 - 2015	1.82%	1.78%	1.05%	0.07%
2012 - 2020	1.96%	1.94%	1.30%	0.65%
2012 - 2024	--	1.96%	1.41%	0.91%
Peak (MW)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	2,978	2,978	2,978	2,978
2000	3,485	3,485	3,485	3,485
2012	4,560	4,620	4,620	4,620
2012*	4,560	4,592	4,592	4,592
2015	4,865	4,993	4,922	4,709
2020	5,359	5,445	5,223	4,892
2024	--	5,772	5,432	5,032
Average Annual Growth Rates				
1990 - 2000	1.58%	1.58%	1.58%	1.58%
2000 - 2012	2.72%	2.86%	2.86%	2.86%
2012* - 2015	2.18%	2.83%	2.34%	0.84%
2012* - 2020	2.04%	2.15%	1.62%	0.79%
2012* - 2024	--	1.92%	1.41%	0.77%
Historical values are shaded				
*Weather normalized: *CED 2013 Preliminary* uses a weather-normalized peak value derived from the actual 2012 peak for calculating growth rates during the forecast period				

Source: California Energy Commission, Demand Analysis Office, 2013

As shown in **Figure 3-1**, *CED 2013 Preliminary* electricity consumption forecasts are lower at the beginning of the forecast period than projected by *CED 2011*. Consumption remains relatively flat from 2012 to 2013, due to a combination of slow economic growth, an increase in residential and commercial electricity rates, and the assumption of normal weather (2012 was a warm year). Growth in the mid case is slightly less than *CED 2011*, due to rate increases and the addition of building and appliance standards. In 2022, all three consumption scenarios remain below the level projected by *CED 2011*.

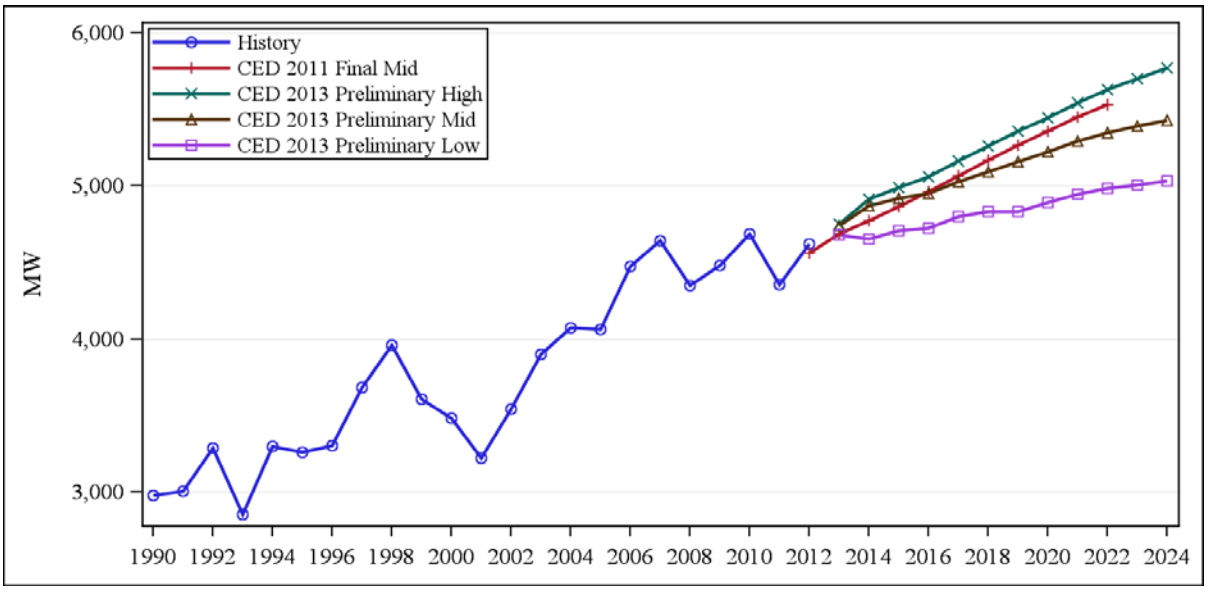
While 2012 was a warm year on average, the SDG&E planning area experienced a below average peak temperature. Actual peak load was only slightly lower than weather normalized peak. The relationship between peak demand scenarios, shown in **Figure 3-2**, follows a similar pattern as the consumption forecast. While the *CED 2013 Preliminary* mid peak demand forecast begins at a higher value than projected in *CED 2011*, the lower growth rate causes the mid scenario to dip below *CED 2011* levels by 2016.

Figure 3-1: SDG&E Planning Area Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-2: SDG&E Planning Area Peak

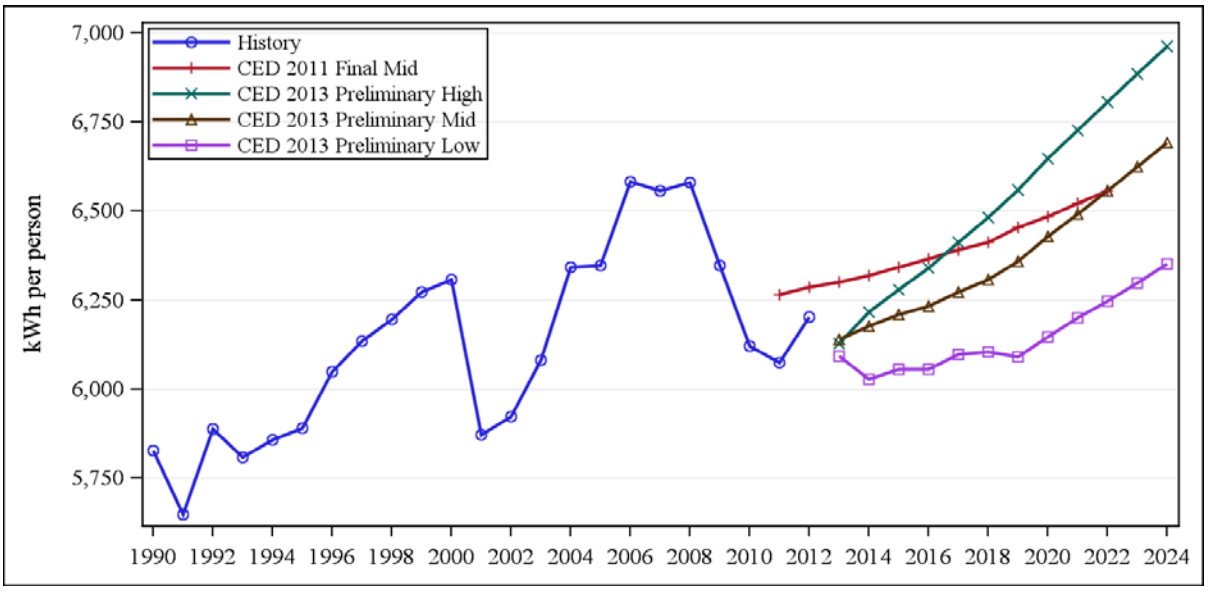


Source: California Energy Commission, Demand Analysis Office, 2013

SDG&E's projected peaks reflect staff estimates of future non-event-based demand response committed program impacts incremental to 2012 impacts, including real-time or time-of-use pricing and permanent load shifting. The projected impacts reach around 3 MW in 2024. See Volume 1 for more details.

As **Figure 3-3** shows, per capita electricity consumption is lower in the *CED 2013 Preliminary* demand scenarios throughout the forecast period compared to *CED 2011*. The drop in 2013 shows the combined effect of flat consumption and increased population. Unlike *CED 2011*, which considered only a single population scenario, *CED 2013 Preliminary* incorporates high, mid, and low population projections. While the high and mid consumption forecasts are nearly identical in 2013, there is some spread between population estimates for that year. As a result, the high per capita consumption scenario shown below actually begins from a lower point than the mid scenario.

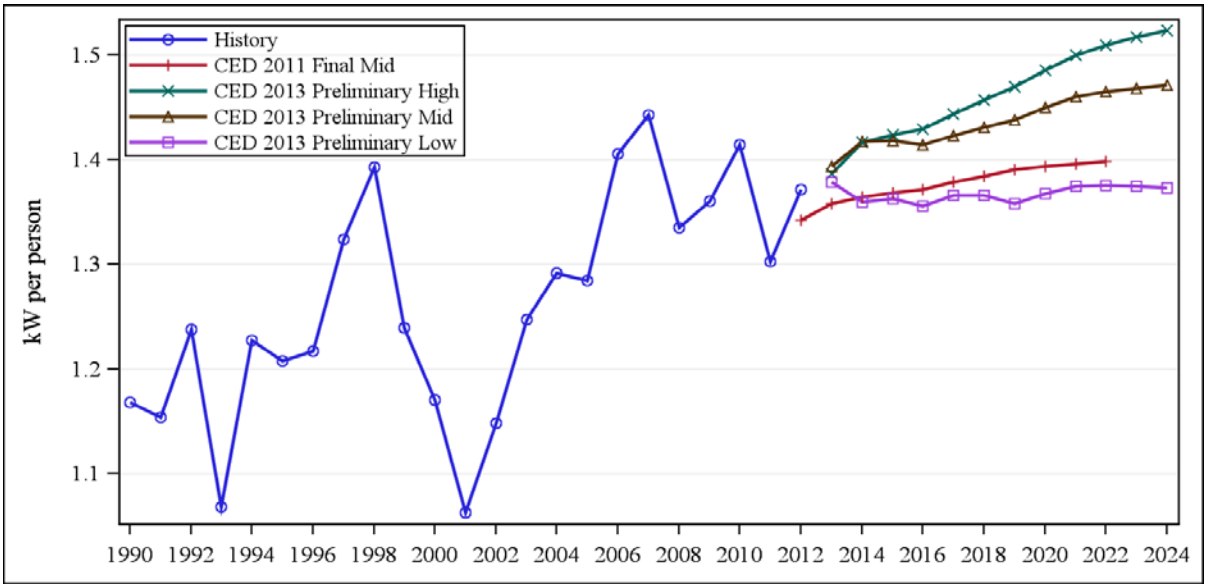
Figure 3-3: SDG&E Planning Area Per Capita Electricity Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-4 shows per capita peak demand. *CED 2013 Preliminary* per capita peak scenarios follow the same pattern as the per capita consumption scenarios. Both per capita consumption and per capita peak values are projected to surpass the range of recent historical levels in the mid and high scenarios.

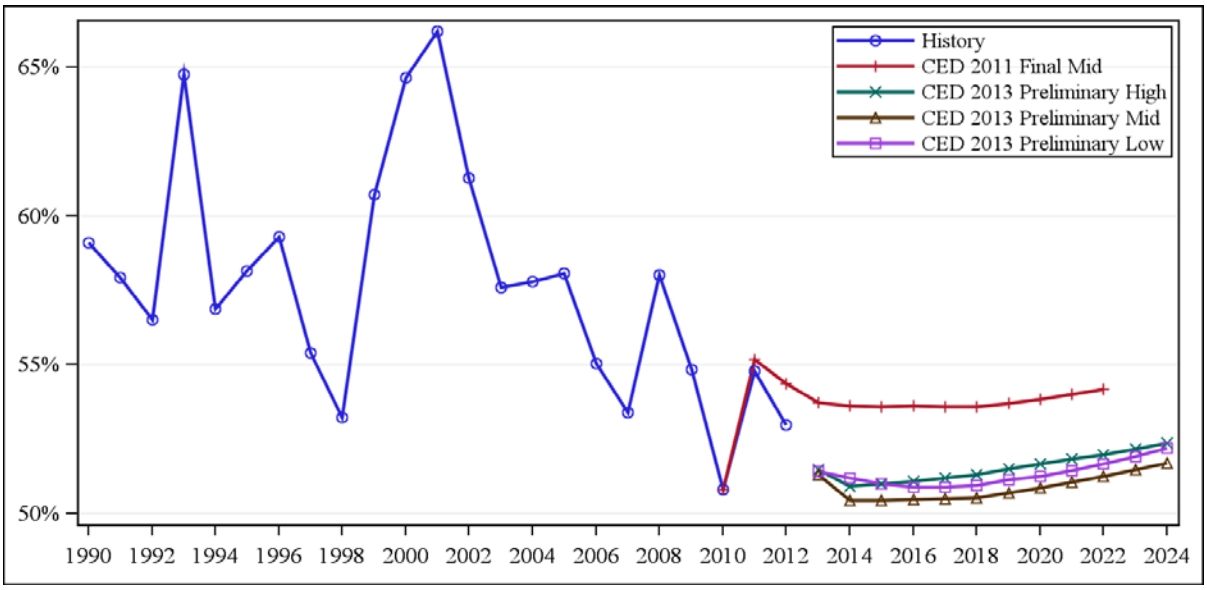
Figure 3-4: SDG&E Planning Area per Capita Peak Demand



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-5 compares forecasted load factors. The load factor is a measure of the increase in peak demand relative to annual electricity consumption. Lower load factors indicate "a needle peak"; higher load factors indicate a more stable load. Greater population and economic growth in the SDG&E planning area has been taking place in hotter inland areas, leading to a higher saturation and use of central air conditioning. *CED 2013 Preliminary* projects load factors to be relatively constant over the forecast period, increasing somewhat in the later years as electric vehicles usage has a greater impact on consumption than demand.

Figure 3-5: SDG&E Planning Area Load Factors



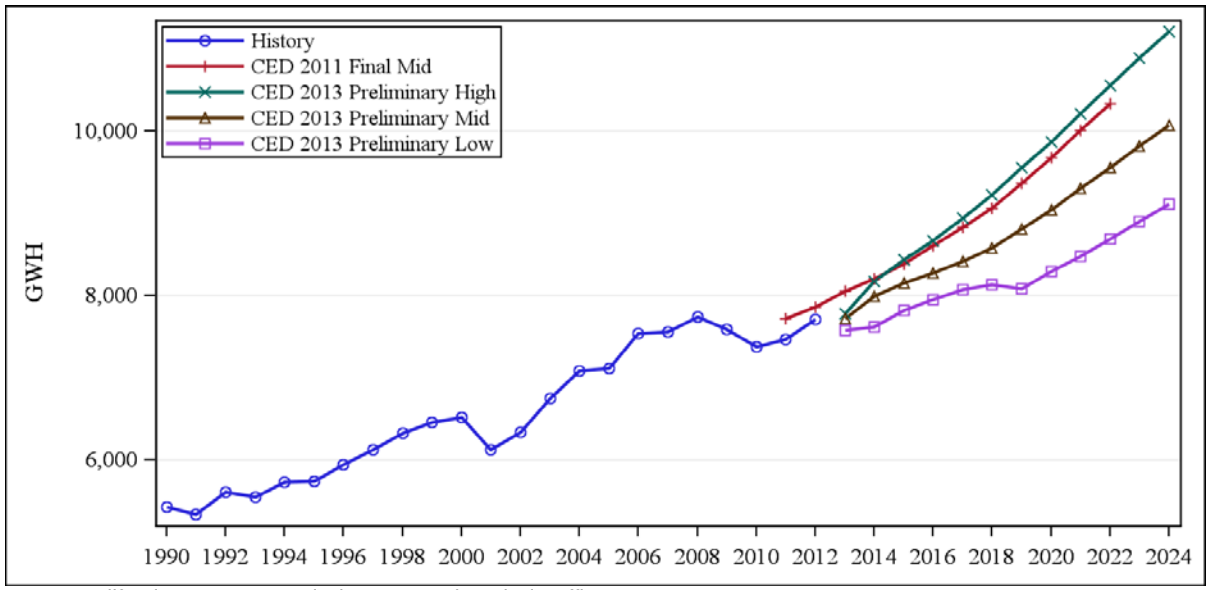
Source: California Energy Commission, Demand Analysis Office, 2013

Sector Level Results and Input Assumptions

Residential Sector

Figure 3-6 compares *CED 2013 Preliminary* and *CED 2011* planning area residential forecasts. Due to lower income growth and a lower starting point, the low and mid scenarios project a lower level of consumption than *CED 2011*. The high demand scenario is slightly higher than *CED 2011* and roughly matches the growth rates. *CED 2013 Preliminary* scenarios have a significantly wider spread than in *CED 2011* due to different personal income assumptions.

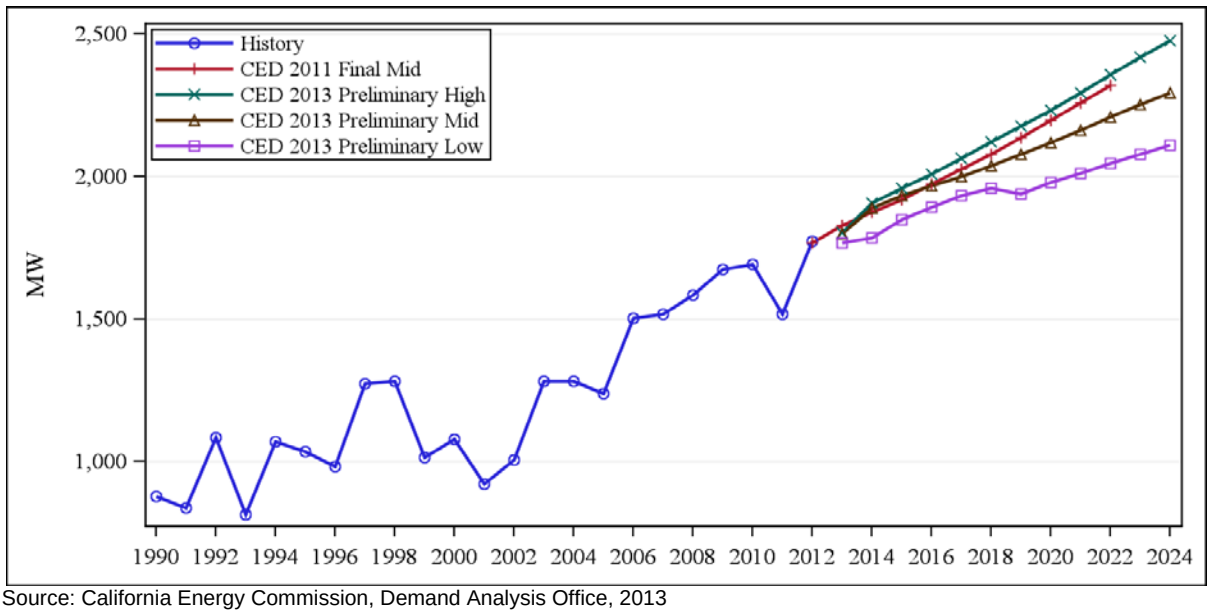
Figure 3-6: SDG&E Planning Area Residential Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-7 compares *CED 2013 Preliminary* and *CED 2011* residential peak demand forecasts. The low and mid *CED 2013 Preliminary* forecasts are both lower than *CED 2011* while the high demand scenario is slightly higher and roughly parallel to *CED 2011*.

Figure 3-7: SDG&E Planning Area Residential Peak

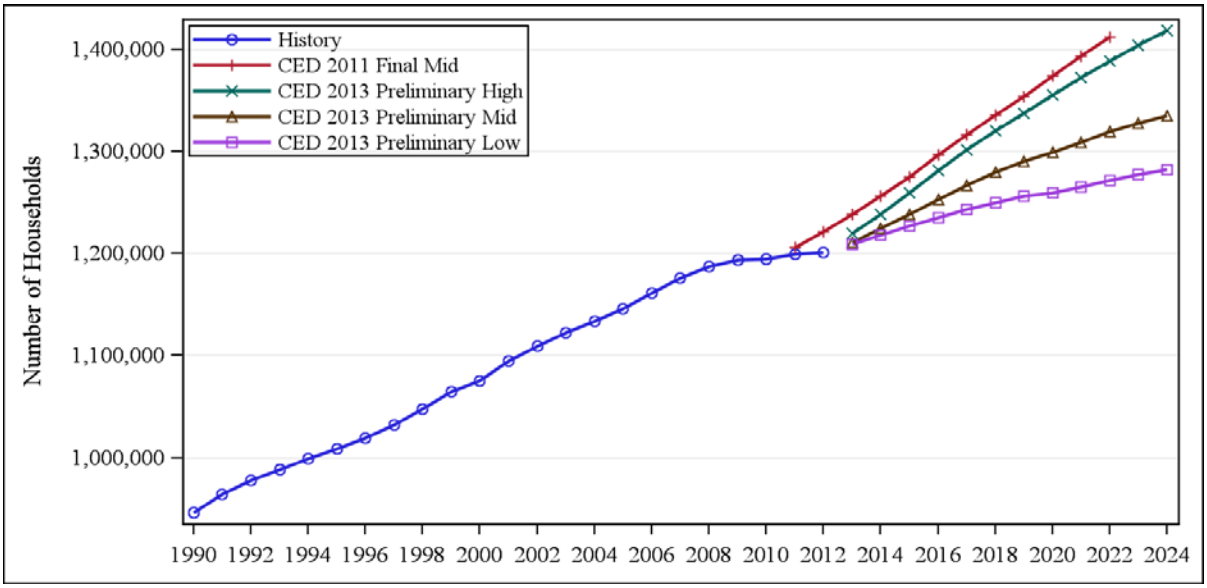


Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-8, **Figure 3-9**, and **Figure 3-10** compare the residential economic/demographic drivers used in *CED 2013 Preliminary* with those used in *CED 2011*. **Figure 3-8** provides

comparisons of total household projections. Although the high demand scenario housing number growth rates are similar to *CED 2011* the mid and low demand scenarios have significantly lower number of households projected over the forecast period. This results in a much wider spread of households in the *CED 2013 Preliminary* than was used in *CED 2011*.

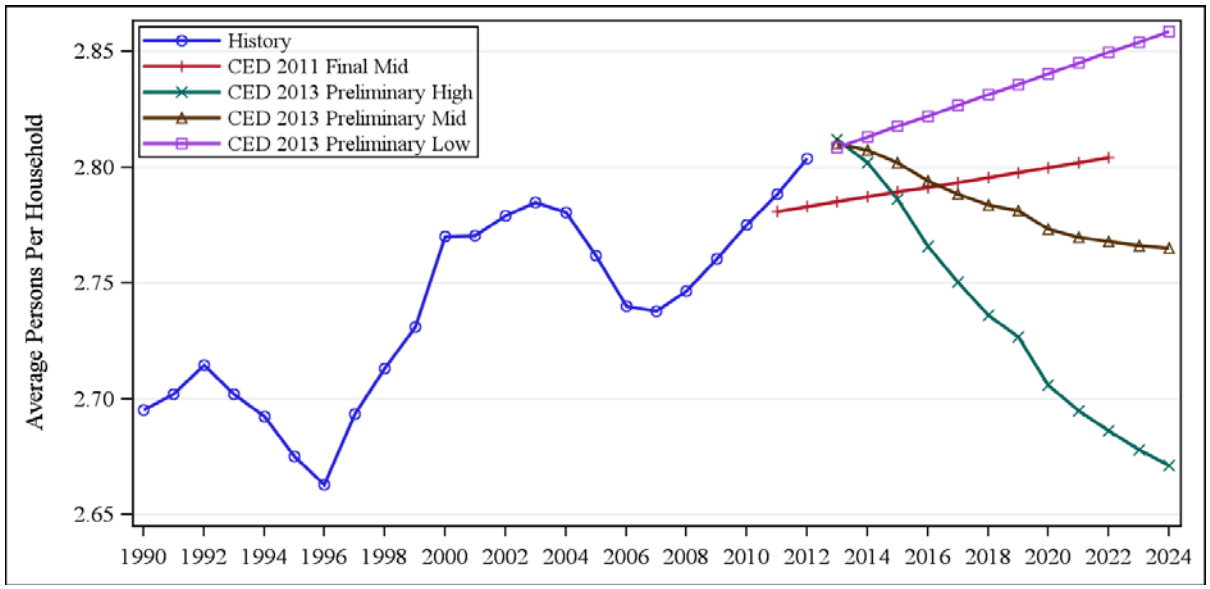
Figure 3-8: SDG&E Planning Area Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-9 compares persons per household. *CED 2013 Preliminary* persons per household is higher in the near term due to the starting point. However, the mid and low demand scenarios have significantly lower long term persons per household primarily due to the wide spread of household projections across the three demand scenarios. The *CED 2013 Preliminary* high demand scenario begins higher than *CED 2011* and grows at a faster rate than *CED 2011* due to the population projection differences.

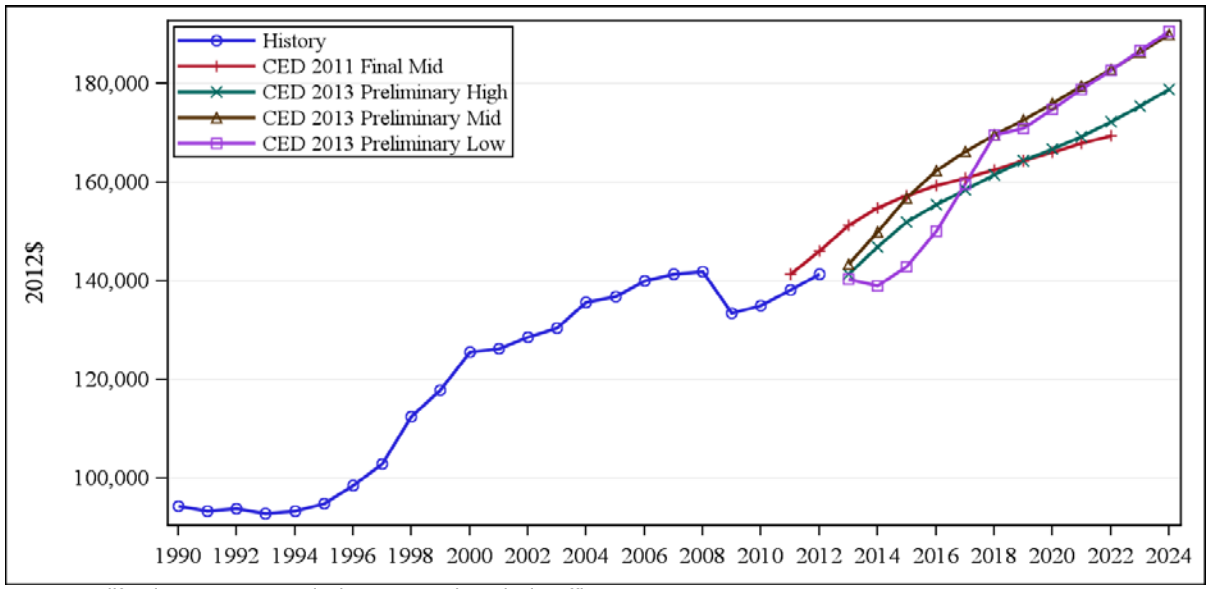
Figure 3-9: SDG&E Planning Area Persons per Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-10 provides a comparison of average household income between forecasts. Near term *CED 2013 Preliminary* average household incomes are lower but in all cases increase more rapidly through the forecast and exceed *CED 2011* demand scenario by 2019. The significantly lower household growth rates in the *CED 2013 Preliminary* low demand scenario results in average household incomes exceeding the mid demand scenario by 2017.

