



In response to COVID-19, there is increased interest in information about California's energy demand and supply issues.

The California Energy Commission's (CEC) Energy Insights analysis provides a snapshot of trends in the energy sector, including impacts to energy supply and demand to the following sectors since Governor Gavin Newsom announced California's stay-at-home order on March 19, 2020. <sup>1</sup>

- [Electricity Sector](#)
- [Natural Gas Sector](#)
- [Transportation Fuels Sector](#)

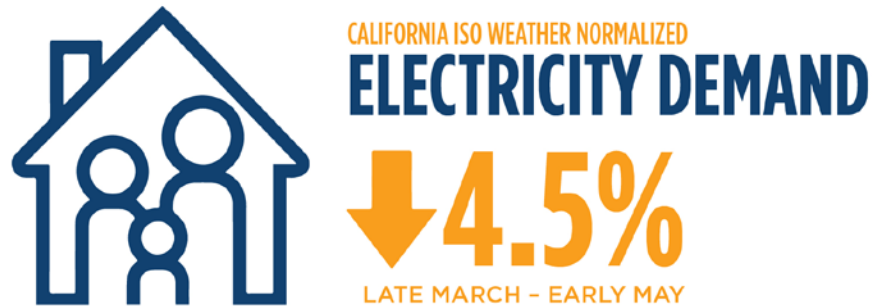
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<sup>1</sup> Several factors impact energy supply and demand from year to year and month to month, including economy, demographics, and weather variations. In addition, data are collected at various intervals and time frames, depending on the reporting regulations for each energy sector.

## Key Highlights

### Electricity Sector

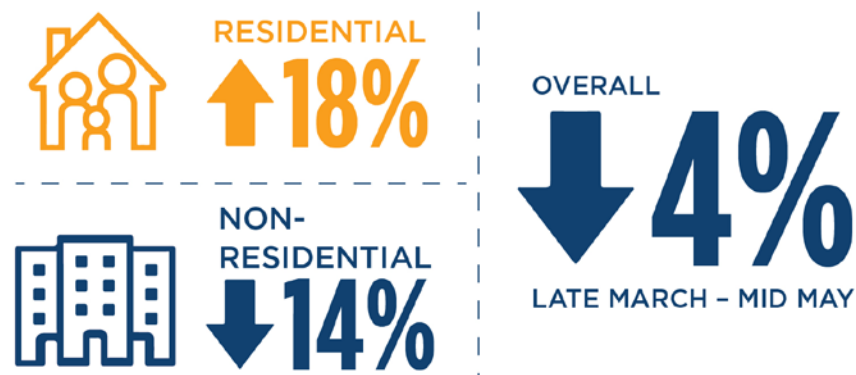
Demand in the California Independent System Operator (ISO) territory has fallen relative to 2019 particularly during weekday morning and midday hours.<sup>2</sup>



The hot weather in April and May increased late afternoon and early-evening peak demand back to levels expected without the stay-at-home order.



While overall electricity demand declined since the stay-at-home-order, residential demand has increased.



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<sup>2</sup> Source: California ISO, March 23–May 11.

## Key Highlights

### Natural Gas Sector

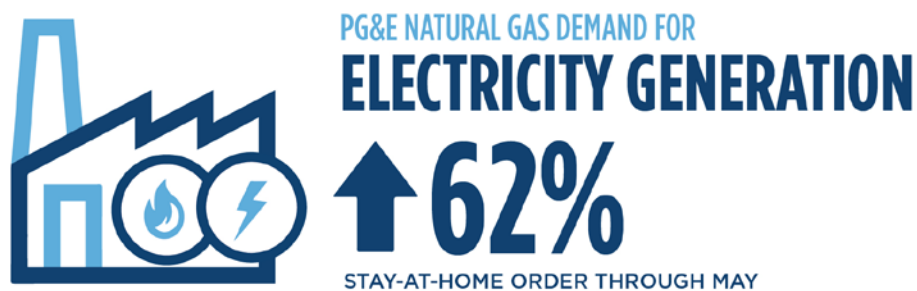
Natural gas demand increased during the first month of the stay-at-home order compared to the same time frame in 2019 but dropped in late April and May.<sup>3</sup>



Residential & small commercial, and industrial & large commercial demand declined.



Because of hotter weather and lower hydroelectric resources this year, natural gas demand for electric generation increased, according to sector-level data from PG&E.