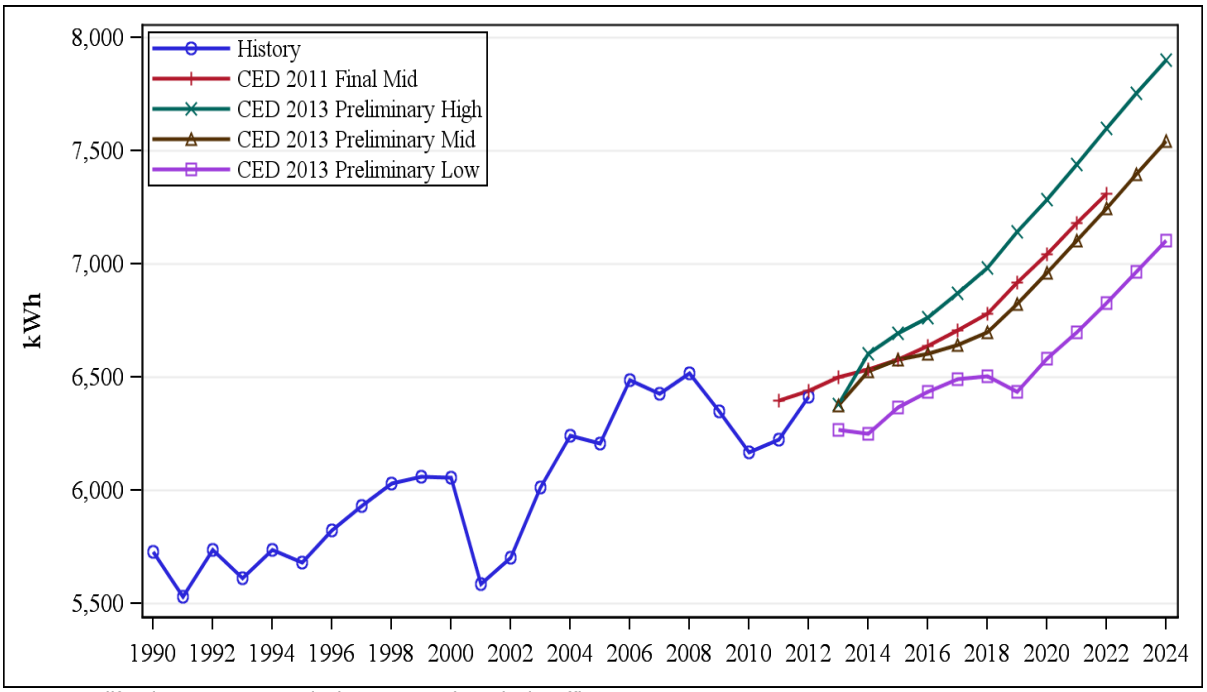
Figure 3-10: SDG&E Planning Area Average Household Income Projections



Source: California Energy Commission, Demand Analysis Office, 2013

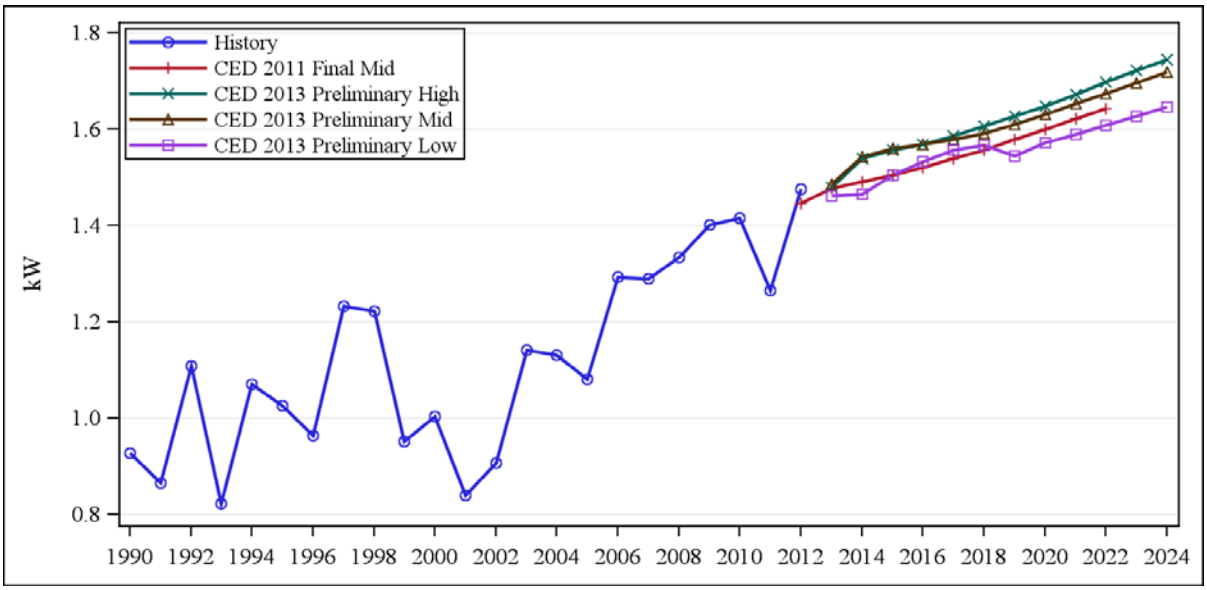
Figure 3-11 and **Figure 3-12** compare residential consumption per household and residential peak use per household, respectively. The *CED 2013 Preliminary* forecast of consumption per household begins at a lower point but grows at a similar rate in the mid scenario compared to *CED 2011.* The low and high *CED 2013 Preliminary* scenarios bound *CED 2011* and the *CED 2013 Preliminary* mid demand scenarios. As with *CED 2011*, long term growth rates are influenced by increases in electric vehicle demand growth. The 2013 peak use per household roughly matches that projected in *CED 2011.* However, in the mid and high scenario near-term peak, growth results in a forecast slightly higher than in *CED 2011.* In the low *CED 2013 Preliminary* demand scenario, the growth rate is similar to *CED 2011* with the exception of a few years.

Figure 3-11: SDG&E Planning Area Consumption per Household



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-12: SDG&E Planning Area Peak Use per Household

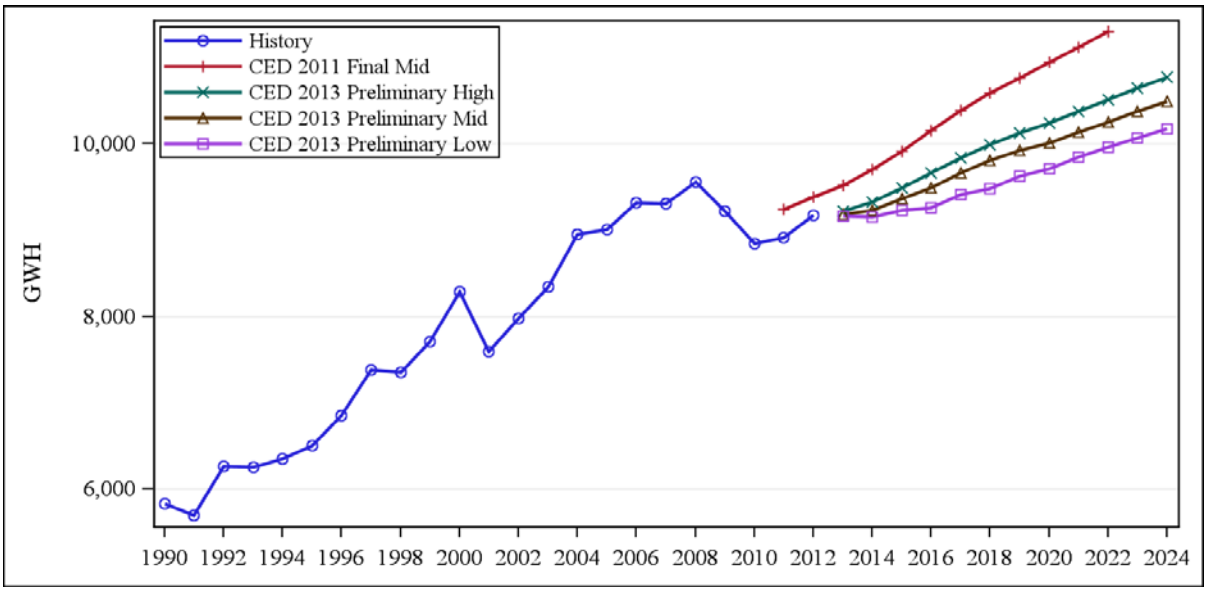


Source: California Energy Commission, Demand Analysis Office, 2013

Commercial Sector

Figure 3-13 compares the SDG&E commercial sector electricity consumption forecasts. The *CED 2013 Preliminary* consumption scenarios are lower than *CED 2011* throughout the forecast period. The differences are primarily caused by a lower starting point due to lower estimates of recent historical commercial consumption. The growth rate of commercial consumption is slightly lower in the scenarios than in *CED 2011* because of lower growth in projected floor space.

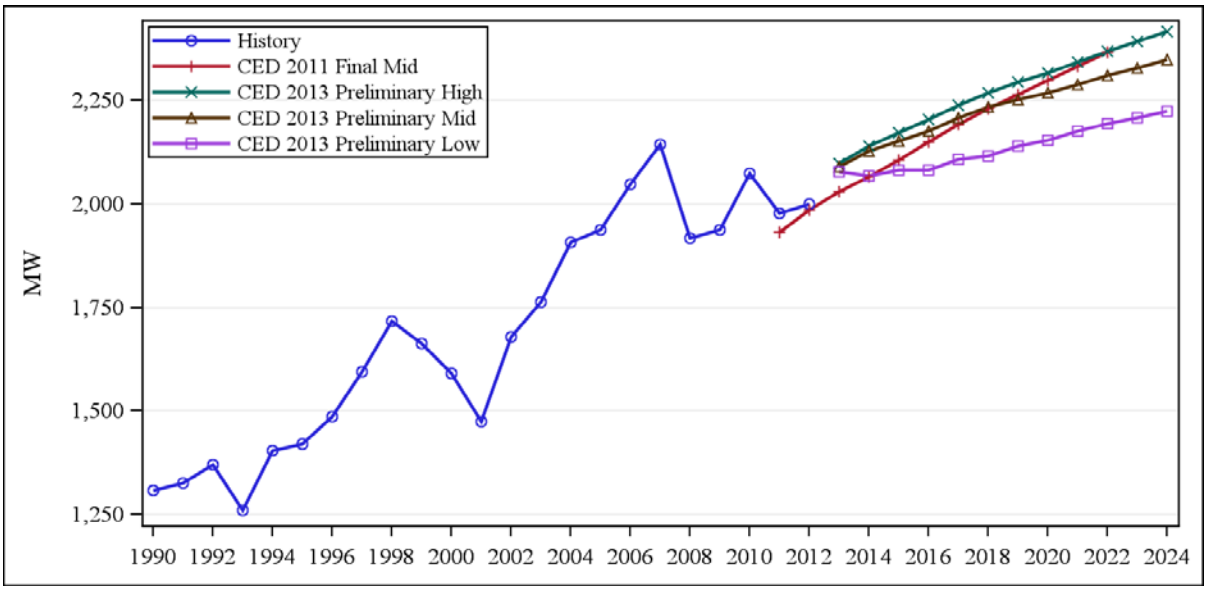
Figure 3-13: SDG&E Planning Area Commercial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-14 compares the SDG&E commercial sector peak demand forecasts. Growth in the scenario forecasts is driven by the underlying electricity consumption forecast, which exhibits a similar pattern. Initially, all three peak scenario forecasts start higher than *CED 2011* due to higher estimates of recent historical commercial demand. However, all three demand scenarios reduce to *CED 2011* levels or below after the initial period of the forecast as a result of lower growth in projected floor space.

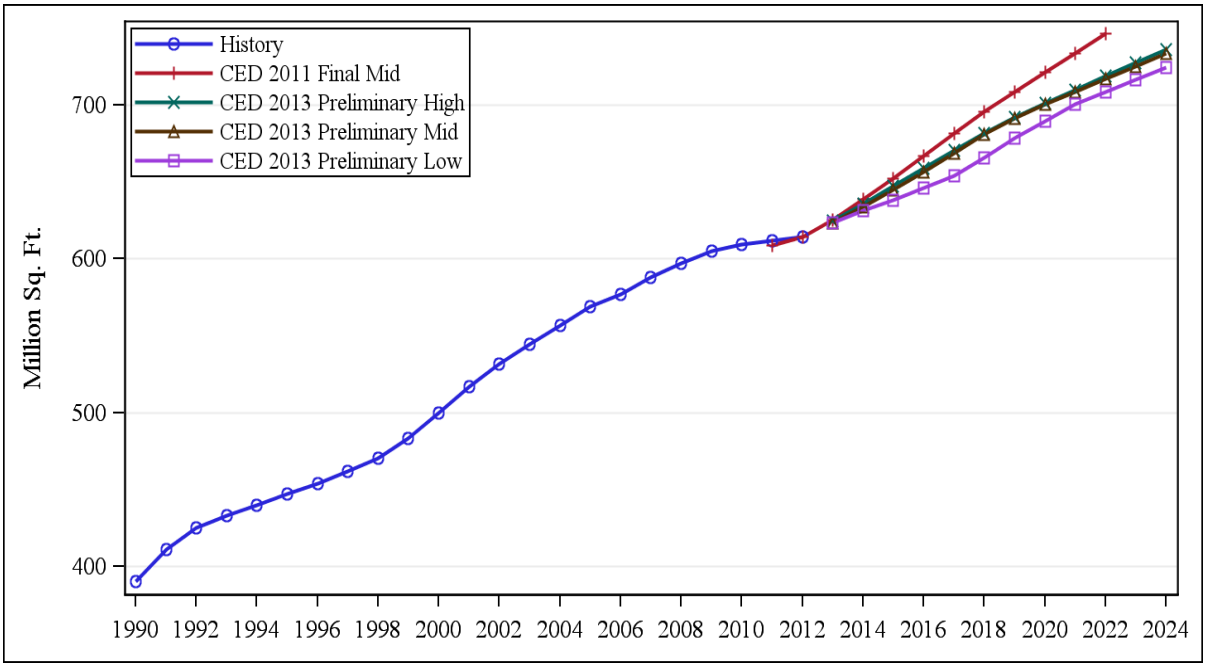
Figure 3-14: SDG&E Planning Area Commercial Sector Peak



Source: California Energy Commission, Demand Analysis Office, 2013

In staff's commercial building sector forecasting model, floor space by building type (such as retail, offices, and schools) is the key driver. **Figure 3-15** compares SDG&E commercial floor space projections. *CED 2013 Preliminary* floor space projections start at the same level as *CED 2011*, but progressively decrease over the forecast period compared to *CED 2011*.

Figure 3-15: SDG&E Planning Area Commercial Floor Space

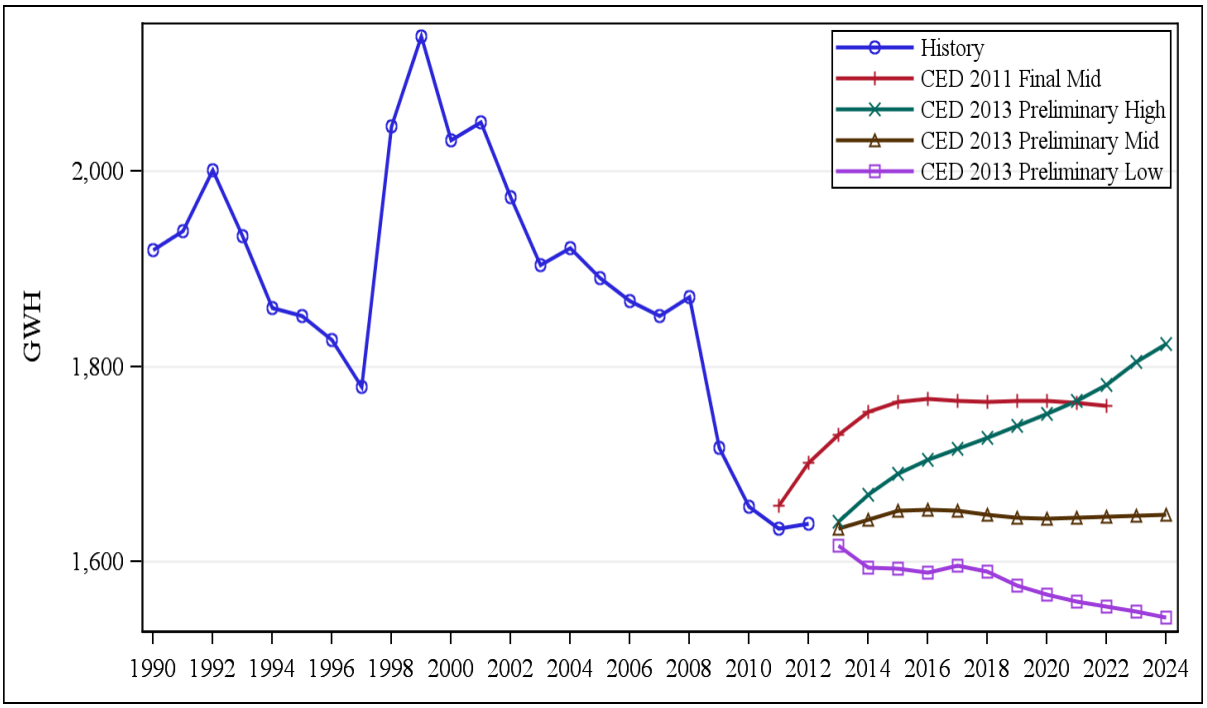


Source: California Energy Commission, Demand Analysis Office, 2013

Industrial Sector

Figure 3-16 compares the SDG&E planning area industrial sector electricity consumption forecasts. *CED 2013 Preliminary* industrial consumption forecasts are lower than the *CED 2011* forecast in the short term. However, projected growth in the high case is higher in the longer term than was projected in the *CED 2011* forecast due to more optimistic economic projections. The differences in consumption scenarios are mainly driven by differences in economic output.

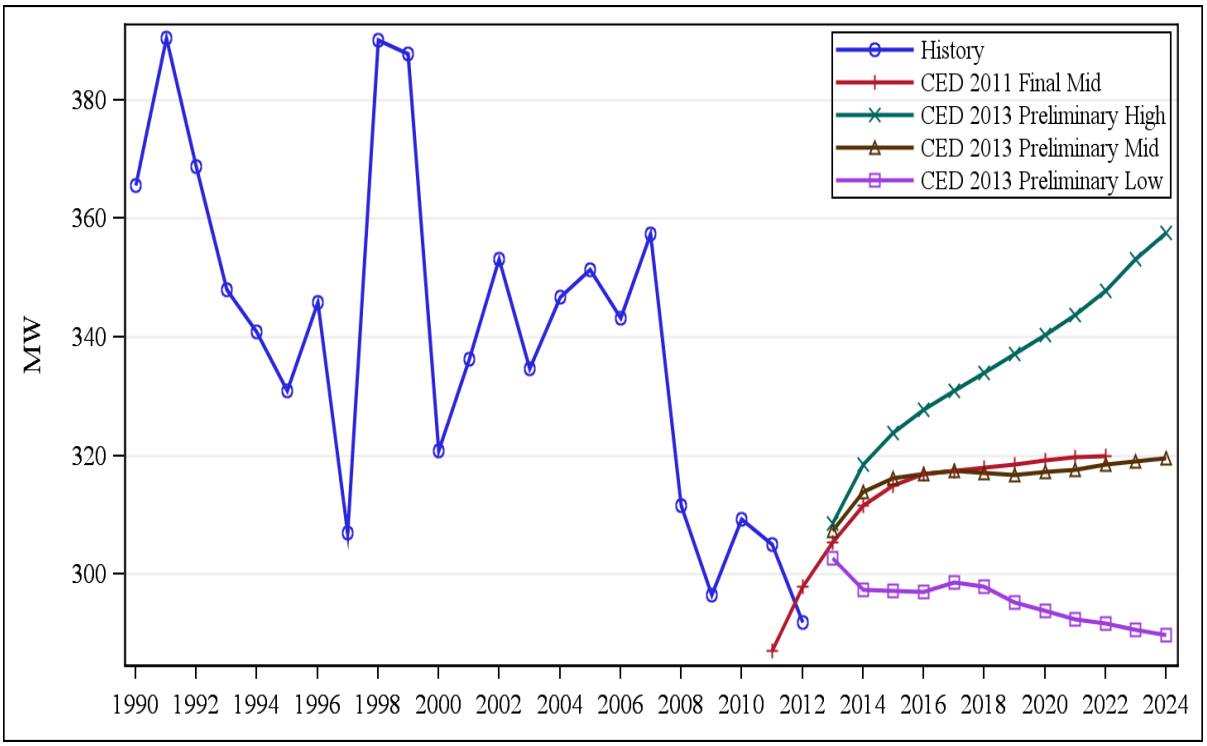
Figure 3-16: SDG&E Planning Area Industrial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-17 compares the SDG&E industrial sector peak forecasts. The *CED 2013 Preliminary* industrial peak forecasts follow the same pattern as the industrial consumption forecasts.

Figure 3-17: SDG&E Planning Area Industrial Sector Peak

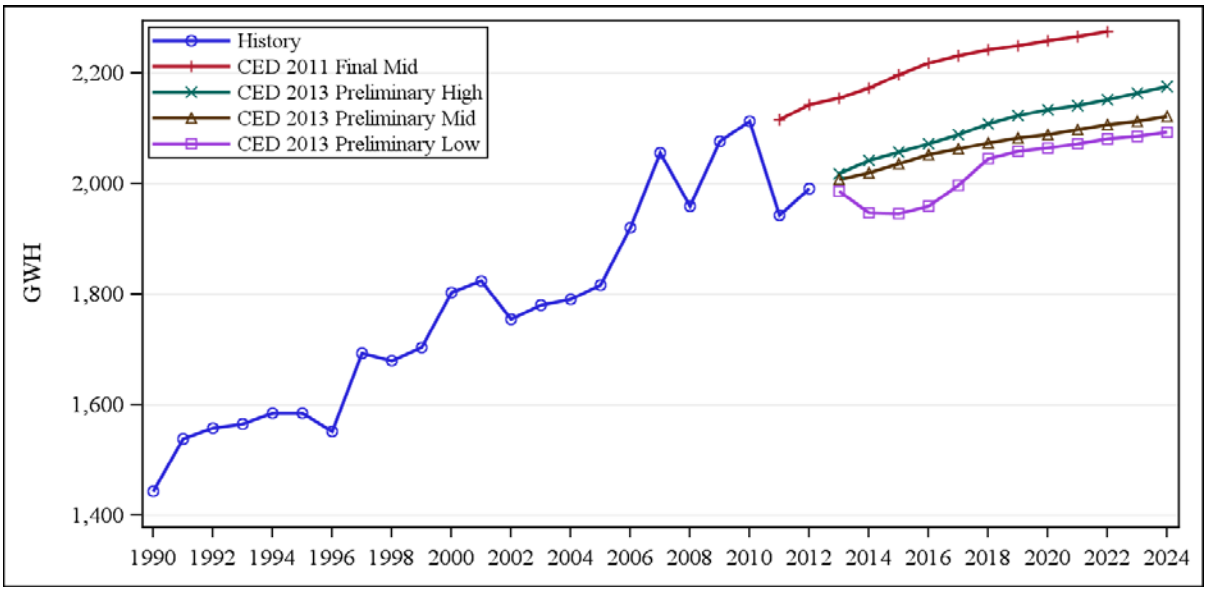


Source: California Energy Commission, Demand Analysis Office, 2013

Other Sectors

Figure 3-18 compares the electricity consumption forecasts for the TCU sector, which includes street lighting. Historical consumption dropped over 120 GWh from 2010 to 2012 so that the new forecasts start at a significantly lower point. *CED 2013 Preliminary* high case has a very similar growth rate to *CED 2011.* In the recession scenario modeled in the low case, electricity consumption bottoms out in 2015 and is subsequently followed by a strong recovery though 2018 where growth resumes at a rate similar to that of the mid case.

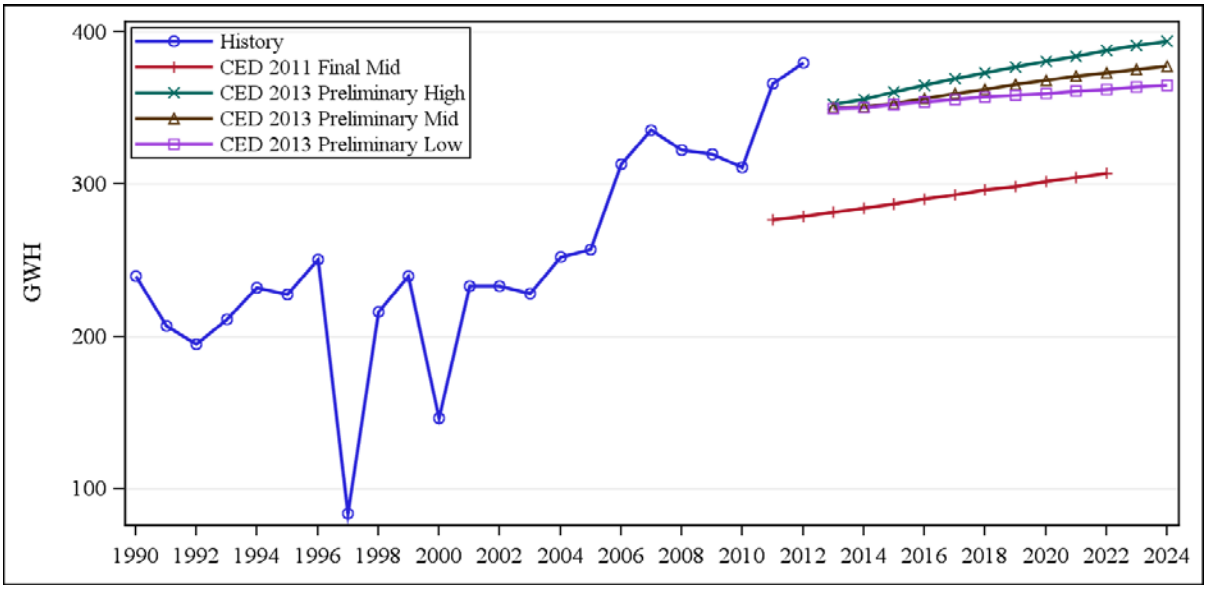
Figure 3-18: SDG&E Planning Area Transportation, Communication, Utilities, and Street Lighting r Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-19 compares the electricity consumption forecasts for the agriculture and water pumping sectors. The *CED 2013 Preliminary* scenarios start at a point over 20 percent higher than *CED 2011* but the two mid cases have similar rates of growth over the forecast period. All three demand scenarios are projected to grow over time, primarily because of a projected increase in ground-water pumping.

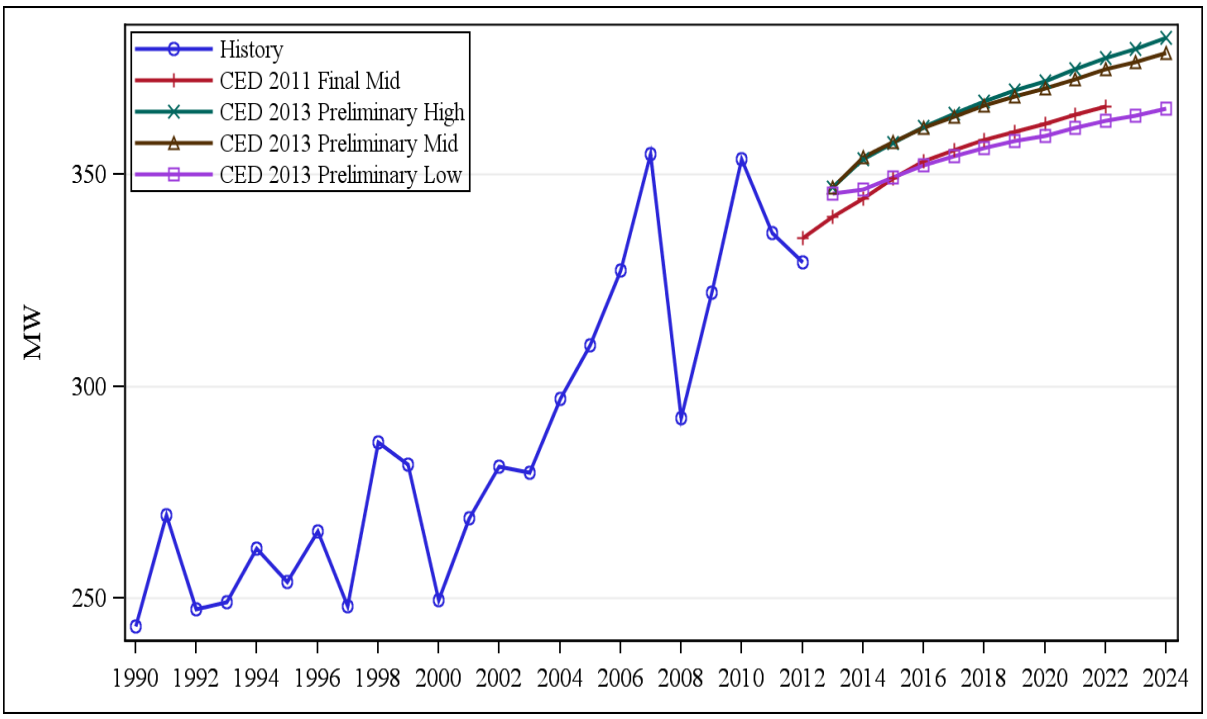
Figure 3-19: SDG&E Planning Area Agriculture and Water Pumping Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-20 compares projected combined peak for the transportation, communication, utilities, street lighting, agriculture, and water pumping sectors. The *CED 2013 Preliminary* mid starts somewhat above *CED 2011*, but grows at a similar rate over the entire forecast period. By 2018, the new mid case is just 8 MW higher than predicted by *CED 2011*.

Figure 3-20: SDG&E Planning Area Other Sector Peak

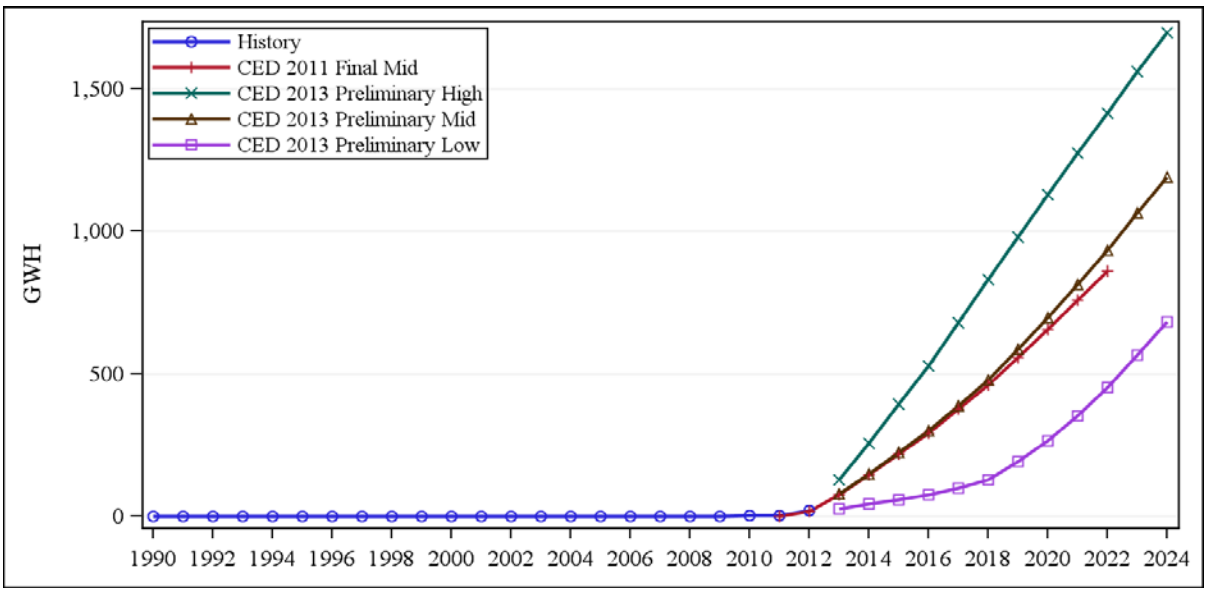


Source: California Energy Commission, Demand Analysis Office, 2013

Electric Vehicles

Consumption by electric vehicles in the SDG&E planning area is expected to increase to more than 480 GWh by 2018. By the end of the forecast period, consumption by electric vehicles is projected to reach more than 680 GWh in the low demand scenario and nearly 1,700 GWh in the high demand scenario. Staff assumes most recharging would occur during off-peak hours, so peak impacts are projected to be relatively small—just 29 MW in the low case and 73 MW in the high case by 2024. **Figure 3-21** presents the SDG&E planning area electric vehicle consumption forecast for each of the demand scenarios.

Figure 3-21: SDG&E Electricity Consumption by Electric Vehicles



Source: California Energy Commission, Demand Analysis Office, 2013

Self-Generation

The peak demand forecast is reduced by the projected impacts of distributed PV, solar thermal, and combined heat and power systems, including the effects of the SGIP, CSI, and other programs, as discussed in Volume 1. The effects of these programs are forecast based on a combination installation trend analysis and predictive modeling. **Table 3-2** shows the forecast of peak impacts from PV and non-PV self-generation. Staff projects between 285 and 253 MW of peak reduction from PV systems by 2024. Peak reductions are based on installed PV system capacities ranging from 546 MW by 2024 in the high demand case to 614 MW by 2024 in the low demand case.

Table 3-2: SDG&E Planning Area Self-Generation Peak Impacts (MW)

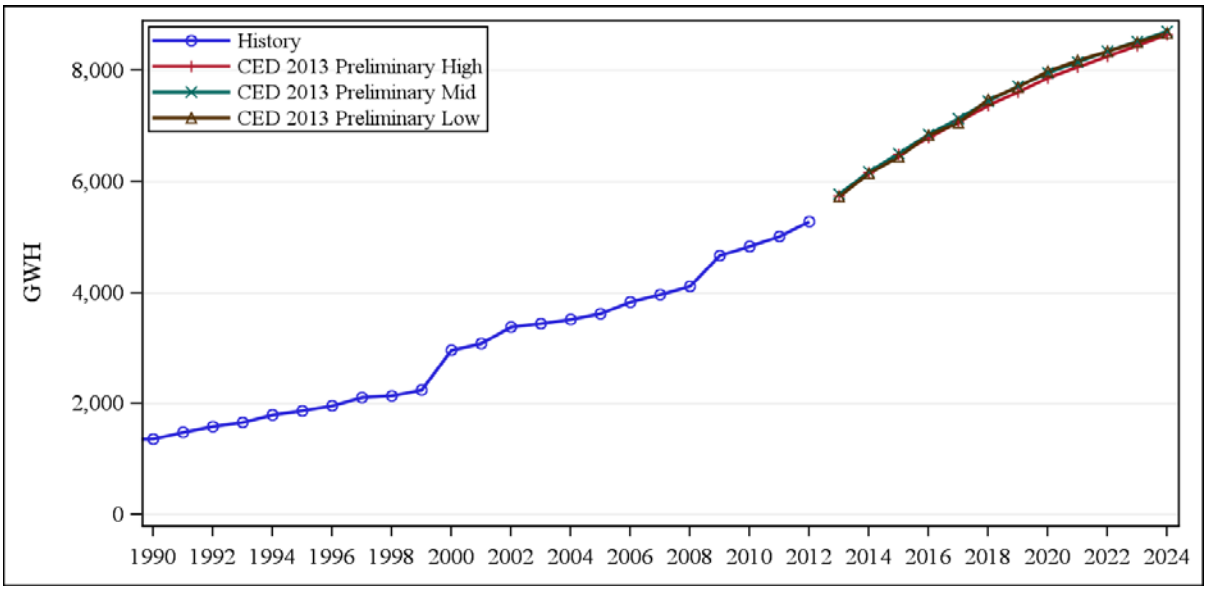
Scenario	Technology	1990	2000	2012	2015	2020	2024
Low Demand	Photovoltaic	0.0	0.0	67.9	165.9	210.5	285.3
	Non-Photovoltaic	77.7	59.9	109.8	110.0	110.2	110.4
	Total	77.7	59.9	177.8	275.8	320.7	395.8
Mid Demand	Photovoltaic	0.0	0.0	67.9	155.2	196.0	270.4
	Non-Photovoltaic	77.7	59.9	109.8	110.0	110.2	110.5
	Total	77.7	59.9	177.8	265.2	306.2	380.9
High Demand	Photovoltaic	0.0	0.0	67.9	143.2	179.5	253.0
	Non-Photovoltaic	77.7	59.9	109.8	110.0	110.2	110.4
	Total	77.7	59.9	177.8	253.2	289.7	363.5

Source: California Energy Commission, Demand Analysis Office, 2013

Conservation/Efficiency Impacts

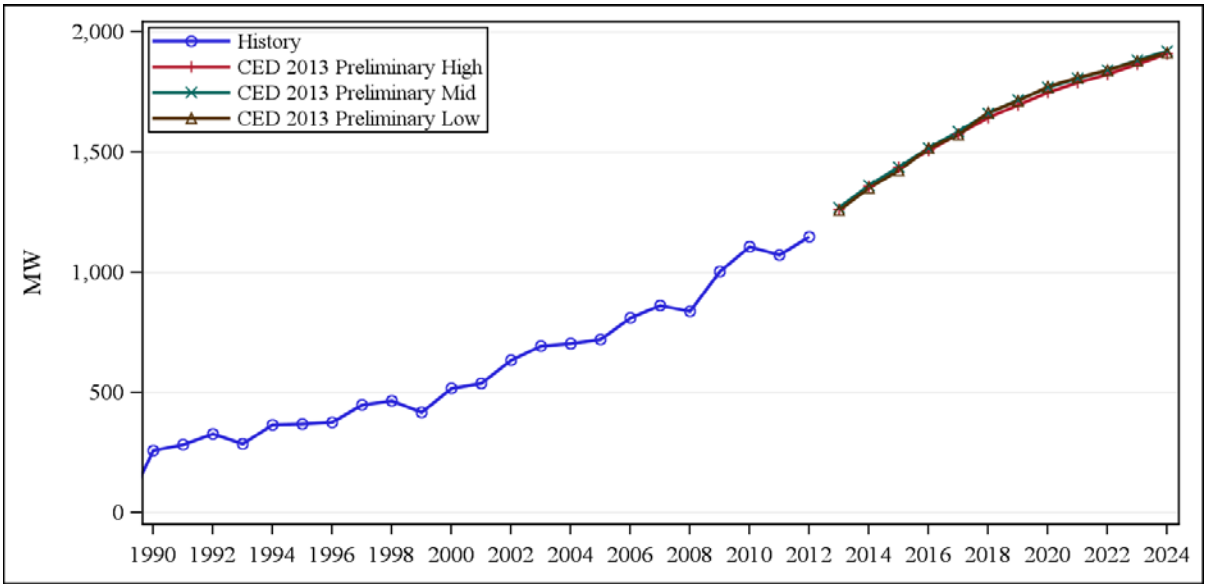
Staff spent a great deal of time refining methods to account for energy efficiency and conservation impacts while preparing recent forecasts. **Figure 3-22** and **Figure 3-23** show committed electricity consumption and peak efficiency savings estimates from all sources, including building and appliance standards; utility programs implemented through 2014; and price and other effects, or savings associated with rate changes and certain market trends not directly related to programs or standards. Projected savings impacts are highest in the low demand scenario, since price and program effects are inversely related to the demand outcome. Within the demand scenarios, higher demand yields more standards savings since new construction and appliance usage increase, while lower demand is associated with more program savings and higher rates (and therefore more price effects). The net result is that savings totals among the scenarios are very similar.

Figure 3-22: SDG&E Planning Area Electricity Consumption Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 3-23: SDG&E Planning Area Electricity Peak Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Table 3-3 presents estimated savings for building and appliance standards in the mid demand case for selected years. Total standards impacts are higher in the high demand case by 1.5-2.0 percent due to higher home and commercial floor space construction and 1.5-2.0 percent lower in the low demand case. The standards savings estimates include the 2010 revision to Title 24 building standards as well as Assembly Bill 1109 (Huffman, Chapter 534, Statutes of 2007) lighting savings and television standard savings, just as they were in *CED 2011*. For *CED 2013*, new standards savings impacts were included for the 2013 Title 24 standards update and impacts from standards affecting battery chargers. Savings are measured against a baseline before 1975, so they incorporate more than 30 years of impacts. Volume 1, Chapter 3 provides more detail on staff work related to energy efficiency and conservation.

Table 3-3: SDG&E Planning Area Standards Savings Estimates

Electricity Consumption Savings (GWH)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	401	197	598	144	94	238	836
2000	443	616	1,059	398	259	657	1,716
2012	350	1,617	1,968	815	475	1,289	3,257
2015	387	2,106	2,493	948	557	1,505	3,997
2020	470	2,699	3,169	1,209	685	1,894	5,063
2024	525	2,967	3,491	1,392	748	2,140	5,631
Electricity Peak Demand Savings (MW)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	65	32	97	32	21	53	151
2000	72	100	171	74	48	122	294
2012	79	365	444	172	100	273	717
2015	90	492	582	200	118	318	900
2020	111	640	751	253	143	397	1,148
2024	123	694	816	291	156	448	1,264

Source: California Energy Commission, Demand Analysis Office, 2013

CHAPTER 4: Sacramento Municipal Utility District Planning Area

The SMUD planning area includes SMUD retail customers but does not include new members of the SMUD control area, Roseville, Redding, and WAPA. To support electricity system analysis, staff derives forecasts by control area and California Independent System Operator congestion zone from the planning area forecasts. Using historical consumption data and regional population projections, the estimated share of the PG&E forecast for WAPA, Roseville, and Redding forecasts are subtracted from the PG&E planning area and added to the SMUD control area. The results in this chapter are for the SMUD planning area only.

This chapter is organized as follows. First, forecasted consumption and peak loads for the SMUD planning area are discussed; both total and per capita values are presented. The *CED 2013 Preliminary* values are compared to the adopted *CED 2011* mid scenario, with differences between the two forecasts explained. The forecasted load factors, jointly determined by the consumption and peak load estimates, are also discussed. Second, the chapter presents sector consumption and peak load forecasts. The residential, commercial, industrial, and "other" sector forecasts are compared to those in *CED 2011,* and differences between the two are discussed. Third, the chapter discusses the forecasts of electric vehicles, self-generation, and the impacts of conservation and efficiency programs.

Sacramento Area Economic and Demographic Outlook

This section provides general information on the economic and demographic outlook for the Sacramento Area using outlooks provided by Moody's, IHS Global Insight, the University of California, Los Angeles (UCLA), the California Department of Finance, and the United States Census Bureau. These outlooks are based on economic data available in January 2013.

Sacramento's economy is in recovery, but is showing signs of slowing down because of lingering weakness in state and local government employment. The unemployment rate has fallen below 10.5 percent, but a declining labor force is a contributor.

Sacramento inventory of homes for sale is decreasing and the median price of existing single-family homes has increased. Construction of single family homes is on the rise.

Sacramento's recovery should expand in 2013. An improved outlook for state revenues should limit spending cuts and furloughs, reducing Sacramento's largest economic drag. Longer term, Sacramento will benefit from above-average population growth as relatively low costs attract new residents and businesses from other parts of the state.

Forecast Results

For this forecast, three demand scenarios were developed. The high demand scenario includes high economic and demographic projections, low energy price projections, and low efficiency impact assumptions. The low demand scenario includes low economic and demographic projections, high energy price projections, and high efficiency impact assumptions. Volume 1 provides more detail on the construction of the demand scenarios.

Table 4-1 presents a comparison of *CED 2013 Preliminary* high, mid, and low demand scenarios with the mid demand scenario from *CED 2011* for electricity consumption and peak demand for selected years. Comprehensive results are available electronically as a set of forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/).

In the SMUD planning area, the *CED 2013 Preliminary* mid demand electricity consumption is 3.9 percent lower than *CED 2011* in 2020, the result of a lower than projected level of consumption in 2012 and a lower growth rate over the forecast period. By 2024, the *CED 2013 Preliminary* high demand level is 5.2 percent higher than the mid case while the low demand scenario is 3.6 percent lower. For peak demand, the *CED 2013 Preliminary* high and low scenarios are 6.0 percent higher and 5.7 percent lower, respectively, than the mid case by 2024.

Weather-normalized peak demand in 2012 was 1.4 percent lower than predicted in *CED 2011*.

Table 4-1: SMUD Planning Area Forecast Comparison

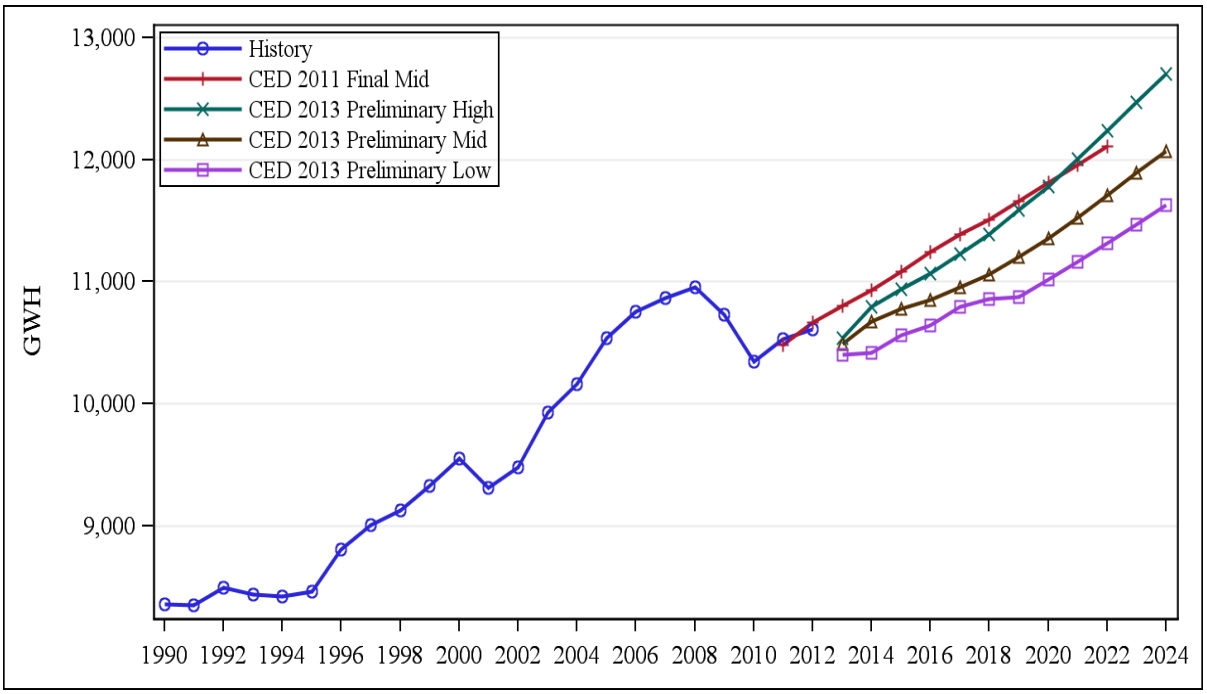
Consumption (GWH)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	8,361	8,358	8,358	8,358
2000	9,502	9,550	9,550	9,550
2012	10,667	10,608	10,608	10,608
2015	11,082	10,938	10,778	10,563
2020	11,812	11,781	11,353	11,017
2024	--	12,704	12,071	11,631
Average Annual Growth Rates				
1990 - 2000	1.29%	1.34%	1.34%	1.34%
2000 - 2012	1.16%	1.06%	1.06%	1.06%
2012 - 2015	1.28%	1.03%	0.53%	-0.14%
2012 - 2020	1.28%	1.32%	0.85%	0.47%
2012 - 2024	--	1.51%	1.08%	0.77%
Peak (MW)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	2,193	2,194	2,194	2,194
2000	2,686	2,687	2,687	2,687
2012	3,096	2,953	2,953	2,953
2012*	3,096	3,052	3,052	3,052
2015	3,255	3,197	3,167	3,057
2020	3,467	3,445	3,320	3,165
2024	--	3,698	3,490	3,291
Average Annual Growth Rates				
1990 - 2000	2.05%	2.05%	2.05%	2.05%
2000 - 2012	1.43%	0.95%	0.95%	0.95%
2012* - 2015	1.68%	1.57%	1.24%	0.06%
2012* - 2020	1.42%	1.53%	1.06%	0.46%
2012* - 2024	--	1.61%	1.12%	0.63%
Historical values are shaded				
*Weather normalized: *CED 2013 Preliminary* uses a weather-normalized peak value derived from the actual 2012 peak for calculating growth rates during the forecast period				

Source: California Energy Commission, Demand Analysis Office, 2013

As shown in **Figure 4-1**, *CED 2013 Preliminary* electricity consumption forecasts are lower at the beginning of the forecast period than projected by *CED 2011*. Consumption dips slightly from 2012 to 2013, due to a combination of slow economic growth and an expected increase in electricity rates. Growth in the mid case is slightly less than CED 2011, due to rate increases and the addition of building and appliance standards. In 2022, only the high consumption scenario surpasses the level projected by *CED 2011*.

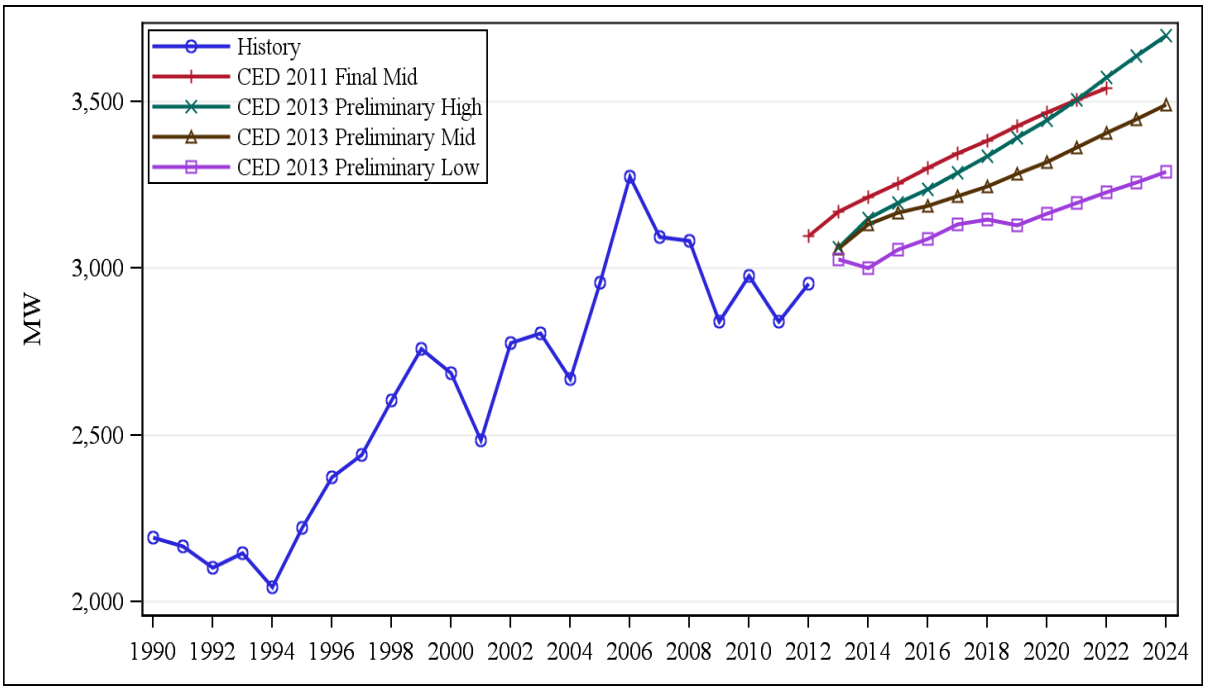
The SMUD planning area extreme temperatures were below average in 2012, so actual peak load was slightly lower than weather normalized peak. The relationship between peak demand scenarios, shown in **Figure 4-2**, follows a similar pattern as the consumption forecast. As with consumption, the peak demand forecast begins at a lower value than projected in *CED 2011* and all three scenarios remain below *CED 2011* values for most of the forecast period.

Figure 4-1: SMUD Planning Area Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

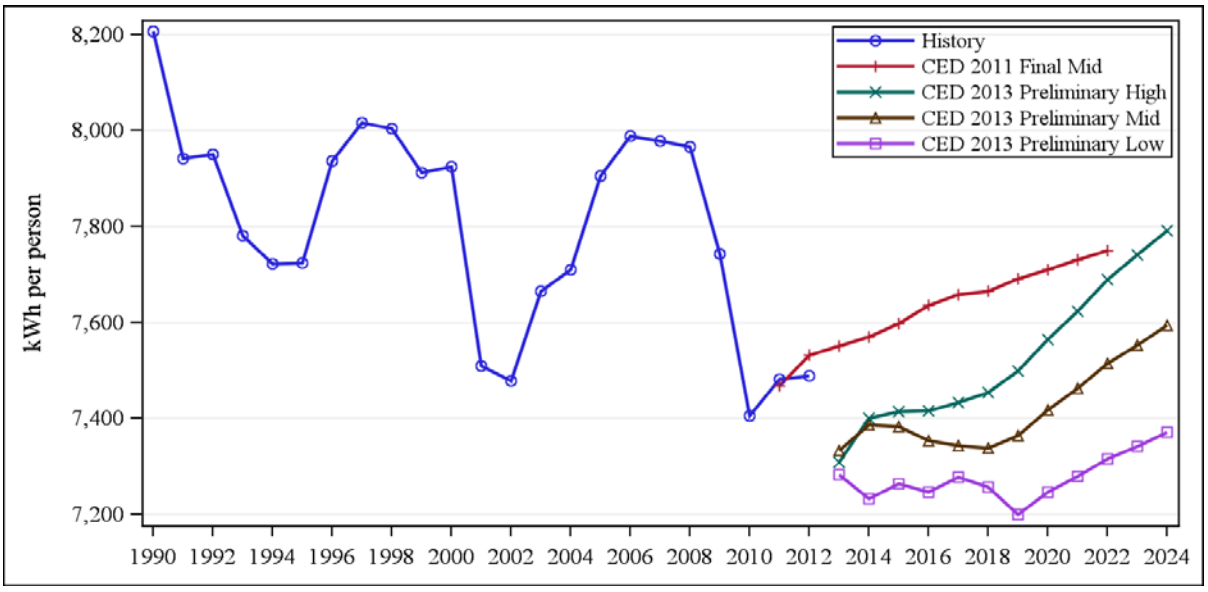
Figure 4-2: SMUD Planning Area Peak



Source: California Energy Commission, Demand Analysis Office, 2013

As **Figure 4-3** shows, per capita electricity consumption is lower in the *CED 2013 Preliminary* demand scenarios throughout the forecast period compared to *CED 2011*. The drop in 2013 shows the combined effect of decreased consumption and increased population. Unlike *CED 2011*, which considered only a single population scenario, *CED 2013 Preliminary* incorporates high, mid, and low population projections. While the high and mid consumption forecasts are nearly identical in 2013, there is some spread between population estimates for that year. As a result, the high per capita consumption scenario shown below actually begins from a lower point than the mid scenario.

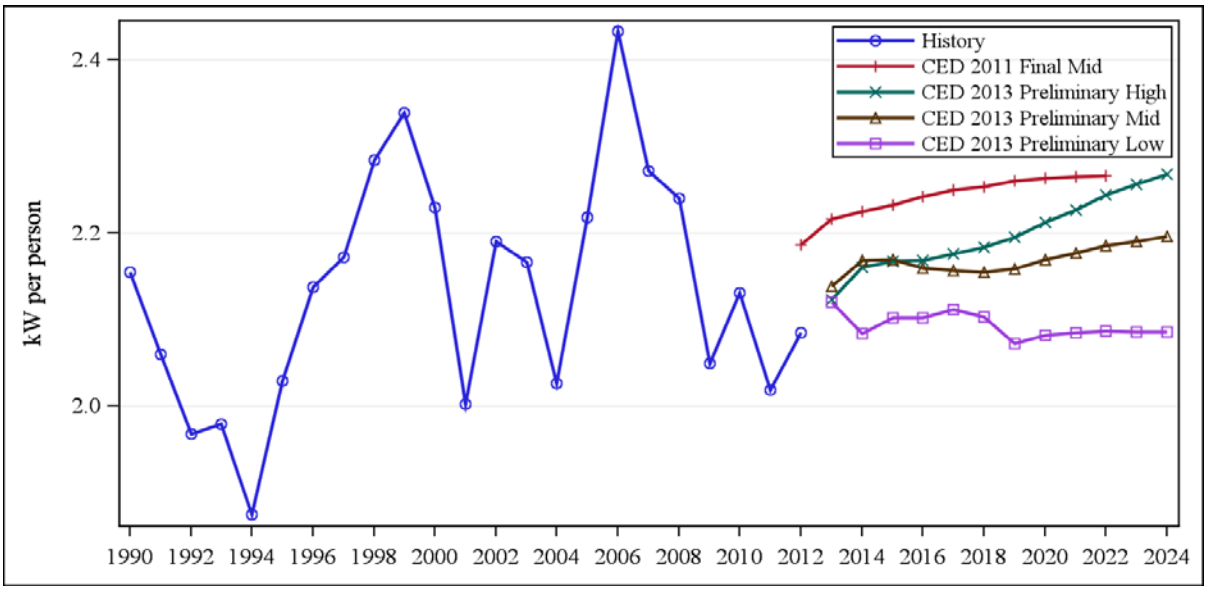
Figure 4-3: SMUD Planning Area Per Capita Electricity Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-4 shows per capita peak demand. *CED 2013 Preliminary* per capita peak scenarios follow the same pattern as the per capita consumption scenarios. The per capita peak values are projected to remain in the range of recent historical levels for all three scenarios.

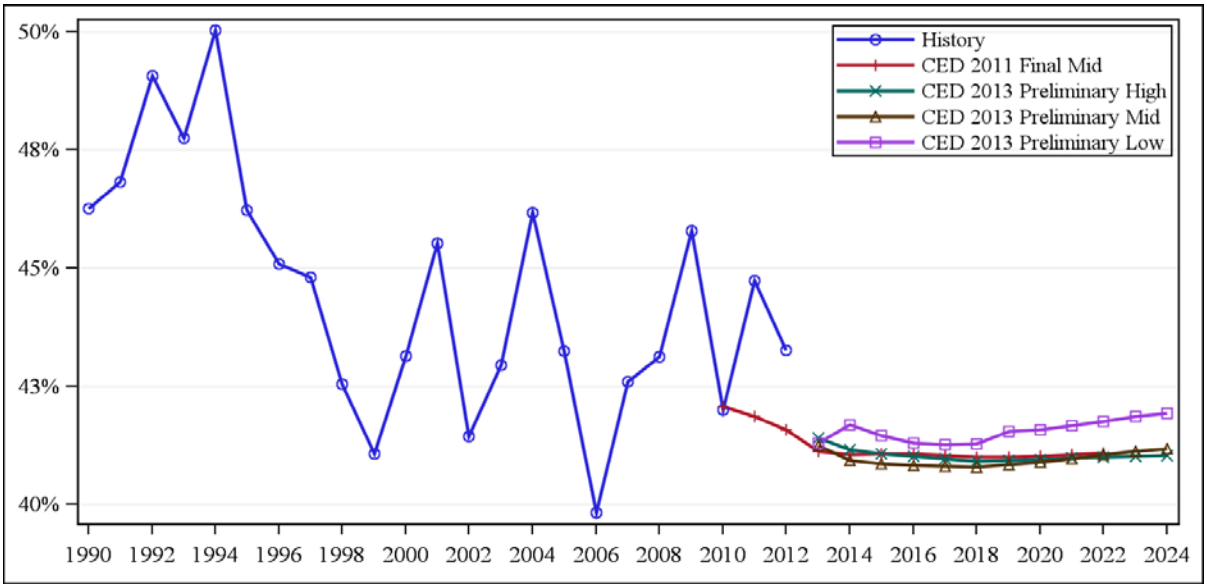
Figure 4-4: SMUD Planning Area per Capita Peak Demand



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-5 compares forecasted load factors. The load factor is a measure of the increase in peak demand relative to annual electricity consumption. Lower load factors indicate "a needle peak"; higher load factors indicate a more stable load. SMUD's warm inland territory has a high saturation of air conditioners, leading to lower load factors than the other planning areas described in this volume. *CED 2013 Preliminary* projects load factors are relatively constant over the forecast period and similar to *CED 2011*.

Figure 4-5: SMUD Planning Area Load Factors



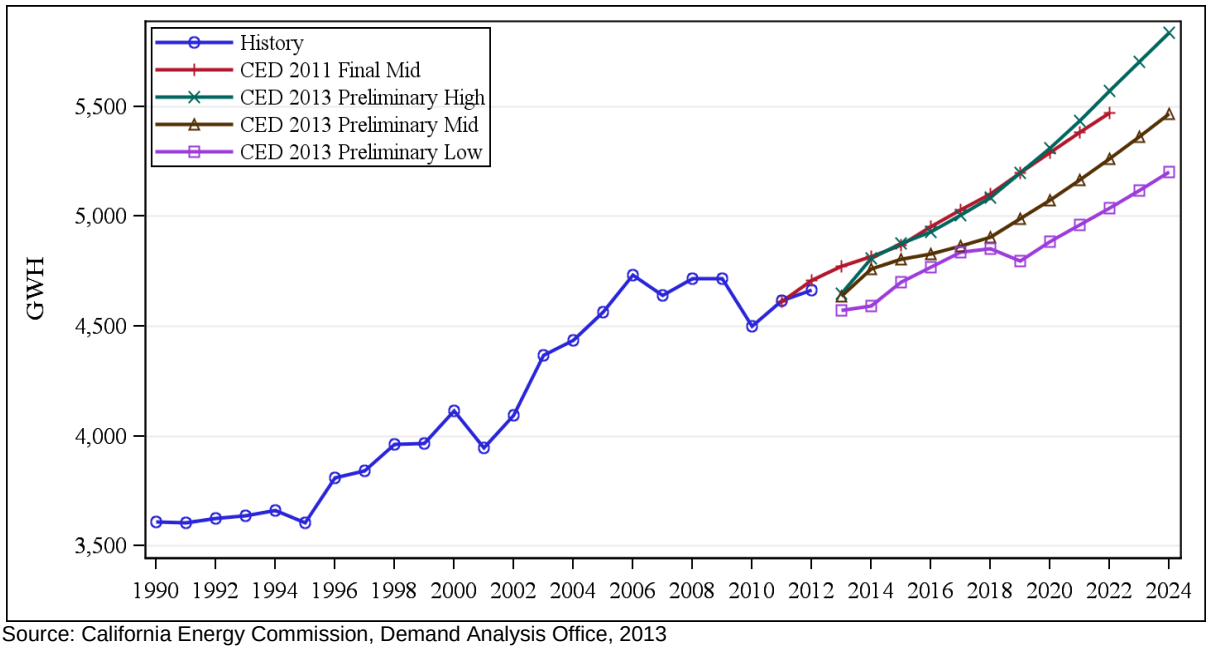
Source: California Energy Commission, Demand Analysis Office, 2013

Sector Level Results and Input Assumptions

Residential Sector

Figure 4-6 compares *CED 2013 Preliminary* and *CED 2011* SMUD residential forecasts. The growth rate for residential consumption over the entire forecast period is generally lower in all three scenarios compared to *CED 2011* mainly because of income and population driven lower near-term consumption. Only the high demand scenario exceeds *CED 2011* after 2020. The *CED 2013 Preliminary* mid and low scenario growth rates roughly match *CED 2011* after 2019 and are driven, in part, by the adoption of electric vehicles. The *CED 2013 Preliminary* low demand scenario has a decline in 2019 due to the differences in the economic and demographic input assumptions.

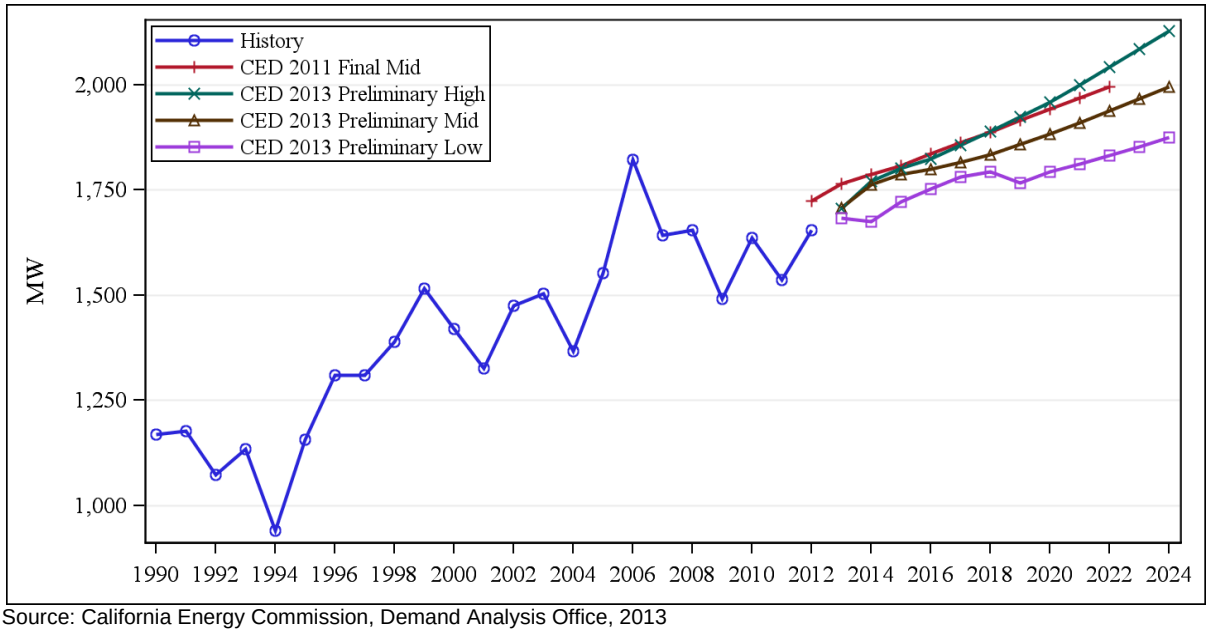
Figure 4-6: SMUD Planning Area Residential Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-7 compares the *CED 2013 Preliminary* and *CED 2011* residential peak demand forecasts. As with consumption, lower near-term peaks result in the low and mid *CED 2013 Preliminary* scenarios remaining lower than *CED 2011*. The high *CED 2013 Preliminary* scenario exceeds *CED 2011* in the long-term.

Figure 4-7: SMUD Planning Area Residential Peak

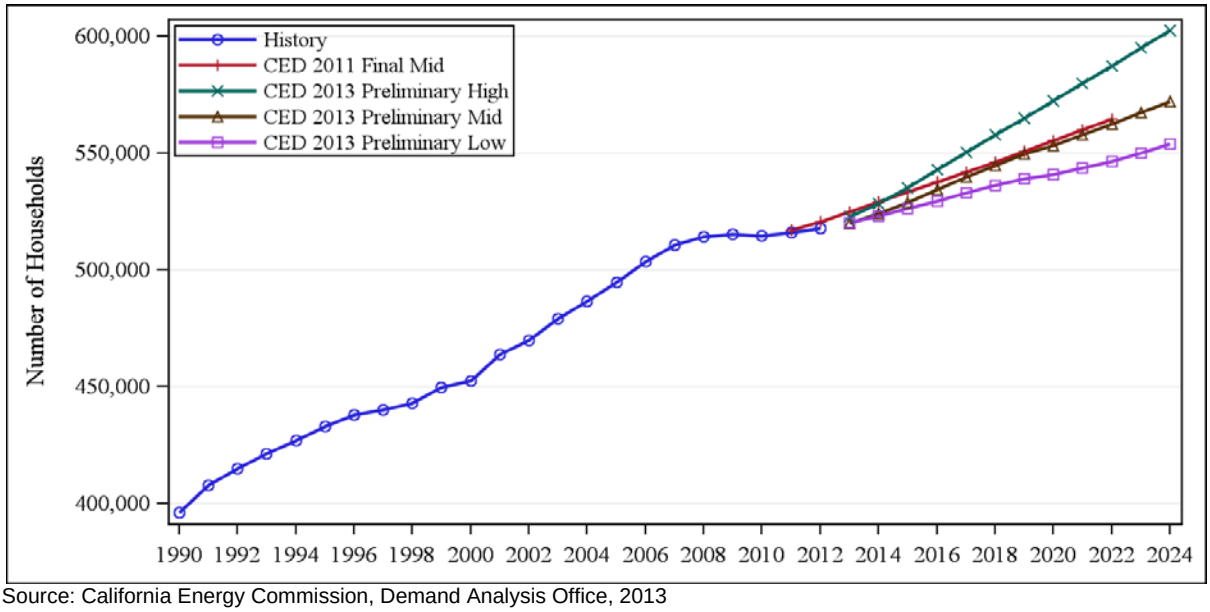


Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-8 and **Figure 4-9** compare the residential economic/demographic drivers used in the *CED 2013 Preliminary* forecast with drivers used in *CED 2011*. **Figure 4-8** compares total households, and **Figure 4-9** compares persons per household projections. The mid *CED 2013 Preliminary* forecast of households is slightly lower than *CED 2011* but roughly matches through 2022. The low and high *CED 2013 Preliminary* scenarios bound the both mid scenarios and are slightly wider than the *CED 2011* projections.

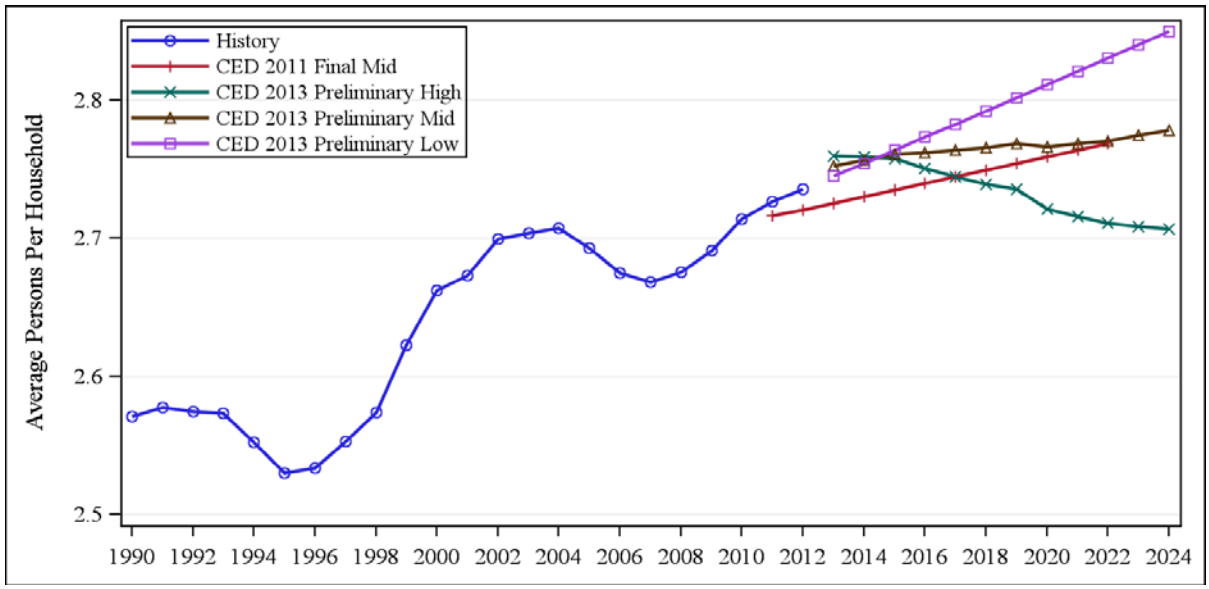
The low and mid *CED 2013 Preliminary* scenario persons per household growth rates are lower than the *CED 2011* scenario. However, both the high and mid *CED 2013 Preliminary* scenarios remain higher than the *CED 2011* persons per household throughout the forecast. In the *CED 2013 Preliminary* low scenario, persons per household declines below the *CED 2011* persons per household in 2017.

Figure 4-8: SMUD Planning Area Residential Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

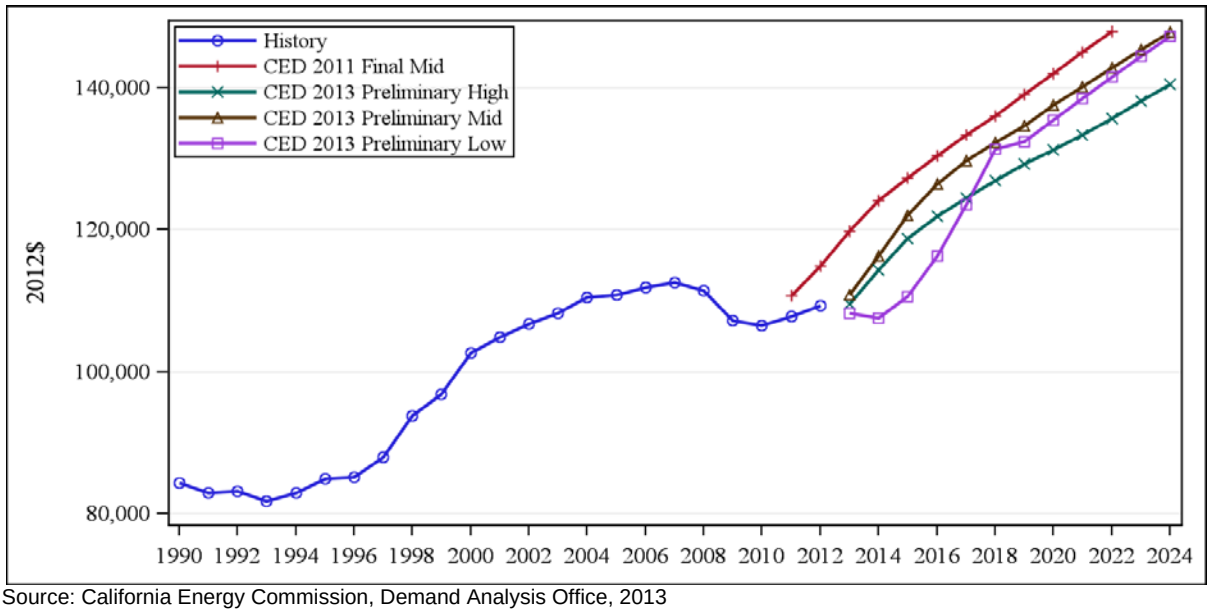
Figure 4-9: SMUD Planning Area Persons per Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-10 compares average household income in the two forecasts. Lower near-term average household incomes and growth rates that never consistently exceed *CED 2011* growth rates result in average household incomes lower than incomes in *CED 2011*. The significantly lower household growth rates in the *CED 2013 Preliminary* low demand scenario results in average household incomes exceeding the mid demand scenario by 2017.

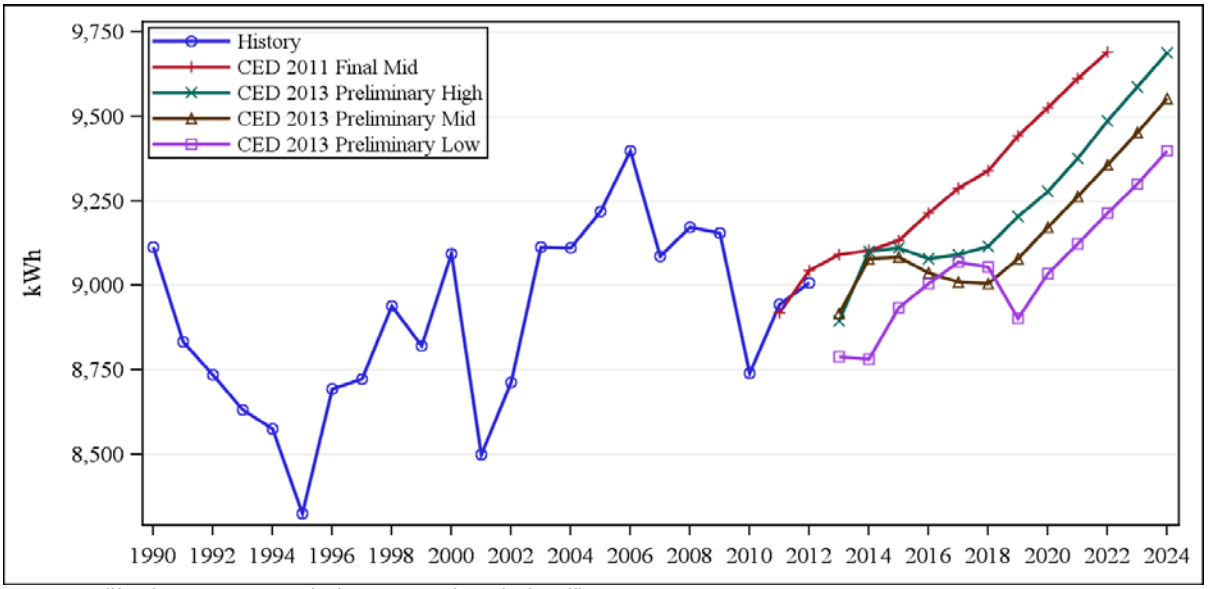
Figure 4-10: SMUD Planning Area Average Household Income Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-11 compares electricity consumption per household in the two forecasts and shows the 1990–2010 historical series. Consumption per household stays near the middle of the historical series for the first five forecast years but significantly surpasses historical highs by the end of the forecast period. As in the case of per capita electricity consumption, higher growth in consumption per household results from faster income growth and increased numbers of electric vehicles. The use per household for all three scenarios has decreased relative to *CED 2011* due to lower near-term consumption in the low and mid scenarios and rapid household growth in the high demand scenario.

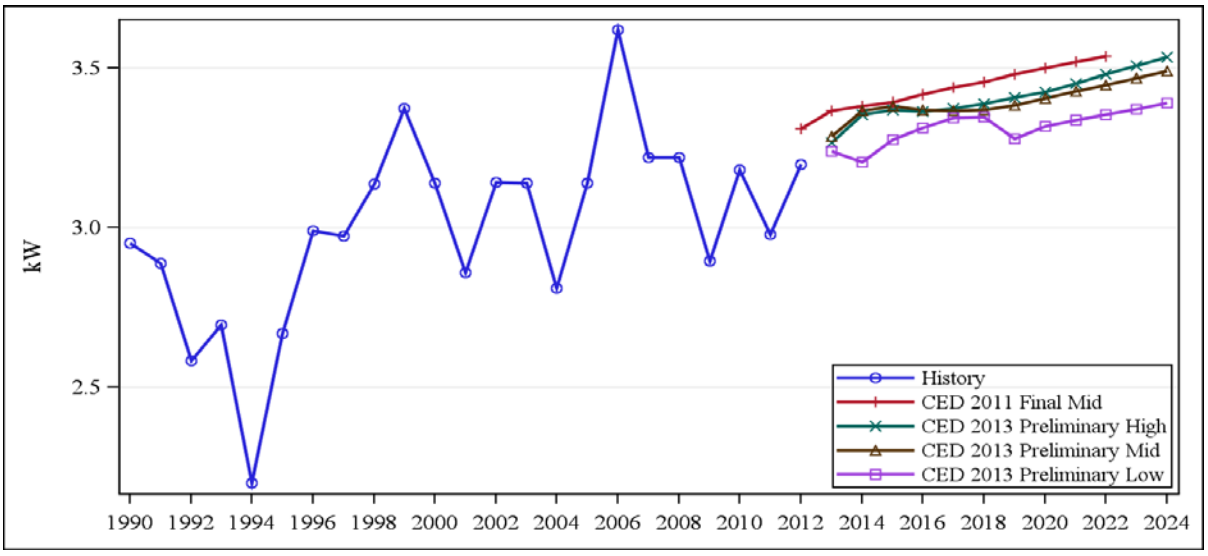
Figure 4-11: SMUD Planning Area Electricity Use per Household



Source: California Energy Commission, Demand Analysis Office, 2013

The increases in peak use per household for all three new scenarios shown in **Figure 4-12** are less than those predicted for energy use per household, since charging electric vehicles has little effect on peak compared to consumption. Dampened near-term demand due to lower consumption and higher housing results in a relatively flat near-term peak household demand. By 2020 *CED 2013 Preliminary* per household peak use growth rates are consistent with the *CED 2011* scenario.

Figure 4-12: SMUD Planning Area Peak Use per Household

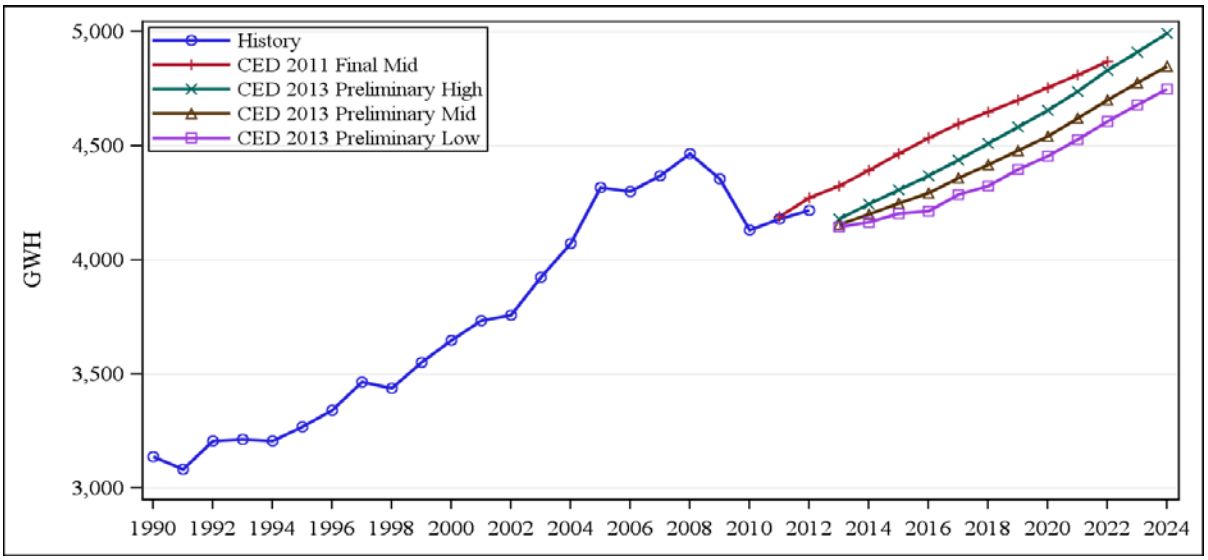


Source: California Energy Commission, Demand Analysis Office, 2013

Commercial Sector

Figure 4-13 compares the SMUD commercial sector electricity consumption forecasts. The *CED 2013 Preliminary* consumption scenarios are lower than *CED 2011* throughout the forecast period. The differences are primarily caused by a lower starting point due to lower estimates of recent historical commercial consumption. The growth rate of commercial consumption later in the forecast period is slightly higher in all three scenarios than in *CED 2011* because of faster growth in projected floor space.

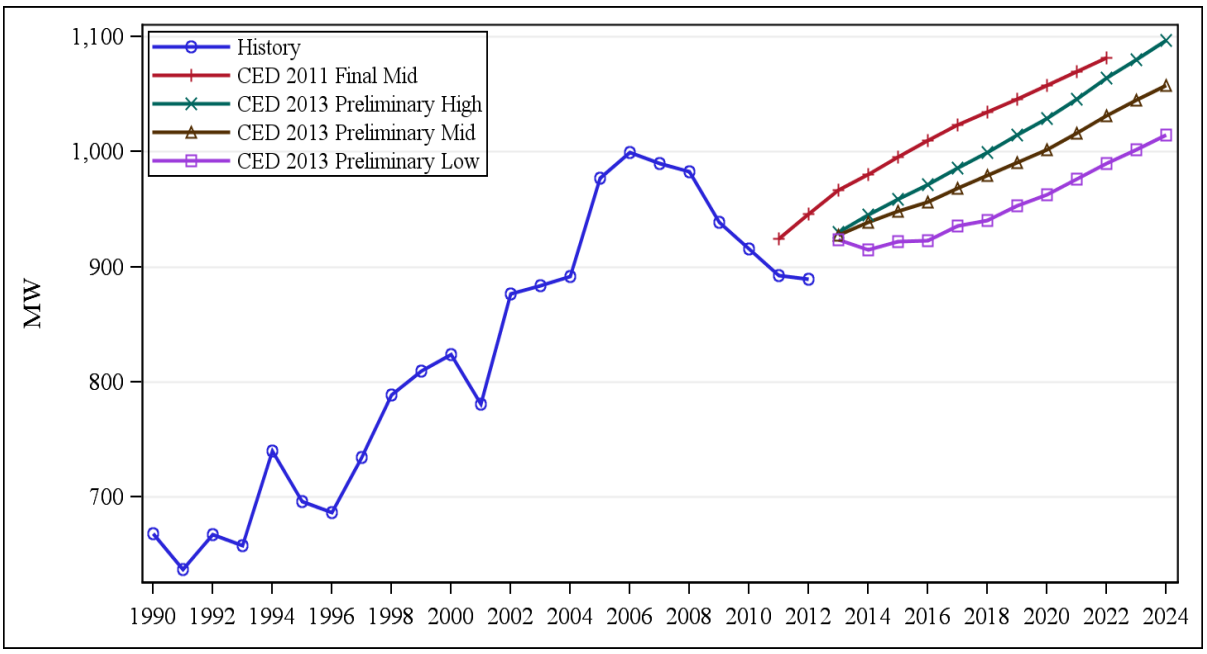
Figure 4-13: SMUD Planning Area Commercial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-14 compares the SMUD commercial sector peak demand forecasts. Growth in both forecasts is driven by the underlying electricity consumption forecast, which exhibits a similar pattern. The *CED 2013 Preliminary* high demand scenario produces a higher peak forecast due to faster growth in projected floor space.

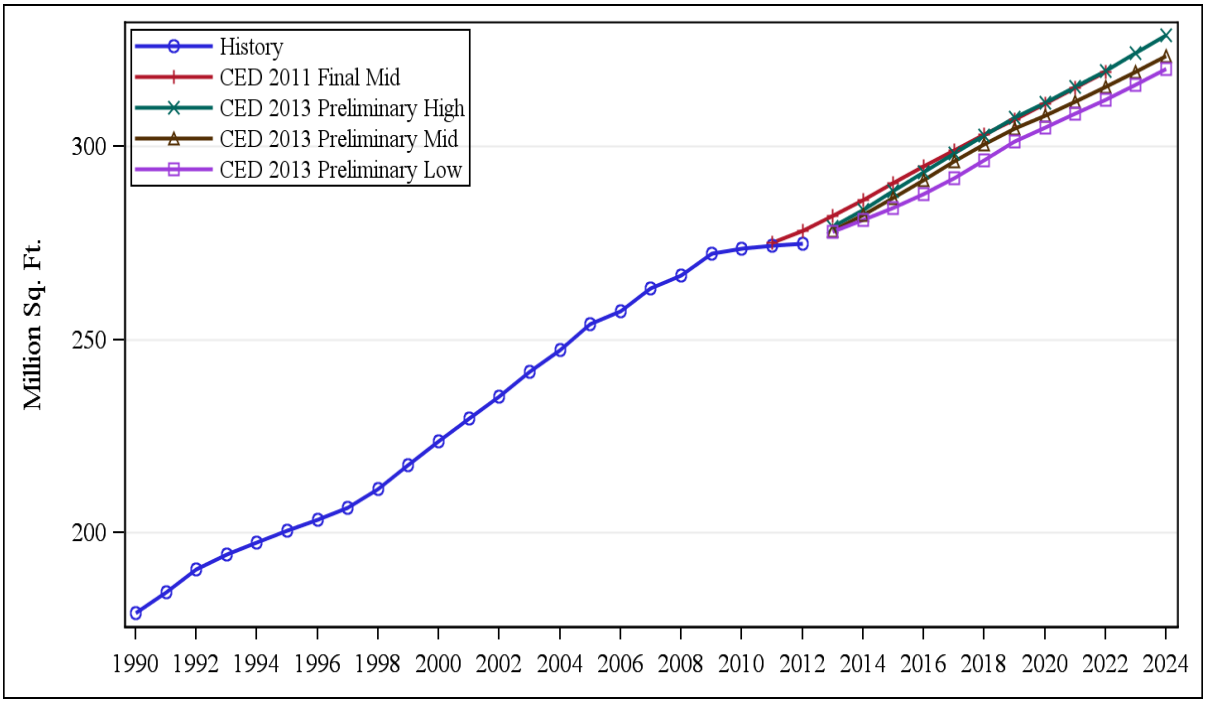
Figure 4-14: SMUD Planning Area Commercial Sector Peak



Source: California Energy Commission, Demand Analysis Office, 2013

In staff's commercial building sector forecasting model, floor space by building type (such as retail, offices, and schools) is the key driver. **Figure 4-15** compares SMUD commercial floor space projections. *CED 2013* floor space projections are somewhat lower over the forecast period than those used in the previous forecast due to a lower starting point. However, the growth rate in the high case *CED 2013Preliminary* scenario is slightly higher than in *CED 2011*.

Figure 4-15: SMUD Planning Area Commercial Floor Space

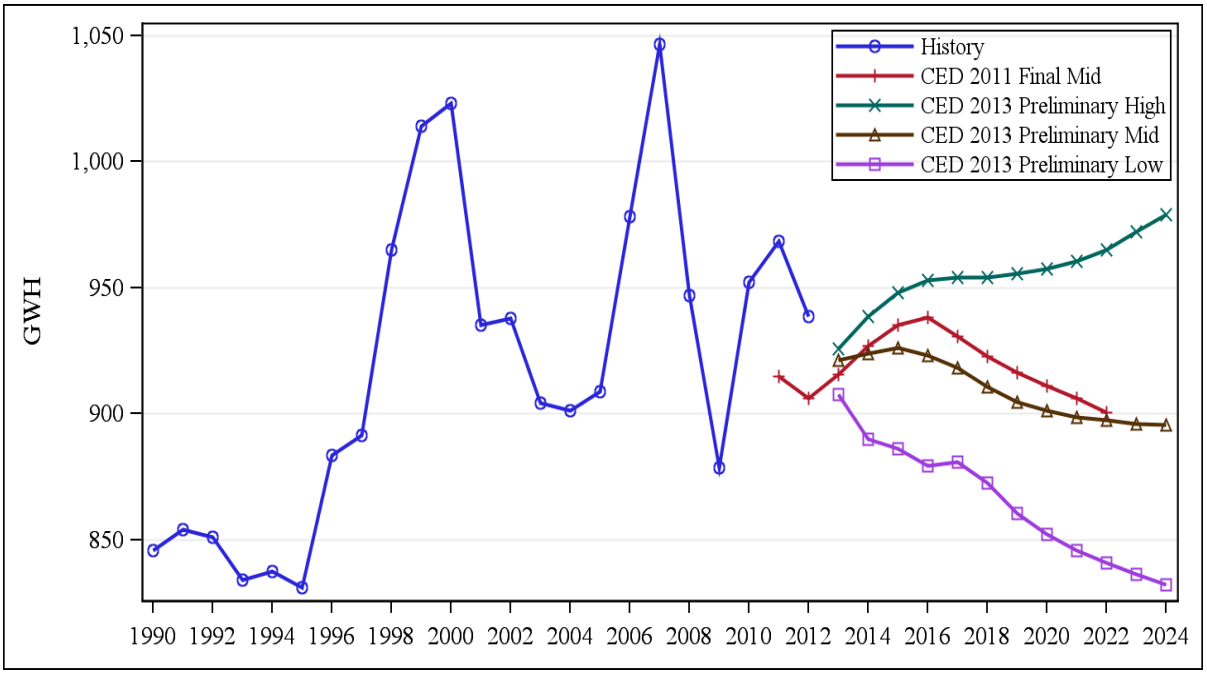


Source: California Energy Commission, Demand Analysis Office, 2013

Industrial Sector

Figure 4-16 compares the SMUD planning area industrial sector electricity consumption forecasts. For *CED 2013 Preliminary,* the mid and low case industrial consumption forecasts are lower than the *CED 2011* forecast. However, projected growth in the high case is higher than was projected in the *CED 2011* forecast due to more optimistic economic projections. The mid case scenario follows a similar growth pattern as the *CED 2011* forecast but starts from a slightly higher historical starting point. The differences in consumption scenarios are mainly driven by differences in economic output.

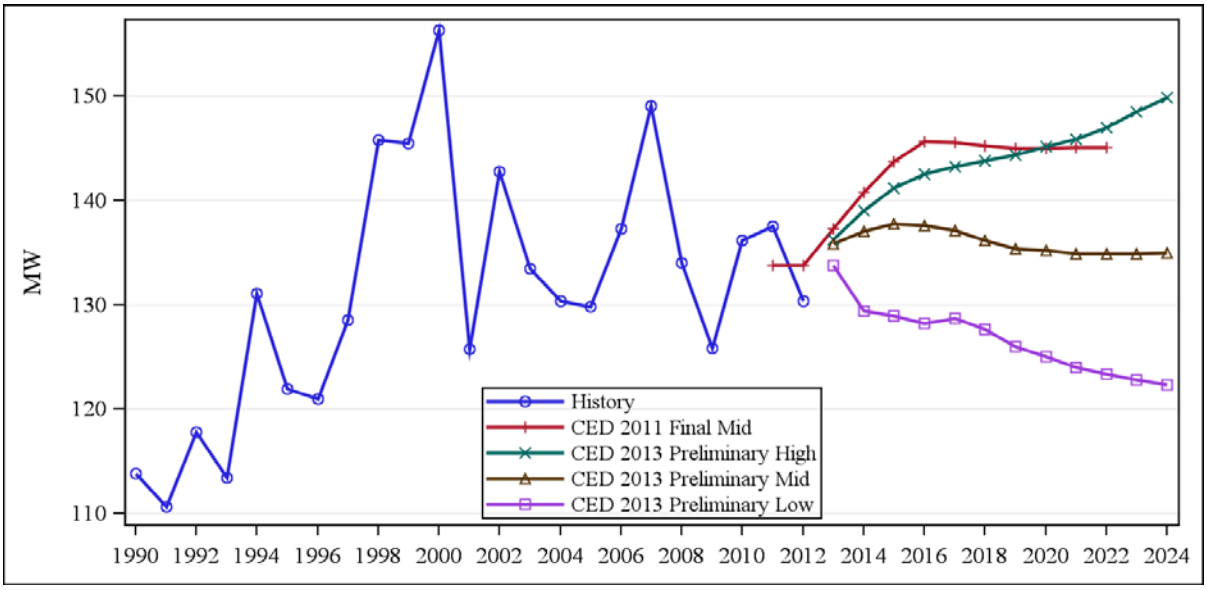
Figure 4-16: SMUD Planning Area Industrial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-17 compares the SMUD industrial sector peak forecasts. The *CED 2013* industrial peak forecasts follow the same pattern as the consumption forecasts. The *CED 2013* mid and low case scenarios are lower than *CED 2011* throughout the forecast period. For *CED 2013 Preliminary* high case, the growth rate later in the forecast period is higher than in *CED 2011* because of faster growth in projected floor space.

Figure 4-17: SMUD Planning Area Industrial Sector Peak

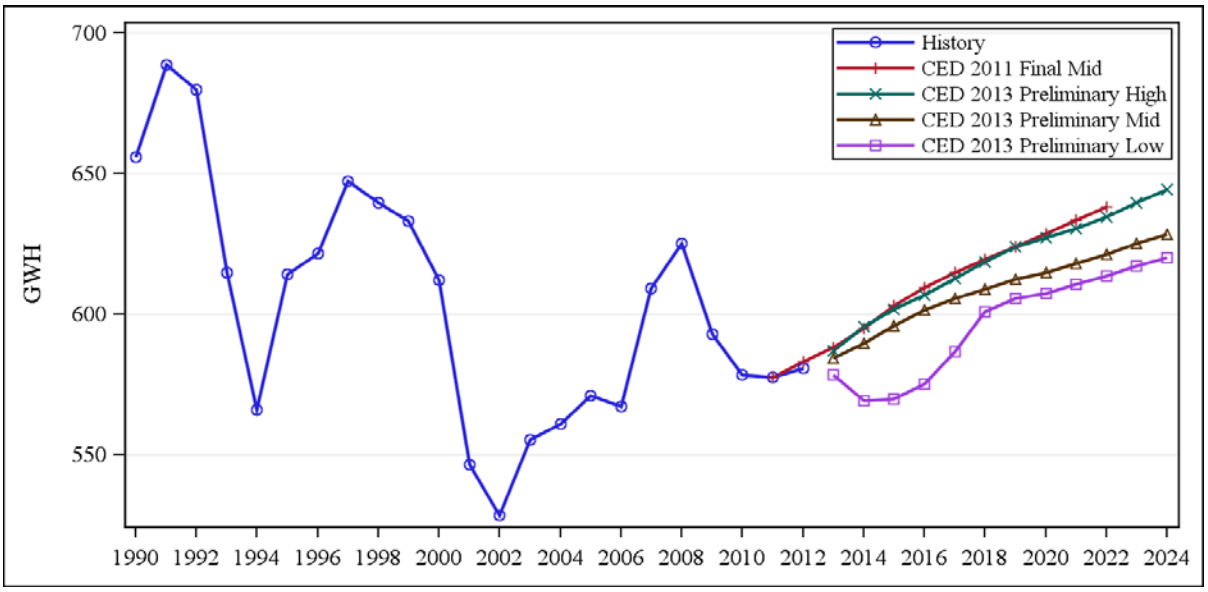


Source: California Energy Commission, Demand Analysis Office, 2013

Other Sectors

Figure 4-18 compares the electricity consumption forecasts for the TCU sector, which includes street lighting. *CED 2013 Preliminary* high case is nearly identical to *CED 2011.* The mid case in the new forecast grows at a slower rate than *CED 2011* and is approximately 15 GWh lower by the end of the forecast. In the recession scenario modeled in the low case, electricity consumption bottoms out in 2015 and is subsequently followed by a strong recovery though 2018, where growth resumes at a rate similar to that of the mid case.

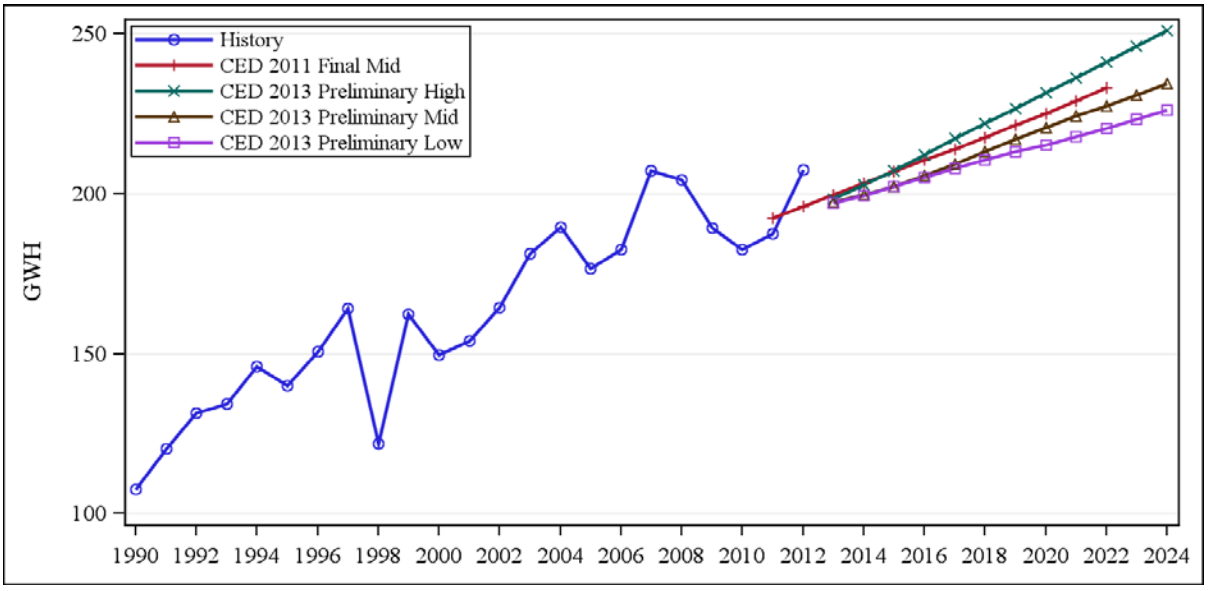
Figure 4-18: SMUD Planning Area Transportation, Communication, Utilities, and Street Lighting Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-19 compares the electricity consumption forecasts for the agriculture and water pumping sectors. The *CED 2013 Preliminary* mid case starts just below what was predicted by *CED 2011* and has a similar rate of growth over the forecast period. All three demand scenarios are projected to grow over time, primarily because of a projected increase in ground-water pumping.

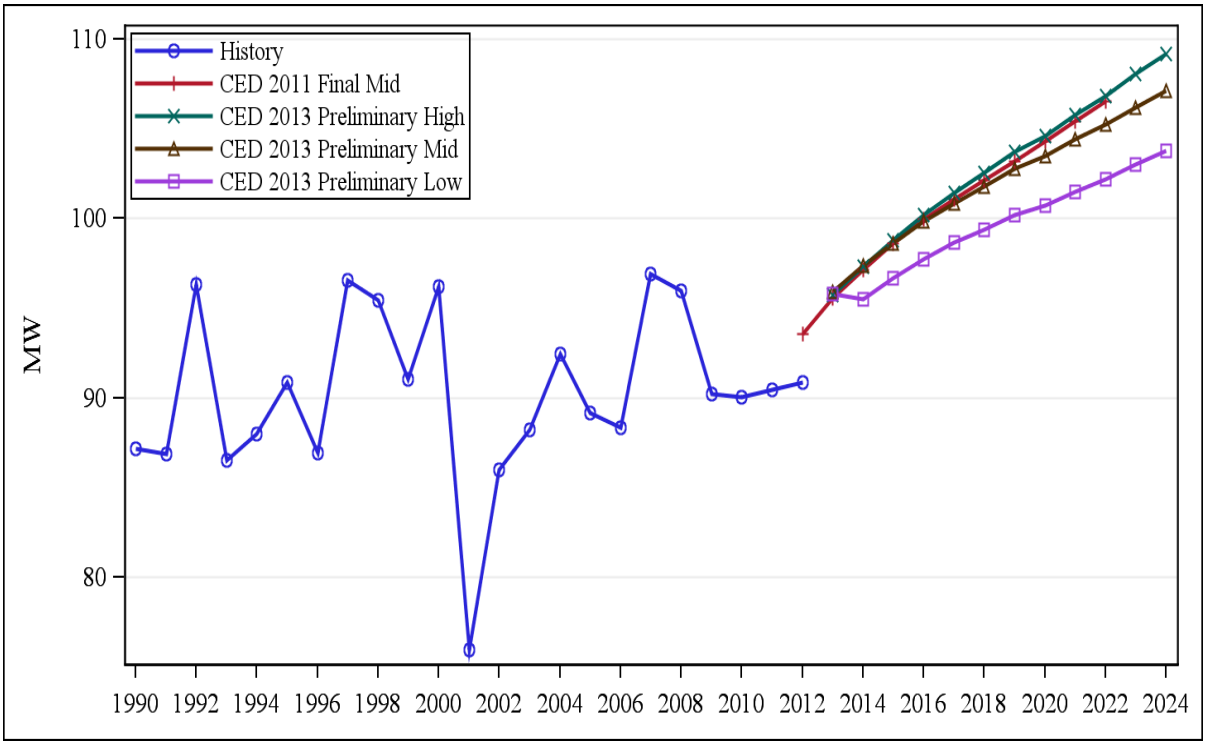
Figure 4-19: SMUD Planning Area Agriculture and Water Pumping Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-20 compares projected combined peak for the transportation, communication, utilities, street lighting, agriculture, and water pumping sectors. The *CED 2013 Preliminary* mid and high cases are similar to *CED 2011*. The difference in the low case reaches 4 MW by the end of the forecast period.

Figure 4-20: SMUD Planning Area Other Sector Peak

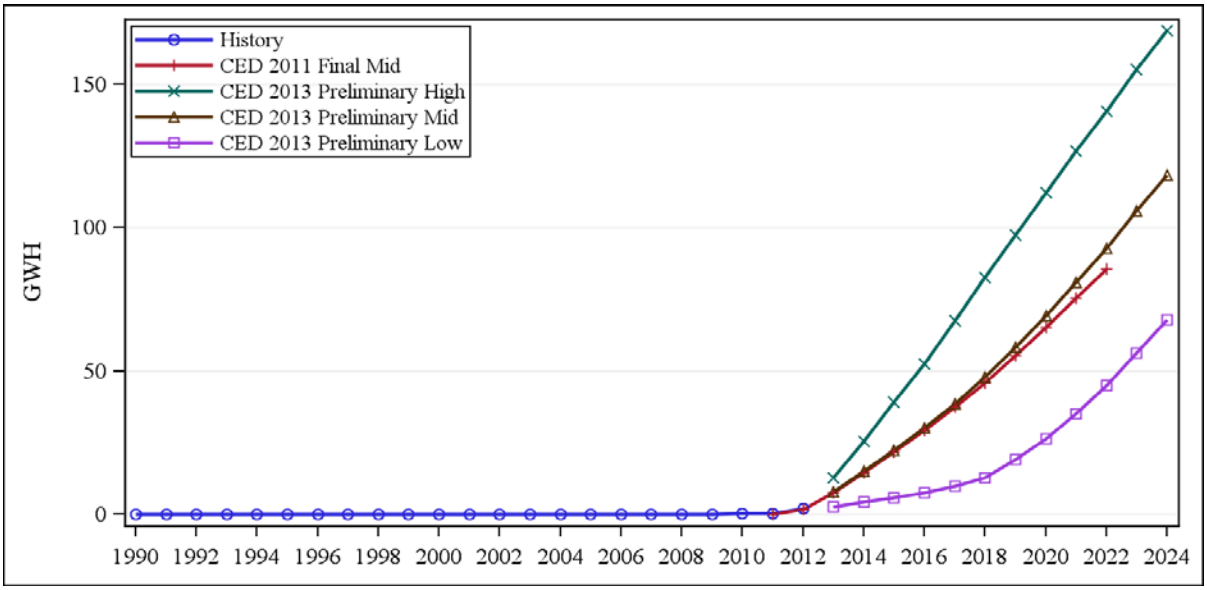


Source: California Energy Commission, Demand Analysis Office, 2013

Electric Vehicles

Consumption by electric vehicles in the SMUD planning area is expected to increase to more than 48 GWh by 2018. By the end of the forecast period, consumption by electric vehicles is projected to reach more than 68 GWh in the low demand scenario and nearly 169 GWh in the high demand scenario. Staff assumes most recharging would occur during off-peak hours, so peak impacts are projected to be relatively small—just 3 MW in the low case and 7 MW in the high case by 2024. **Figure 4-21** presents the SMUD planning area electric vehicle consumption forecast for each of the demand scenarios.

Figure 4-21: SMUD Electricity Consumption by Electric Vehicles



Source: California Energy Commission, Demand Analysis Office, 2013

Self-Generation

The peak demand forecast is reduced by the projected impacts of distributed PV, solar thermal, and combined heat and power systems, including the effects of the SGIP, CSI, and other programs, as discussed in Volume 1. The effects of these programs are forecast based on a combination installation trend analysis and predictive modeling. **Table 4-2** shows the forecast of peak impacts from PV and non-PV self-generation. Staff projects between 49 and 60 MW of peak reduction from PV systems by 2024. Peak reductions are based on installed PV system capacities ranging from 134 MW by 2024 in the high demand case to 162 MW by 2024 in the low demand case.

Table 4-2: SMUD Planning Area Self-Generation Peak Impacts (MW)

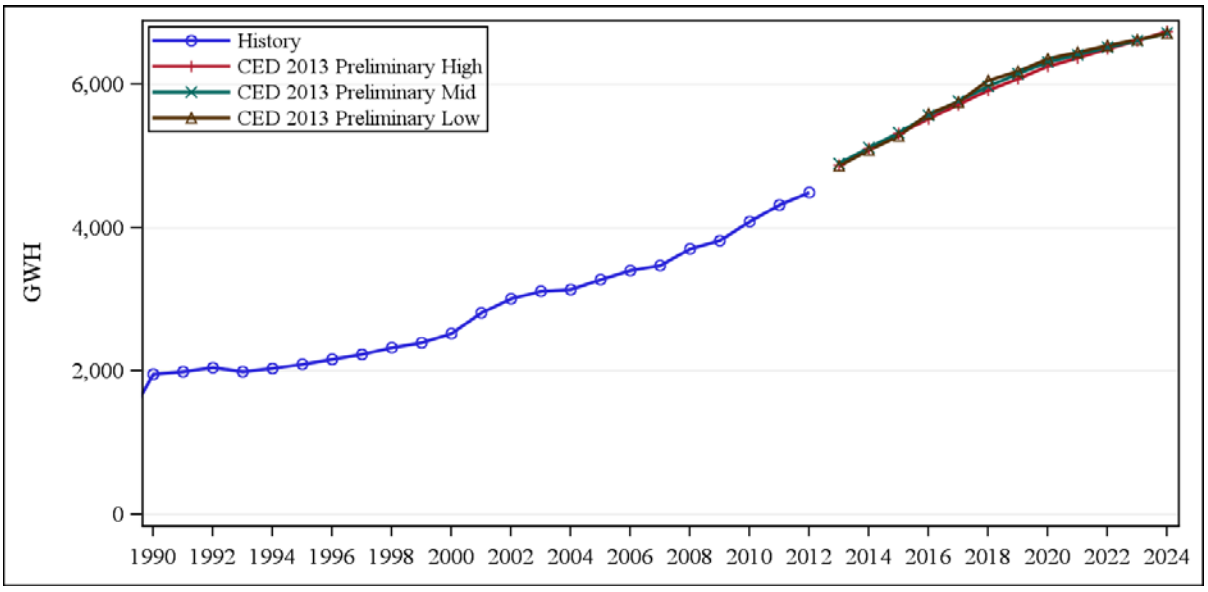
Scenario	Technology	1990	2000	2012	2015	2020	2024
Low Demand	Photovoltaic	0.0	1.1	22.7	30.1	41.8	59.6
	Non-Photovoltaic	0.0	0.0	0.1	0.1	0.3	0.4
	Total	0.0	1.1	22.8	30.3	42.1	59.9
Mid Demand	Photovoltaic	0.0	1.1	22.7	29.7	39.8	54.1
	Non-Photovoltaic	0.0	0.0	0.1	0.1	0.3	0.4
	Total	0.0	1.1	22.8	29.8	40.1	54.4
High Demand	Photovoltaic	0.0	1.1	22.7	29.3	38.6	48.8
	Non-Photovoltaic	0.0	0.0	0.1	0.1	0.3	0.4
	Total	0.0	1.1	22.8	29.5	38.8	49.2

Source: California Energy Commission, Demand Analysis Office, 2013

Conservation/Efficiency Impacts

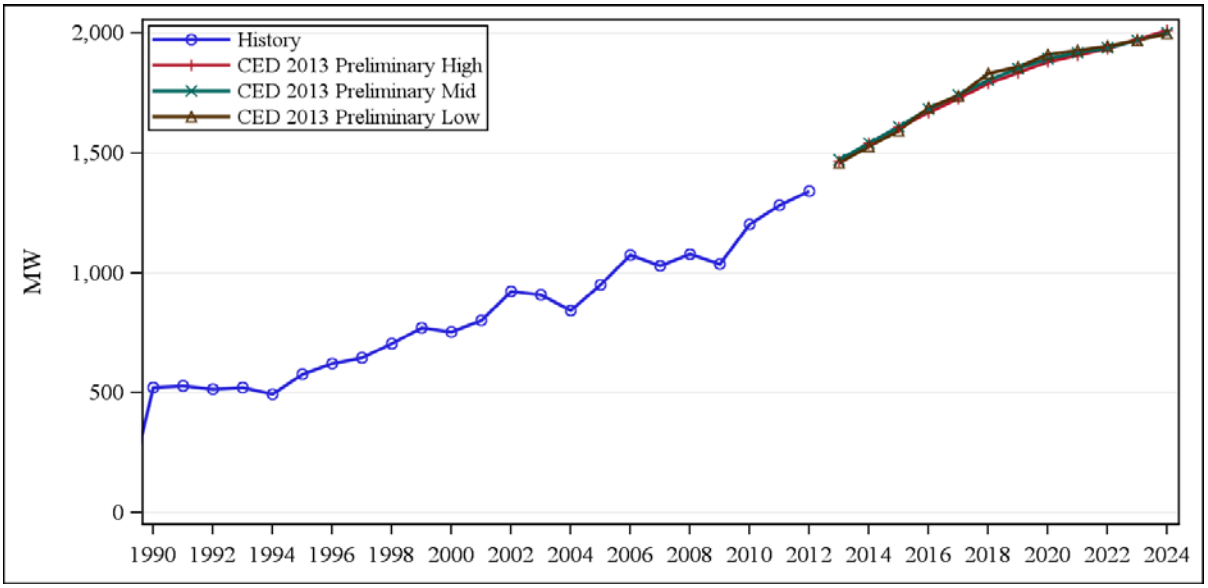
Staff spent a great deal of time refining methods to account for energy efficiency and conservation impacts while preparing recent forecasts. **Figure 4-22** and **Figure 4-23** show committed electricity consumption and peak efficiency savings estimates from all sources, including building and appliance standards; utility programs implemented through 2014; and price and other effects, or savings associated with rate changes and certain market trends not directly related to programs or standards. Projected savings impacts are highest in the low demand scenario, since price and program effects are inversely related to the demand outcome. Within the demand scenarios, higher demand yields more standards savings since new construction and appliance usage increase, while lower demand is associated with more program savings and higher rates (and therefore more price effects). The net result is that savings totals among the scenarios are very similar.

Figure 4-22: SMUD Planning Area Electricity Consumption Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 4-23: SMUD Planning Area Electricity Peak Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Table 4-3 presents estimated savings for building and appliance standards in the mid demand case for selected years. Total standards impacts are higher in the high demand case by 1.5-2.0 percent due to higher home and commercial floor space construction and 1.5-2.0 percent lower in the low demand case. The standards savings estimates include the 2010 revision to Title 24 building standards as well as Assembly Bill 1109 (Huffman, Chapter 534, Statutes of 2007) lighting savings and television standard savings, just as they were in *CED 2011*. For *CED 2013 Preliminary*, new savings impacts were included for the 2013 Title 24 standards update and impacts from standards affecting battery chargers. Savings are measured against a baseline before 1975, so they incorporate more than 30 years of impacts. Volume 1, Chapter 3 provides more detail on staff work related to energy efficiency and conservation.

Table 4-3: SMUD Planning Area Standards Savings Estimates

Electricity Consumption Savings (GWH)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	488	148	636	72	40	112	748
2000	774	399	1,173	184	106	290	1,463
2012	1,018	853	1,870	368	190	558	2,428
2015	1,076	1,091	2,167	421	223	644	2,811
2020	1,189	1,356	2,545	565	279	844	3,389
2024	1,267	1,447	2,714	669	308	977	3,691
Electricity Peak Demand Savings (MW)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	157	48	205	15	9	24	229
2000	266	138	404	42	24	66	470
2012	372	312	684	82	42	124	808
2015	399	405	804	94	50	144	947
2020	435	496	932	126	62	188	1,119
2024	457	522	978	149	69	217	1,195

Source: California Energy Commission, Demand Analysis Office, 2013

CHAPTER 5: Los Angeles Department of Water and Power

The Los Angeles Department of Water and Power (LADWP) planning area includes LADWP bundled retail customers and customers served by energy service providers using the LADWP distribution system to deliver electricity to end users.

This chapter is organized as follows. First, forecasted consumption and peak loads for the LADWP planning area are discussed; both total and per capita values are presented. The *CED 2013 Preliminary* values are compared to the adopted *CED 2011* mid scenario, with differences between the two forecasts explained. The forecasted load factors, jointly determined by the consumption and peak load estimates, are also discussed. Second, the chapter presents sector consumption and peak load forecasts. The residential, commercial, industrial, and "other" sector forecasts are compared to those in *CED 2011*, and differences between the two are discussed. Third, the chapter discusses the forecasts of electric vehicles, self-generation, and the impacts of conservation and efficiency programs. Finally, forecasts of electricity consumption and peak demand are presented for each climate zone within the LADWP planning area.

Los Angeles Area Economic and Demographic Outlook

This section provides general information on the economic and demographic outlook for the Los Angeles Area using outlooks provided by Moody's, IHS Global Insight, the University of California, Los Angeles (UCLA), the California Department of Finance, and the United States Census Bureau. These outlooks are based on economic data available in January 2013.

Los Angeles County's recovery is broadening as local and out-of-area visitors increase their spending and film production takes off. Orange County's recovery continues as increased spending bolsters tourism and the hard-hit housing-related industries strengthen. Riverside and San Bernardino County's recovery is driven by increased consumer spending, expanding trade industries, and newfound stability in state government spending.

All counties in the Los Angeles region have shown improvements in employment. In Los Angeles County, payrolls are being lifted by retail, entertainment, and visitor-dependent industries. In Orange County, job gains are widespread and local government payrolls are stabilizing. Riverside and San Bernardino County's growth in retail, transportation, warehousing, accommodations, state government, and education employment reflect improving conditions. The improving labor market has caused the unemployment rate to fall below 11 percent in Los Angeles County, 12 percent in Riverside and San Bernardino County, and 7.5 percent in Orange County.

Housing market conditions in the Los Angeles region are improving throughout all counties. The median price for a single-family existing house is rising as the inventory of houses for sale dwindles. The issuance of residential construction permits continues to edge upward.

The Los Angeles region should continue to recover in 2013. The recovery in Los Angeles County is expected to be fueled by building of public infrastructure, trade flows, and a growing footprint of entertainment attractions. Orange County's recovery will be strengthened in 2013 because of technology, tourism, and housing. Riverside and San Bernardino County's recovery will be boosted by trade and transportation, housing, and tourism.

Forecast Results

For this forecast, three demand scenarios were developed. The high demand scenario includes high economic and demographic projections, low energy price projections, and low efficiency impact assumptions. The low demand scenario includes low economic and demographic projections, high energy price projections, and high efficiency impact assumptions. Volume 1 provides more detail on the construction of the demand scenarios.

Table 5-1 presents a comparison of *CED 2013 Preliminary* high, mid, and low demand scenarios with the mid scenario from *CED 2011* for electricity consumption and peak demand for selected years. Comprehensive results are available electronically as a set of forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/).

In the LADWP planning area, the *CED 2013 Preliminary* mid demand electricity consumption is 3.9 percent lower than *CED 2011* in 2020, the result of a lower than projected level of consumption in 2012 and a lower growth rate over the forecast period. By 2024, the *CED 2013 Preliminary* high demand level is 5.6 percent higher than the mid case while the low demand scenario is 4.4 percent lower. For peak demand, the *CED 2013 Preliminary* high and low scenarios are 6.1 percent higher and 6.9 percent lower, respectively, than the mid case by 2024.

Weather-normalized peak demand in 2012 was 5.8 percent lower than predicted in *CED 2011*.

Table 5-1: LADWP Planning Area Forecast Comparison

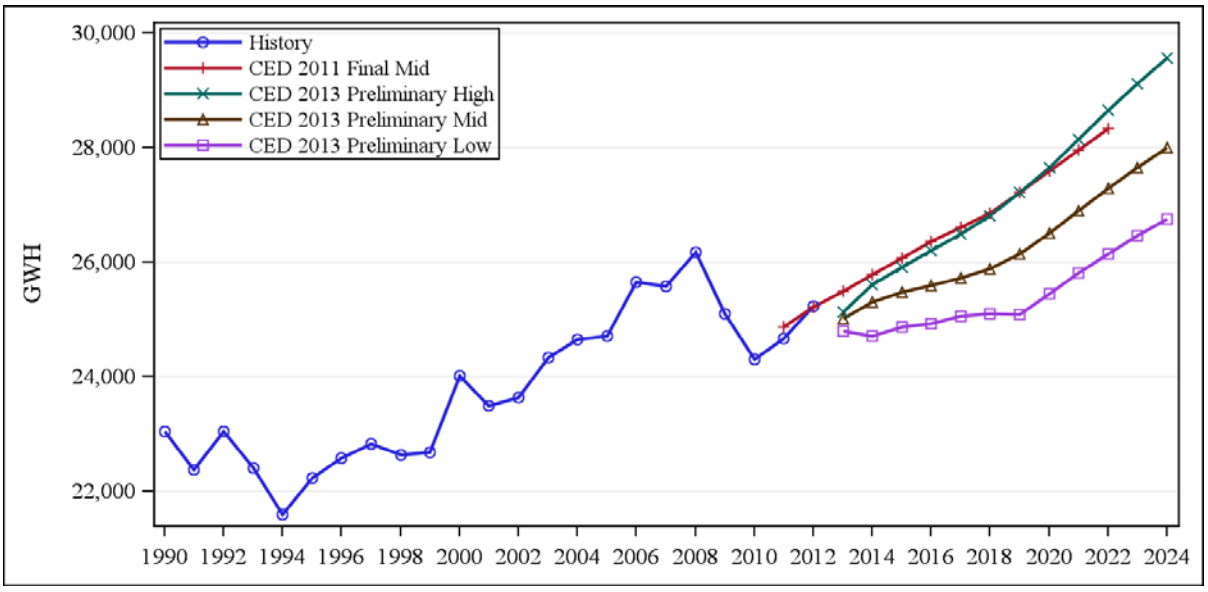
Consumption (GWH)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	23,038	23,038	23,038	23,038
2000	23,562	24,018	24,018	24,018
2012	25,212	25,223	25,223	25,223
2015	26,074	25,905	25,472	24,870
2020	27,587	27,658	26,501	25,444
2024	--	29,560	28,001	26,758
Average Annual Growth Rates				
1990 - 2000	0.23%	0.42%	0.42%	0.42%
2000 - 2012	0.68%	0.49%	0.49%	0.49%
2012 - 2015	1.13%	0.89%	0.33%	-0.47%
2012 - 2020	1.13%	1.16%	0.62%	0.11%
2012 - 2024	--	1.33%	0.87%	0.49%
Peak (MW)				
	CED 2011 Mid	*CED 2013 Preliminary* High	*CED 2013 Preliminary* Mid	*CED 2013 Preliminary* Low
1990	5,341	5,341	5,341	5,341
2000	5,344	5,344	5,344	5,344
2012	6,084	5,782	5,782	5,782
2012*	6,084	5,731	5,731	5,731
2015	6,386	6,060	5,958	5,712
2020	6,774	6,457	6,183	5,808
2024	--	6,860	6,463	6,019
Average Annual Growth Rates				
1990 - 2000	0.01%	0.01%	0.01%	0.01%
2000 - 2012	1.30%	0.79%	0.79%	0.79%
2012* - 2015	1.63%	1.88%	1.30%	-0.11%
2012* - 2020	1.35%	1.50%	0.95%	0.17%
2012* - 2024	--	1.51%	1.01%	0.41%
Historical values are shaded				
*Weather normalized: *CED 2013 Preliminary* uses a weather-normalized peak value derived from the actual 2012 peak for calculating growth rates during the forecast period				

Source: California Energy Commission, Demand Analysis Office, 2013

As shown in **Figure 5-1**, *CED 2013 Preliminary* electricity consumption forecasts are lower at the beginning of the forecast period than projected by *CED 2011*. Consumption dips slightly from 2012 to 2013, due to a combination of slow economic growth, an increase in electricity rates, and the assumption of normal weather (2012 was a particularly warm year). Growth in the mid case is less than CED 2011, due to rate increases and the addition of building and appliance standards. In 2022, only the high consumption scenario surpasses the level projected by *CED 2011*.

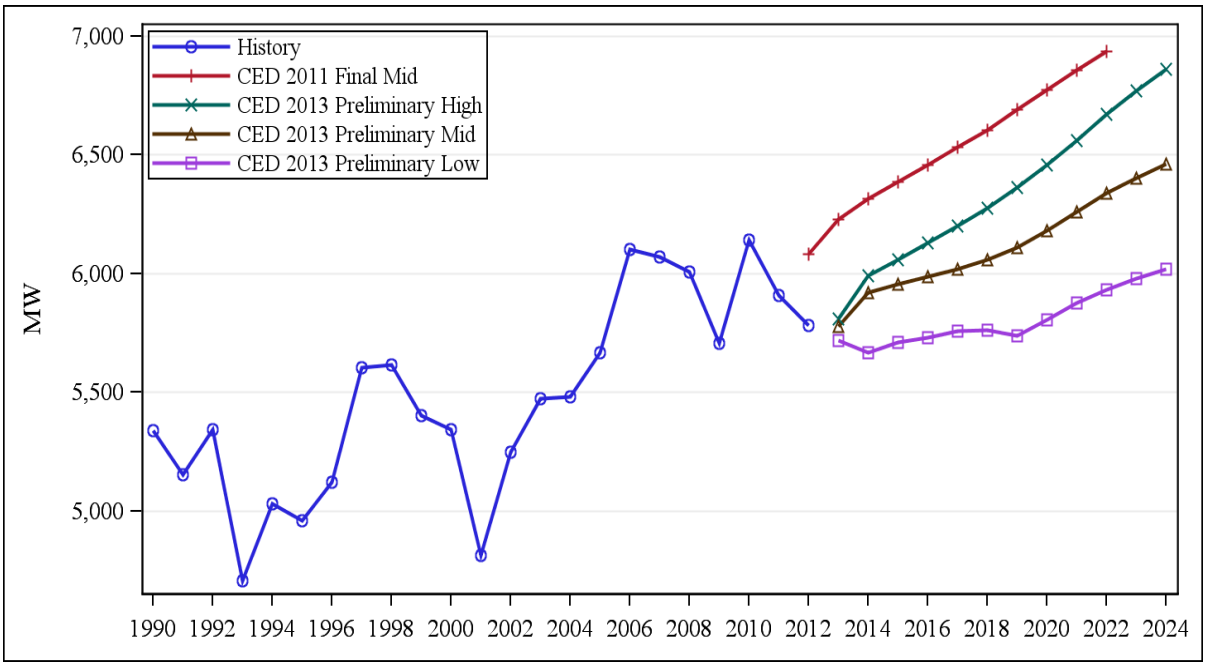
In 2012, the LADWP planning area experienced an above-average peak temperature. The actual peak load was higher than weather normalized peak. The relationship between peak demand scenarios, shown in **Figure 5-2**, follows a similar pattern as the consumption forecast. As with consumption, the peak demand forecast begins at a lower value than projected in *CED 2011* and all three scenarios remain below *CED 2011* values for the entire forecast period. Peak growth is slightly higher than consumption due in part to efficiency considerations—such as increasing lighting efficiency—that have a greater impact on consumption than on peak.

Figure 5-1: LADWP Planning Area Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

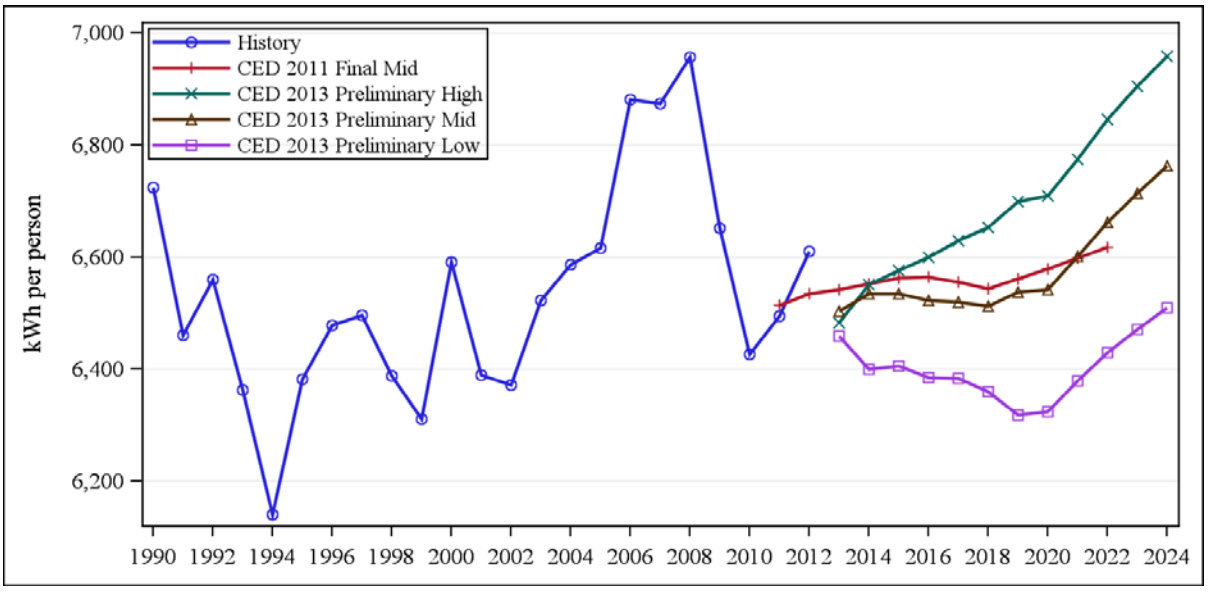
Figure 5-2: LADWP Planning Area Peak



Source: California Energy Commission, Demand Analysis Office, 2013

As **Figure 5-3** shows, per capita electricity consumption in the *CED 2013 Preliminary* forecast begins at a lower point but grows at a faster rate when compared to *CED 2011*. The drop in 2013 shows the combined effect of decreased consumption and increased population. Unlike *CED 2011*, which considered only a single population scenario, *CED 2013 Preliminary* incorporates high, mid, and low population projections. While the high and mid consumption forecasts are nearly identical in 2013, there is some spread between population estimates for that year. As a result, the high per capita consumption scenario shown below actually begins from a lower point than the mid scenario.

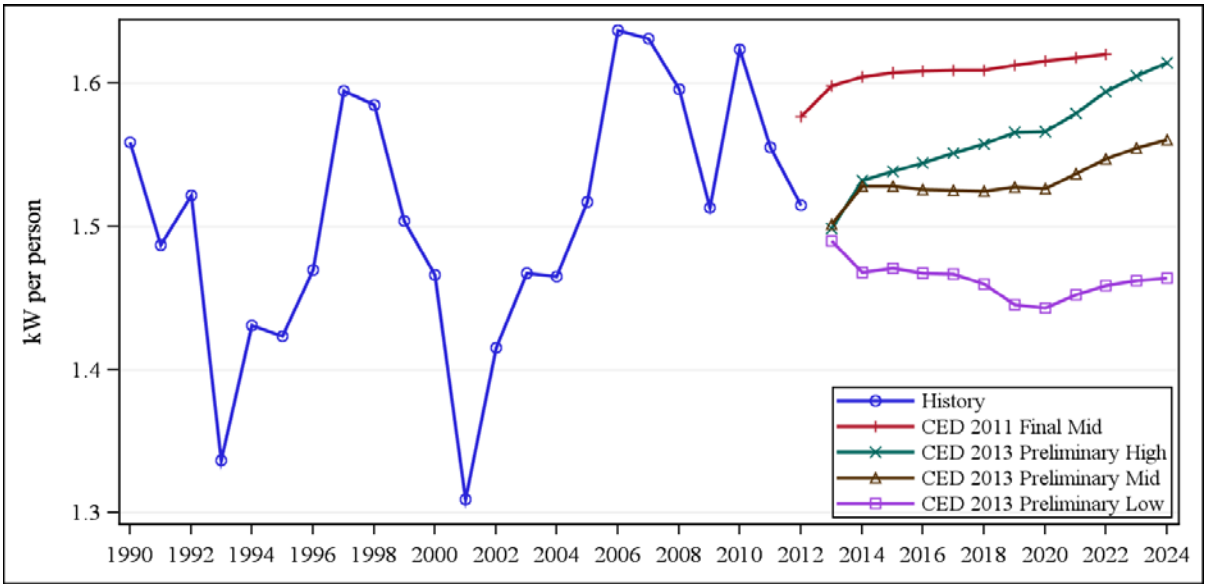
Figure 5-3: LADWP Planning Area Per Capita Electricity Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-4 shows per capita peak demand. *CED 2013 Preliminary* per capita peak scenarios follow the same pattern as the per capita consumption scenarios. The per capita peak values are projected to remain in the range of recent historical levels for all three scenarios, and below the values projected by *CED 2011*.

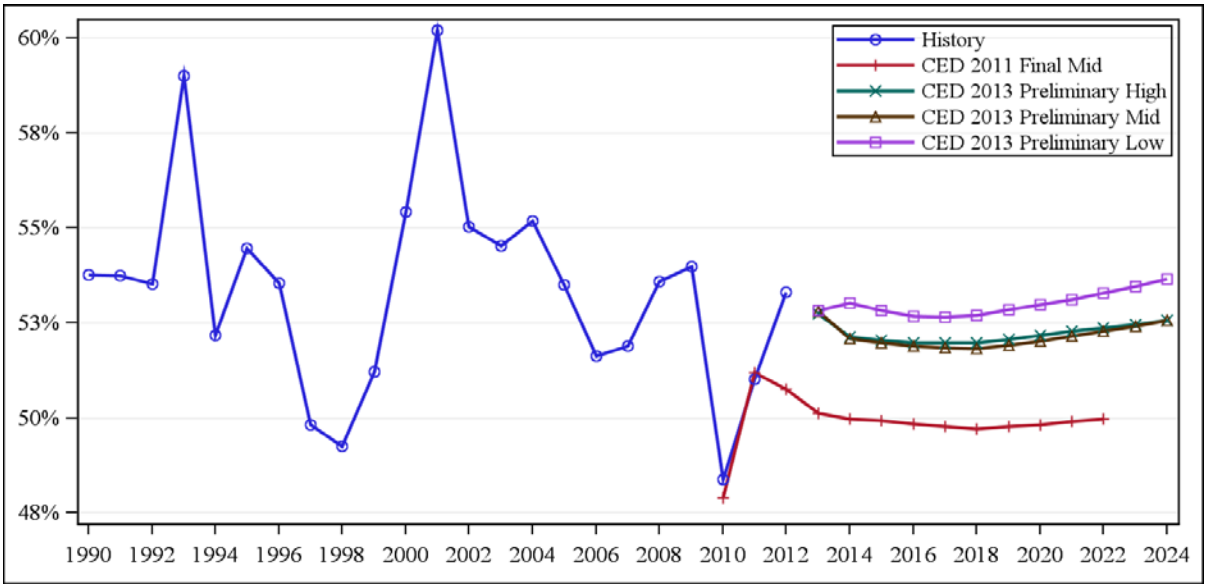
Figure 5-4: LADWP Planning Area per Capita Peak Demand



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-5 compares forecasted load factors. The load factor is a measure of the increase in peak demand relative to annual electricity consumption. Lower load factors indicate "a needle peak"; higher load factors indicate a more stable load. Greater population and economic growth in the LADWP planning area has been taking place in hotter inland areas, leading to a higher saturation and use of central air conditioning. *CED 2013 Preliminary* projects load factors are relatively constant over the forecast period.

Figure 5-5: LADWP Planning Area Load Factors



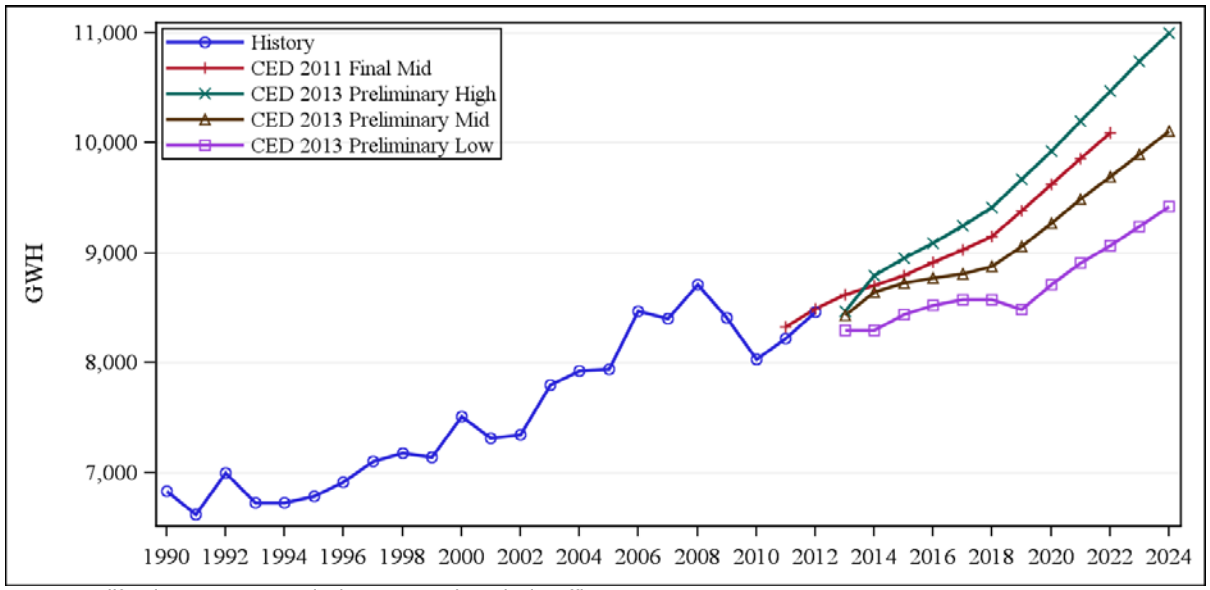
Source: California Energy Commission, Demand Analysis Office, 2013

Sector Level Results and Input Assumptions

Residential Sector

Figure 5-6 compares the *CED 2013 Preliminary* and *CED 2011* LADWP planning area residential forecasts. *CED 2013 Preliminary* is lower than *CED 2011* over the entire forecast period for the low and mid scenarios due to slow economic growth, lower income levels, and population change impacts. The high *CED 2013 Preliminary* scenario exceeds the *CED 2011* scenario by 2014 due to higher average household incomes and increased household populations. The *CED 2013 Preliminary* mid and low scenario growth rates roughly match the *CED 2011* scenario after 2019 and are driven, in part, by the adoption of electric vehicles. The *CED 2013 Preliminary* low demand scenario has a decline in 2019 due to the differences in the economic and demographic input assumptions.

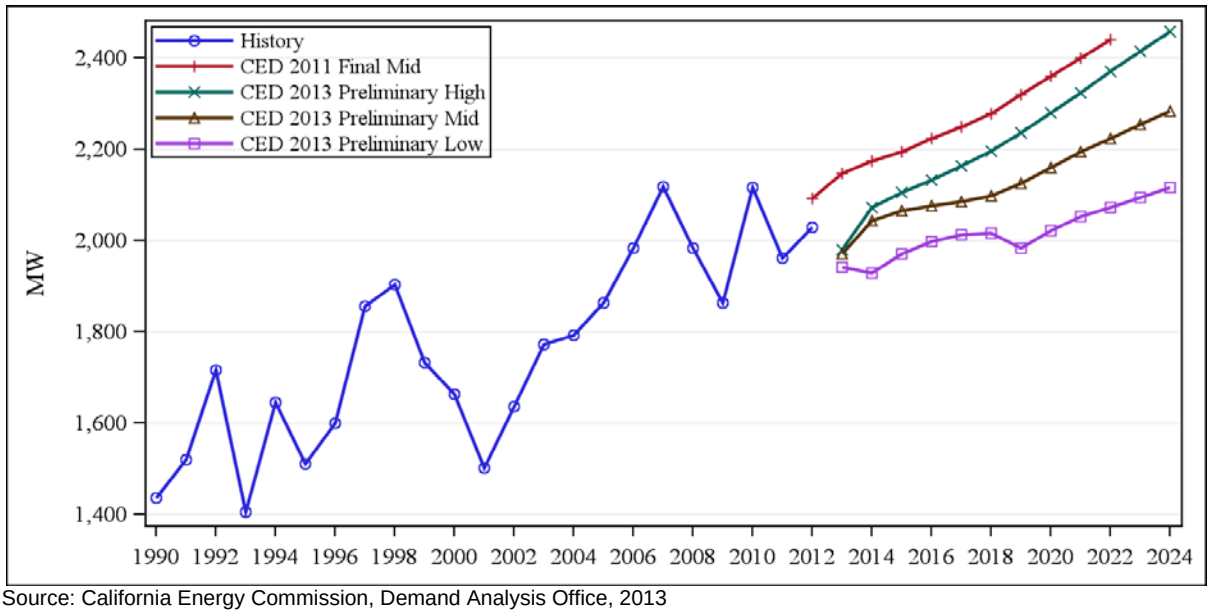
Figure 5-6: LADWP Planning Area Residential Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-7 compares *CED 2013 Preliminary* and *CED 2011* residential peak demand forecasts. Peak demand is lower in all *CED 2013 Preliminary* scenarios than the *CED 2011* scenario. Significant climate change adjustments have been made to the peak demands which result in a lower near-term peak level. Peak demand is directly influenced by demand growth which, in the near-term, will be slower for the low and mid scenarios than in *CED 2011.*

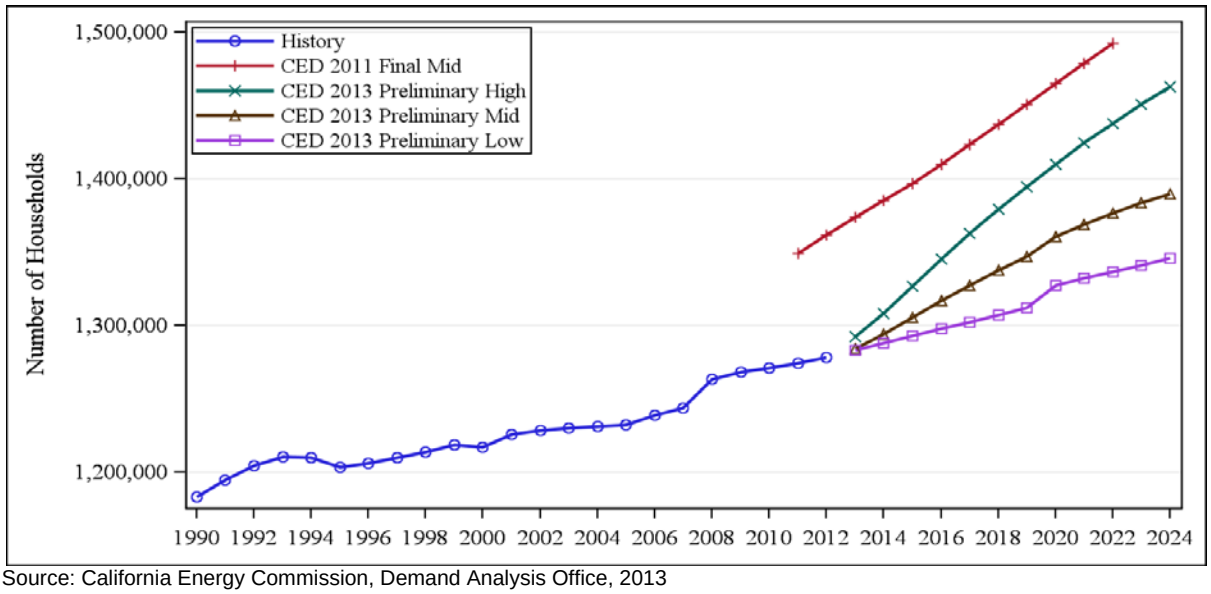
Figure 5-7: LADWP Planning Area Residential Peak



Source: California Energy Commission, Demand Analysis Office, 2013

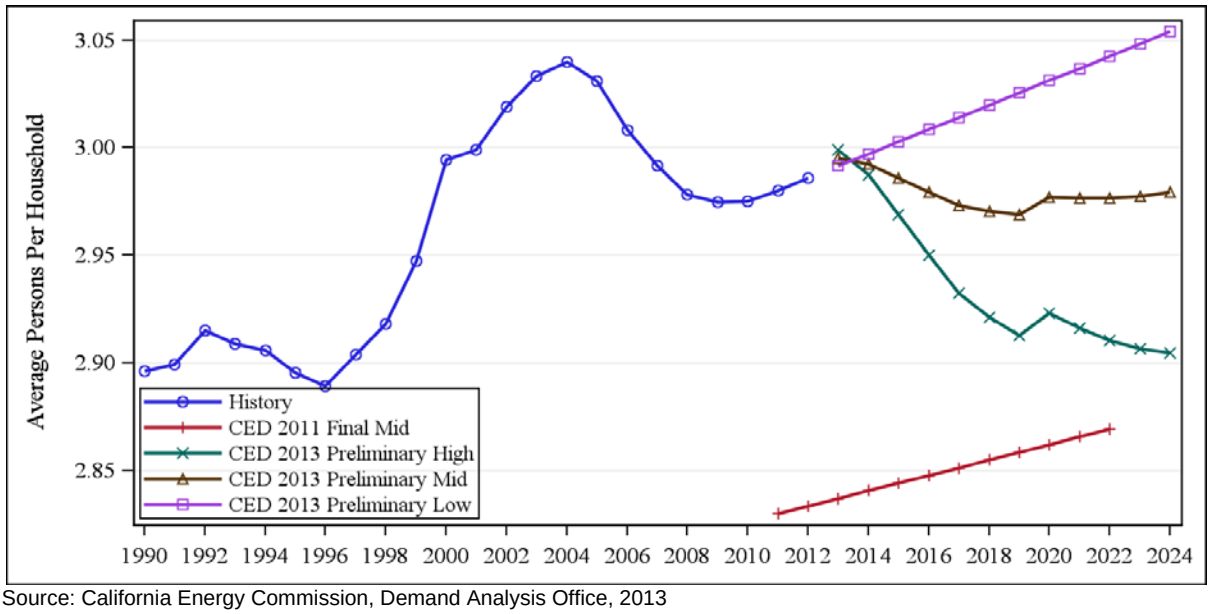
Figure 5-8 and **Figure 5-9** compare the residential economic/demographic drivers used in *CED 2013 Preliminary* with drivers used in *CED 2011*. **Figure 5-8** compares total households while **Figure 5-9** compares persons per household projections. *CED 2013 Preliminary* projected number of households is lower than *CED 2011* in all three scenarios. The number of persons per household is directly influenced by the number of households and hence the significantly lower number of households increases the persons per household over the entire forecast for all scenarios.

Figure 5-8: LADWP Planning Area Residential Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

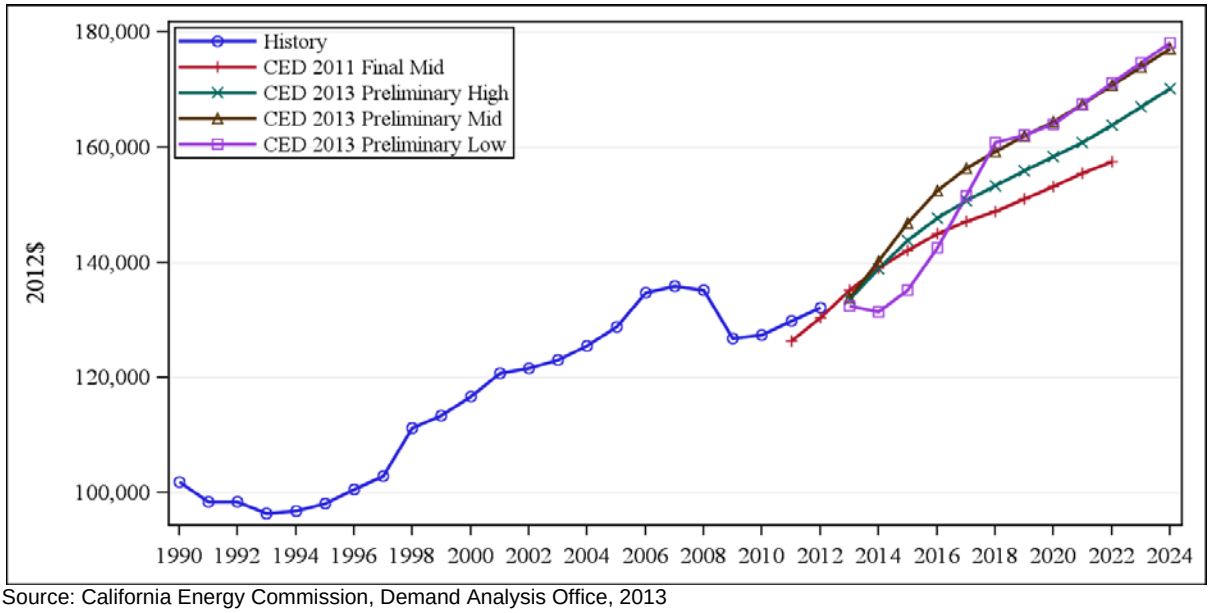
Figure 5-9: LADWP Planning Area Persons per Household Projections



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-10 compares average household income in the two forecasts. The low demand scenario is lower than the *CED 2011* forecast in the near-term. By 2015 the mid and high *CED 2013 Preliminary* scenarios exceed the *CED 2011* forecast and by 2017 the low *CED 2013 Preliminary* scenario exceeds the *CED 2011* forecast.

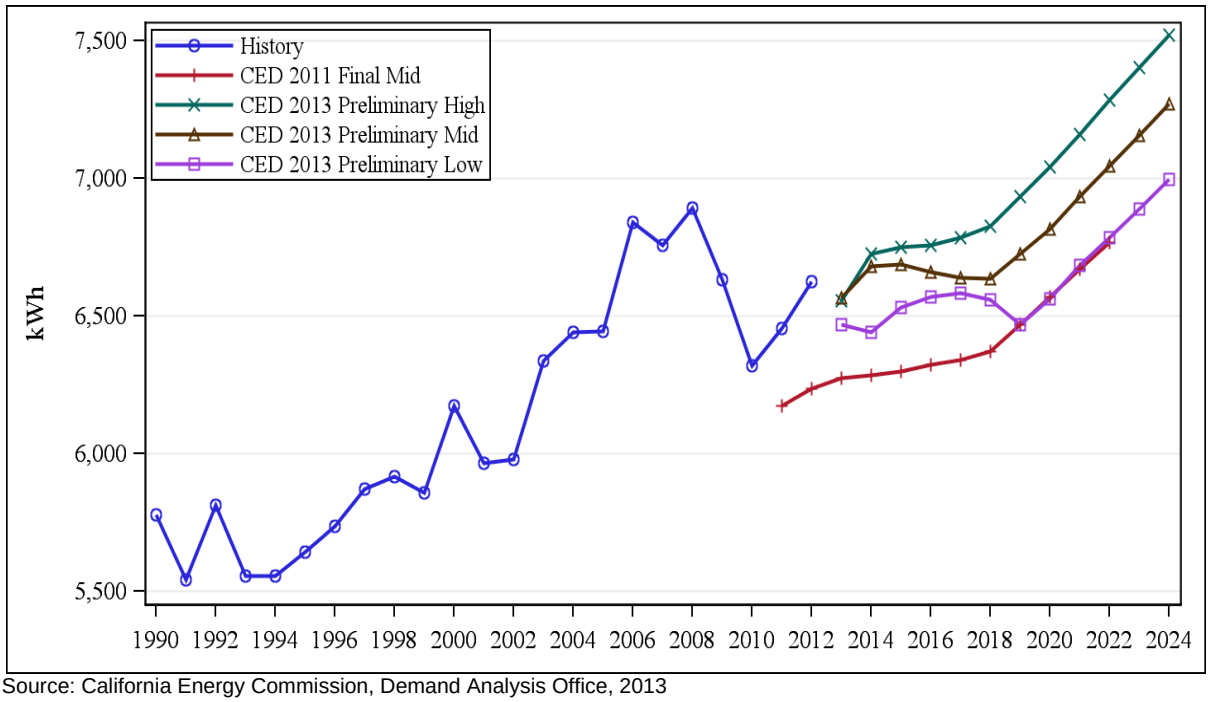
Figure 5-10: LADWP Planning Area Average Household Income Projections



Source: California Energy Commission, Demand Analysis Office, 2013

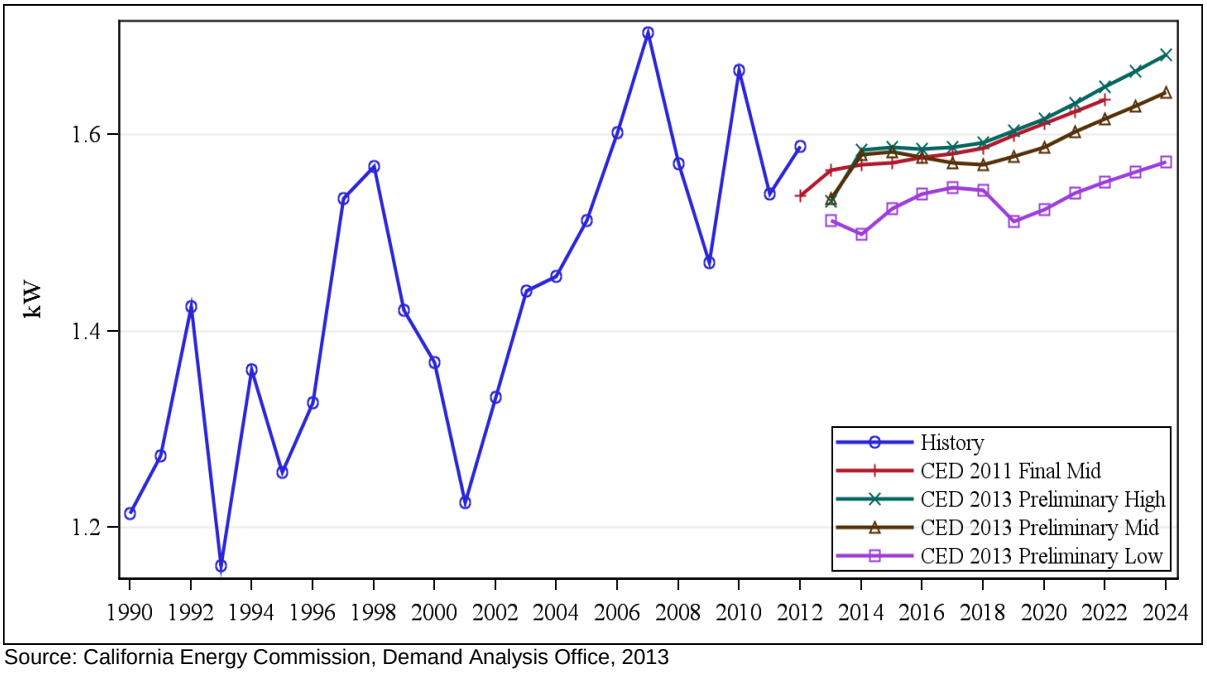
Figure 5-11 compares electricity consumption per household in the two forecasts and shows the 1990–2010 historical series. *CED 2013 Preliminary* use per household grows similarly to the *CED 2011* forecast in the later forecast years, although it begins from a higher level due to the lower number of projected households. Peak use per household begins at a slightly lower point than *CED 2011*, as seen in **Figure 5-12**, but the mid and high scenarios increase to roughly the *CED 2011* level, remaining roughly equal for the high scenario and declining slightly to just below in the mid scenario. The low *CED 2013 Preliminary* demand scenario remains below the *CED 2011* scenario although after 2019 the growth rates are roughly equal.

Figure 5-11: LADWP Planning Area Electricity Consumption per Household



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-12: LADWP Planning Area Peak Use per Household

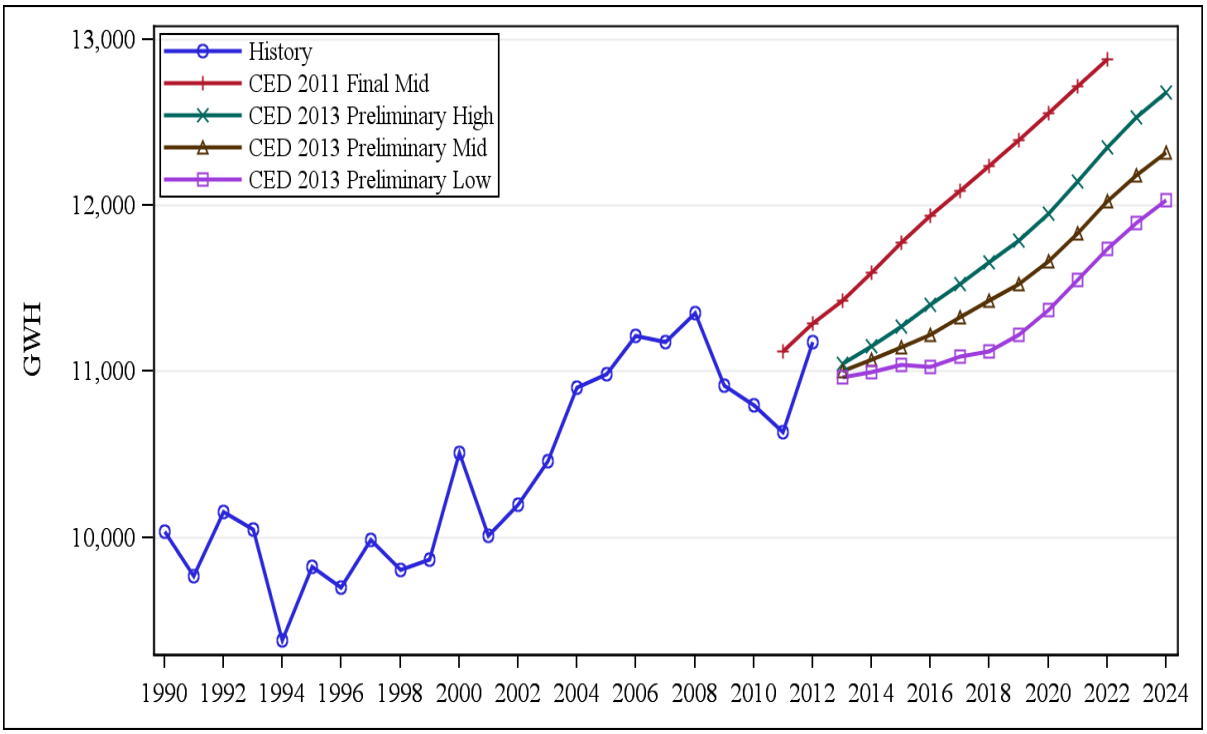


Source: California Energy Commission, Demand Analysis Office, 2013

Commercial Sector

Figure 5-13 compares the LADWP commercial sector electricity consumption forecasts. The *CED 2013 Preliminary* consumption scenarios are lower than *CED 2011* throughout the forecast period. The differences are primarily caused by a lower starting point due to lower estimates of recent historical commercial consumption. The growth rate of commercial consumption in all three scenarios is similar to *CED 2011*.

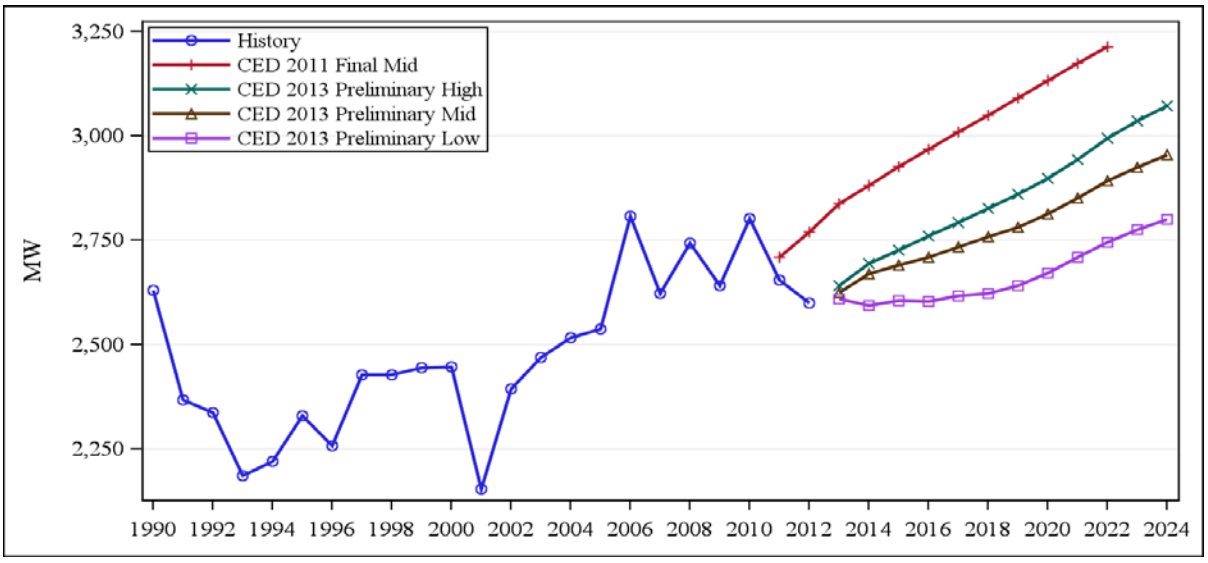
Figure 5-13: LADWP Planning Area Commercial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-14 compares the LADWP commercial sector peak demand forecasts. Growth in both forecasts is driven by the underlying electricity consumption forecast, which exhibits a similar pattern.

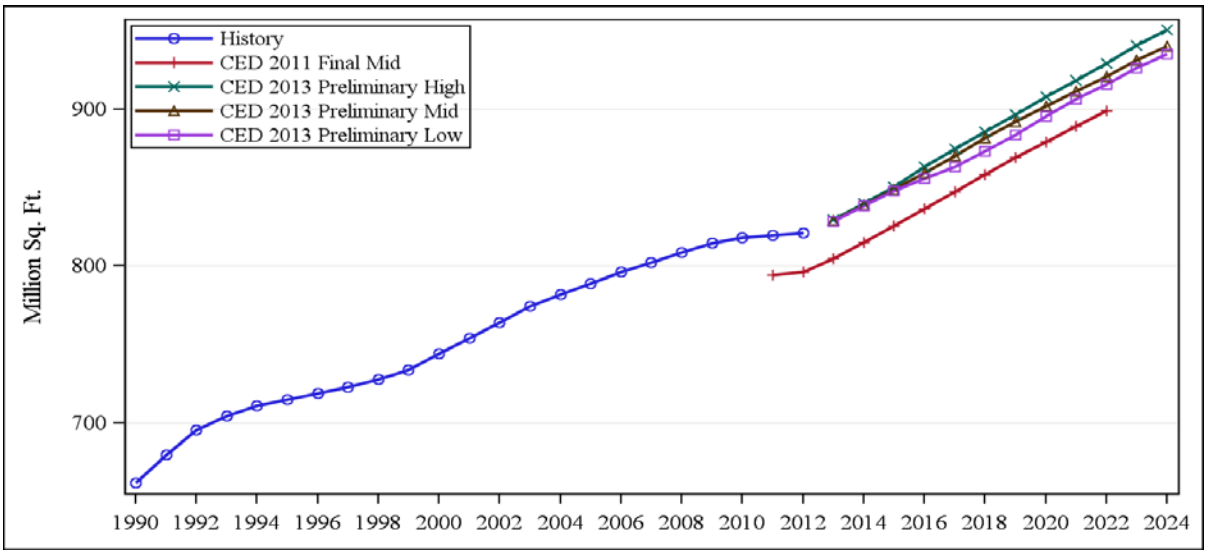
Figure 5-14: LADWP Planning Area Commercial Peak



Source: California Energy Commission, Demand Analysis Office, 2013

In staff's commercial building sector forecasting model, floor space by building type (such as retail, offices, and schools) is the key driver. **Figure 5-15** compares LADWP commercial floor space projections. *CED 2013 Preliminary* floor space projections are somewhat higher over the forecast period than those used in *CED 2011* due to a higher starting point. However, the growth rate in the high case *CED 2013 Preliminary* scenario is slightly higher than in *CED 2011*.

Figure 5-15: LADWP Planning Area Commercial Floor Space

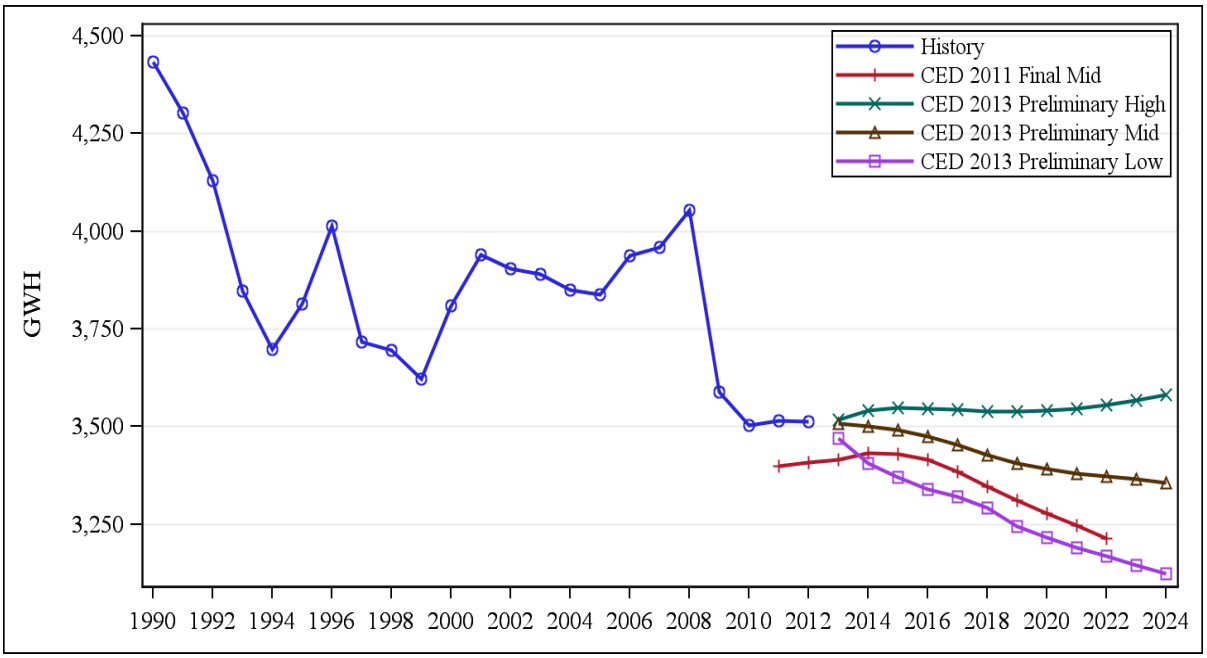


Source: California Energy Commission, Demand Analysis Office, 2013

Industrial Sector

Figure 5-16 compares the LADWP planning area industrial sector electricity consumption forecasts. *CED 2013 Preliminary* industrial consumption in the high and mid case scenarios is higher than the *CED 2011* through the forecast period. Projected growth of the low case *CED 2013 Preliminary* scenario is initially higher than *CED 2011,* but quickly goes lower than *CED 2011* due to more pessimistic economic projections. The differences in consumption scenarios are mainly driven by differences in economic output.

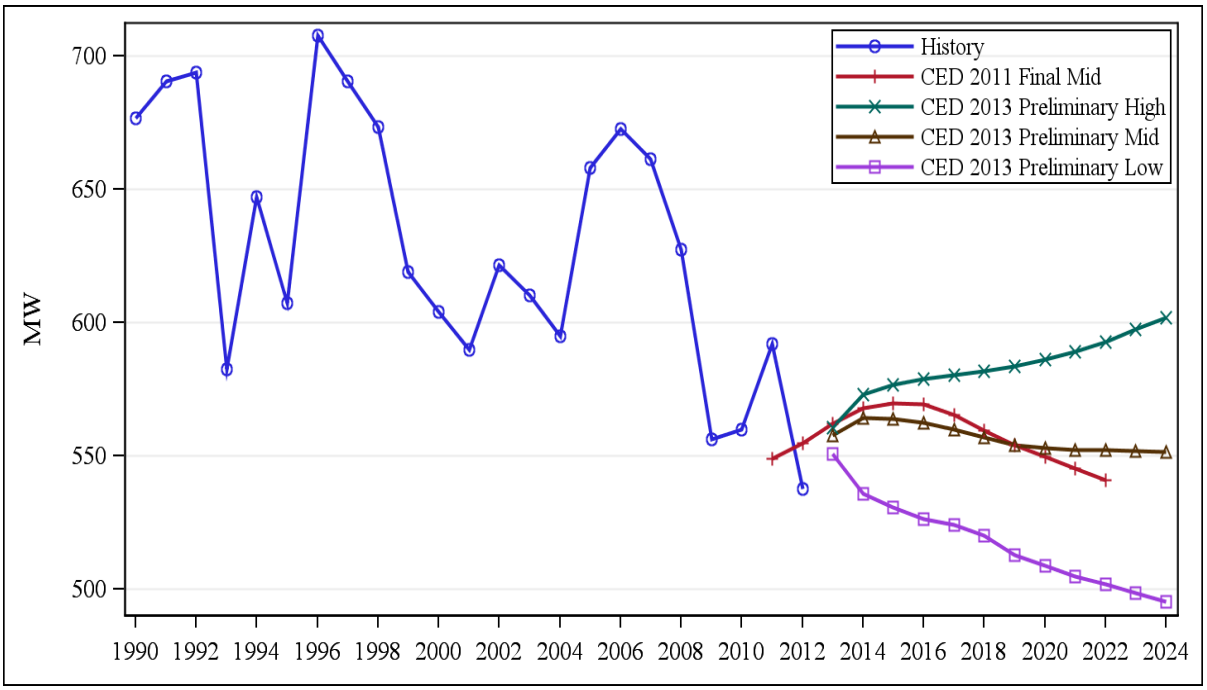
Figure 5-16: LADWP Planning Area Industrial Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-17 compares the LADWP industrial sector peak forecasts. The *CED 2013 Preliminary* industrial peak forecasts follow the same pattern as the consumption forecasts.

Figure 5-17: LADWP Planning Area Industrial Peak

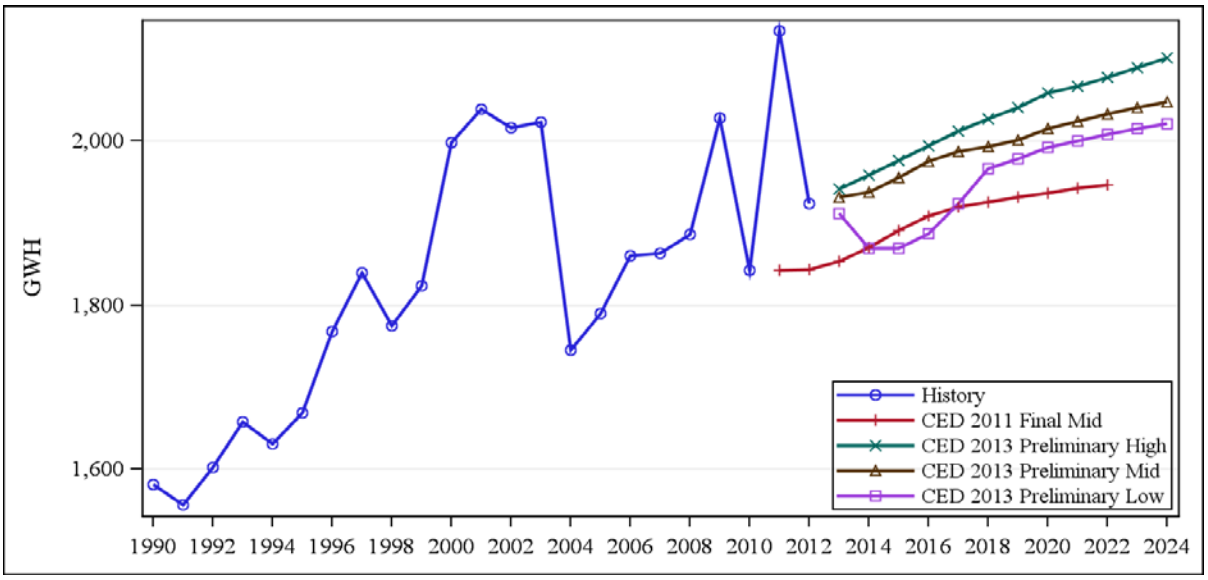


Source: California Energy Commission, Demand Analysis Office, 2013

Other Sectors

Figure 5-18 compares the electricity consumption forecasts for the TCU sector, which includes street lighting. Although the growth rates of both mid cases are similar, *CED 2013 Preliminary* mid starts higher than was predicted by *CED 2011* and remains higher throughout the forecast horizon. In the recession scenario modeled in the low case, electricity consumption bottoms out in 2015 and is subsequently followed by a strong recovery though 2018, where growth resumes at a rate similar to that of the mid case.

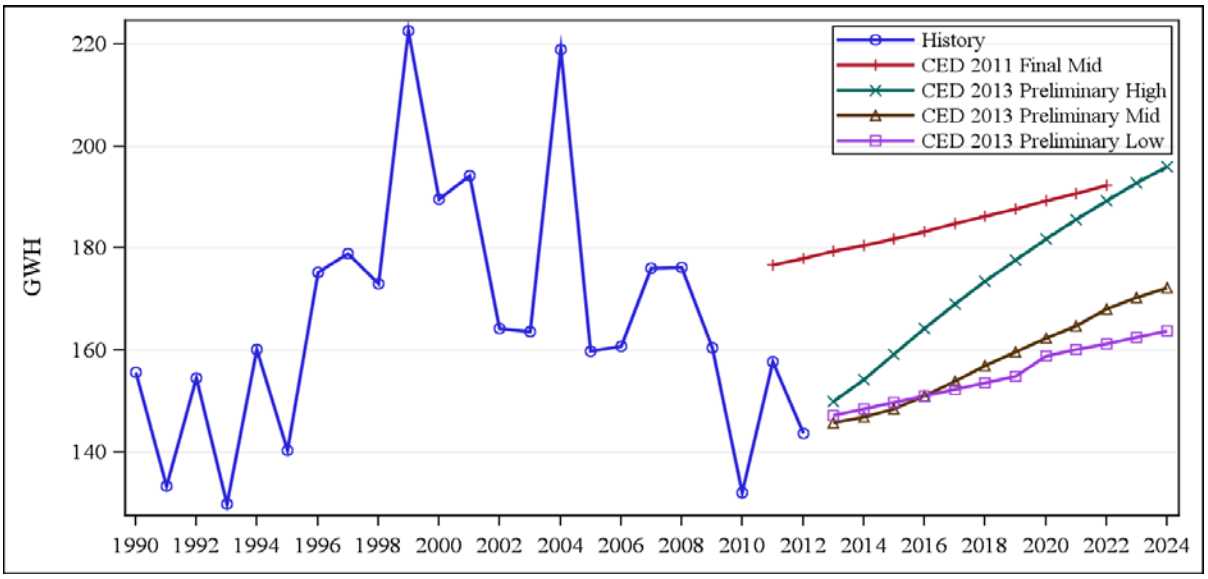
Figure 5-18: LADWP Planning Area Transportation, Communication, Utilities, and Street Lighting Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-19 compares the electricity consumption forecasts for the agriculture and water pumping sectors. The *CED 2013 Preliminary* forecasts start significantly below what was predicted by *CED 2011*. For the new forecasts, electricity growth in the high case is much stronger compared to that of the mid and low scenarios. All three demand scenarios are projected to grow over time, primarily because of a projected increase in ground-water pumping.

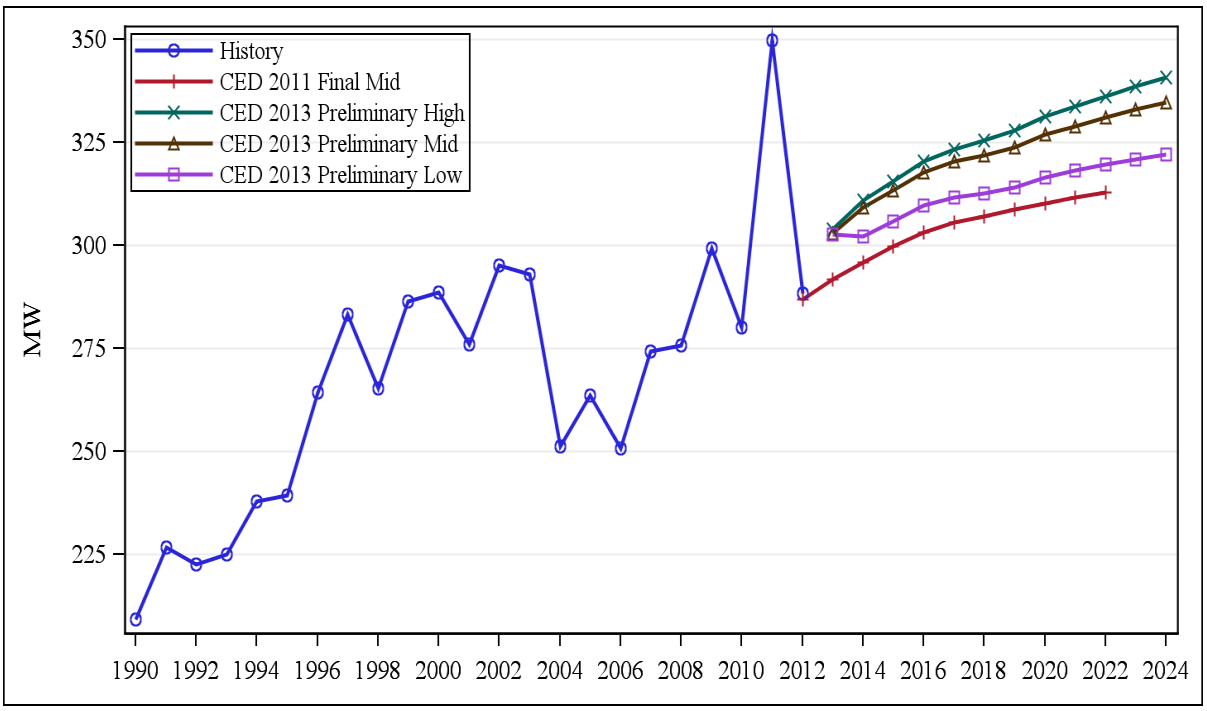
Figure 5-19: LADWP Planning Area Agriculture and Water Pumping Consumption



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 1-20 compares projected combined peak for the transportation, communication, utilities, street lighting, agriculture, and water pumping sectors. The *CED 2013 Preliminary* forecasts are all higher than what was predicted by *CED 2011*. The mid cases of each forecast differ by approximately 15 MW in 2018.

Figure 5-20: LADWP Planning Area Other Sector Peak

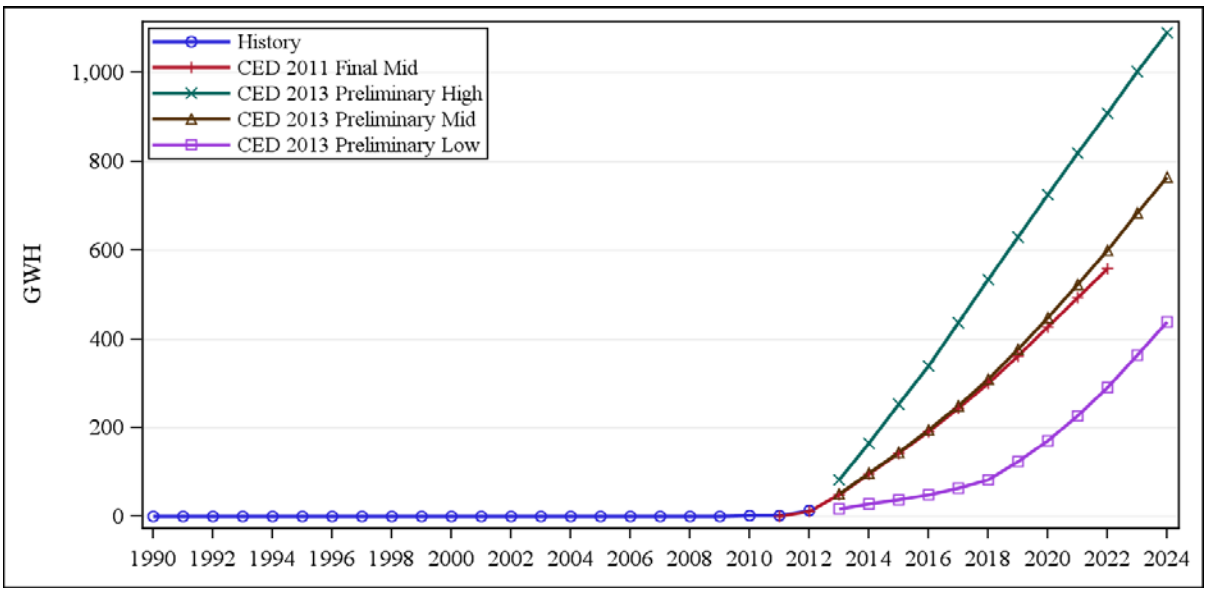


Source: California Energy Commission, Demand Analysis Office, 2013

Electric Vehicles

Consumption by electric vehicles in the LADWP planning area is expected to increase to more than 309 GWh by 2018. By the end of the forecast period, consumption by electric vehicles is projected to reach more than 438 GWh in the low demand scenario and nearly 1,091 GWh in the high demand scenario. Staff assumes most recharging would occur during off-peak hours, so peak impacts are projected to be relatively small—just 19 MW in the low case and 47 MW in the high case by 2024. **Figure 5-21** presents the LADWP planning area electric vehicle consumption forecast for each of the demand scenarios.

Figure 5-21: LADWP Electricity Consumption by Electric Vehicles



Source: California Energy Commission, Demand Analysis Office, 2013

Self-Generation

The peak demand forecast is reduced by the projected impacts of distributed PV, solar thermal, and combined heat and power systems, including the effects of the SGIP, CSI, and other programs, as discussed in Volume 1. The effects of these programs are forecast based on a combination installation trend analysis and predictive modeling. **Table 5-2** shows the forecast of peak impacts from PV and non-PV self-generation. Staff projects between 60 and 77 MW of peak reduction from PV systems by 2024. Peak reductions are based on installed PV system capacities ranging from 165 MW by 2024 in the high demand case to 208 MW by 2024 in the low demand case.

Table 5-2: LADWP Planning Area Self-Generation Peak Impacts (MW)

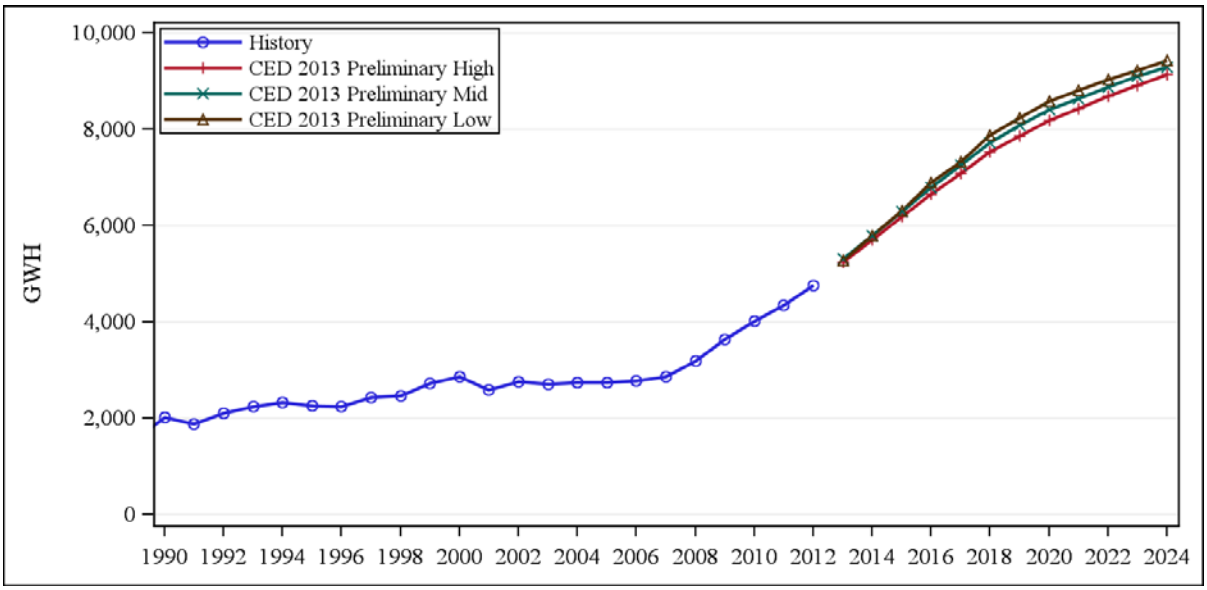
Scenario	Technology	1990	2000	2012	2015	2020	2024
Low Demand	Photovoltaic	0.0	0.2	27.7	38.6	52.4	76.7
	Non-Photovoltaic	148.5	196.6	227.5	237.9	243.1	243.7
	Total	148.5	196.8	255.2	276.5	295.5	320.4
Mid Demand	Photovoltaic	0.0	0.2	27.7	36.7	48.4	67.8
	Non-Photovoltaic	148.5	196.6	227.5	237.9	242.9	243.8
	Total	148.5	196.8	255.2	274.6	291.3	311.6
High Demand	Photovoltaic	0.0	0.2	27.7	34.8	45.6	59.7
	Non-Photovoltaic	148.5	196.6	227.5	237.8	242.4	243.4
	Total	148.5	196.8	255.2	272.7	288.0	303.1

Source: California Energy Commission, Demand Analysis Office, 2013

Conservation/Efficiency Impacts

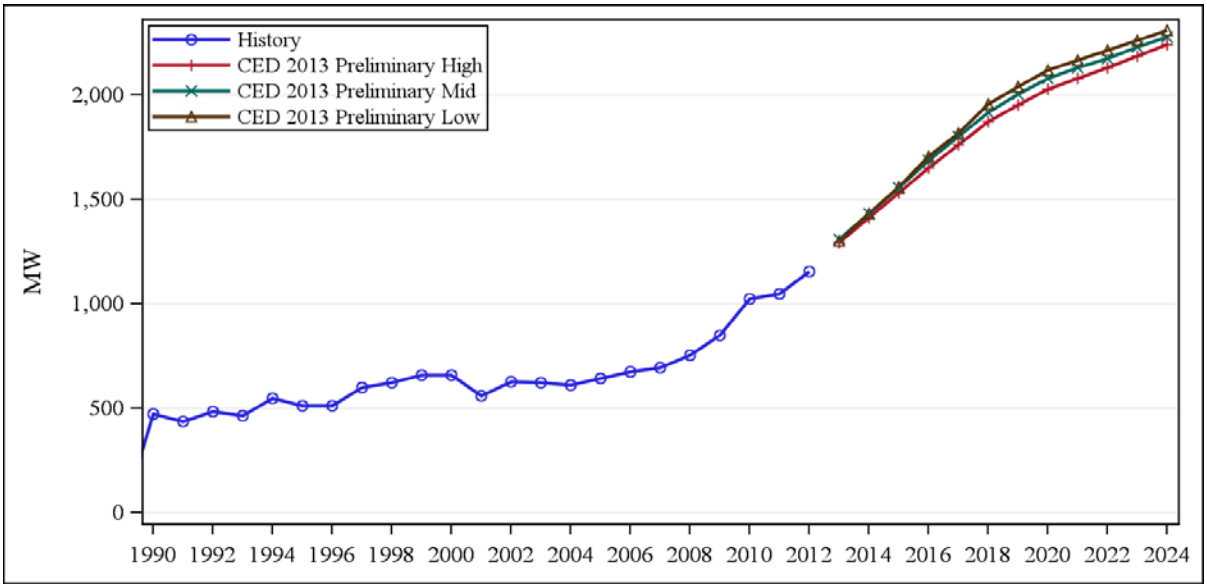
Staff spent a great deal of time refining methods to account for energy efficiency and conservation impacts while preparing recent forecasts. **Figure 5-22** and **Figure 5-23** show committed electricity consumption and peak efficiency savings estimates from all sources, including building and appliance standards; utility programs implemented through 2014; and price and other effects, or savings associated with rate changes and certain market trends not directly related to programs or standards. Projected savings impacts are highest in the low demand scenario, since price and program effects are inversely related to the demand outcome. Within the demand scenarios, higher demand yields more standards savings since new construction and appliance usage increase, while lower demand is associated with more program savings and higher rates (and therefore more price effects). The net result is that savings totals among the scenarios are very similar.

Figure 5-22: LADWP Planning Area Electricity Consumption Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Figure 5-23: LADWP Planning Area Electricity Peak Savings Estimates



Source: California Energy Commission, Demand Analysis Office, 2013

Table 5-3 presents estimated savings for building and appliance standards in the mid demand case for selected years. Total standards impacts are higher in the high demand case by 1.5-2.0 percent due to higher home and commercial floor space construction and 1.5-2.0 percent lower in the low demand case. The standards savings estimates include the 2010 revision to Title 24 building standards as well as Assembly Bill 1109 (Huffman, Chapter 534, Statutes of 2007) lighting savings and television standard savings, just as they were in *CED 2011*. For *CED 2013*, new standards savings impacts were included for the 2013 Title 24 standards update and impacts from standards affecting battery chargers. Savings are measured against a baseline before 1975, so they incorporate more than 30 years of impacts. Volume 1, Chapter 3 provides more detail on staff work related to energy efficiency and conservation.

Table 5-3: LADWP Planning Area Standards Savings Estimates

Electricity Consumption Savings (GWH)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	318	220	538	140	96	236	774
2000	414	683	1,097	292	208	500	1,597
2012	342	1,664	2,006	584	379	963	2,969
2015	385	2,236	2,621	710	469	1,180	3,800
2020	467	2,884	3,351	972	597	1,569	4,920
2024	526	3,125	3,652	1,179	667	1,846	5,498
Electricity Peak Demand Savings (MW)							
	Residential			Commercial			
	Building Standards	Appliance Standards	Total	Building Standards	Appliance Standards	Total	Total Standards
1990	72	50	122	35	24	59	181
2000	93	154	247	70	50	120	367
2012	84	409	493	144	93	237	730
2015	97	562	659	177	117	294	953
2020	117	721	838	243	149	393	1,231
2024	129	766	895	296	167	463	1,357

Source: California Energy Commission, Demand Analysis Office, 2013

Climate Zone Forecasts

For *CED 2013 Preliminary*, staff developed electricity consumption and peak demand forecasts for individual climate zones (see Volume 1, Chapter 1 for more details). The LADWP planning area has two climate zones, each with a designated weather station. The southern, more coastal portion of the City of Los Angeles is assigned to Climate Zone 11

(Long Beach weather station) and the northern, inland portion, along with the Owens Valley, to Climate Zone 12 (Burbank weather station).

Table 5-4 shows the forecast results for electricity consumption and peak demand by climate zone for each demand scenario. To better show forecast trends and to avoid mischaracterizing average annual growth because of 2012-specific weather impacts, growth rates are provided relative to 2013. Full climate zone results are shown in the forms posted alongside this report (http://www.energy.ca.gov/2013_energypolicy/documents/#05302013).

The fastest growth in both consumption and peak demand over the forecast period is projected to be inland, in Climate Zone 12. These results reflect faster population growth in the Owens Valley than in Los Angeles County. For example, growth in population from 2013-2024 in the mid demand case is projected to be 8 percent for Climate Zone 12, compared to 6 percent for Climate Zones 11.

Table 5-4: LADWP Planning Area Climate Zone Forecast Results

		Consumption by Climate Zone (GWh)		Peak Demand by Climate Zone (MW)	
High Demand Case	2013	10,403	14,725	1,707	4,103
	2015	10,662	15,243	1,776	4,284
	2020	11,243	16,415	1,879	4,578
	2024	11,906	17,654	1,991	4,869
	Average Growth 2013-2020	0.98%	1.37%	1.20%	1.38%
	Average Growth 2013-2024	1.13%	1.52%	1.29%	1.44%
Mid Demand Case	2013	10,364	14,652	1,697	4,079
	2015	10,514	14,958	1,746	4,212
	2020	10,850	15,651	1,799	4,384
	2024	11,392	16,609	1,876	4,588
	Average Growth 2013-2020	0.57%	0.83%	0.73%	0.91%
	Average Growth 2013-2024	0.79%	1.05%	0.84%	0.98%
Low Demand Case	2013	10,284	14,509	1,681	4,039
	2015	10,294	14,576	1,673	4,038
	2020	10,463	14,981	1,689	4,119
	2024	10,935	15,823	1,745	4,274
	Average Growth 2013-2020	0.22%	0.40%	0.06%	0.25%
	Average Growth 2013-2024	0.51%	0.73%	0.32%	0.47%

Source: California Energy Commission, Demand Analysis Office, 2013

GLOSSARY

Acronym	Definition
CED	California Energy Demand
CPUC	California Public Utilities Commission
CSI	California Solar Initiative
Energy Commission	California Energy Commission
ESP	Energy service provider
GW/GWh	Gigawatt/gigawatt hours
IEPR	*Integrated Energy Policy Report*
KW/KWh	Kilowatt/Kilowatt hours
LADWP	Los Angeles Department of Water and Power
MW/MWH	Megawatt/megawatt hours
PG&E	Pacific Gas and Electric Company
PV	Photovoltaic
QFER	Quarterly Fuel Energy Report
SCE	Southern California Edison Company
SDG&E	San Diego Gas & Electric Company
SGIP	Self-Generation Incentive Program
SMUD	Sacramento Municipal Utility District
TCU	Transportation, communications, and utility
WAPA	Western Area Power Administration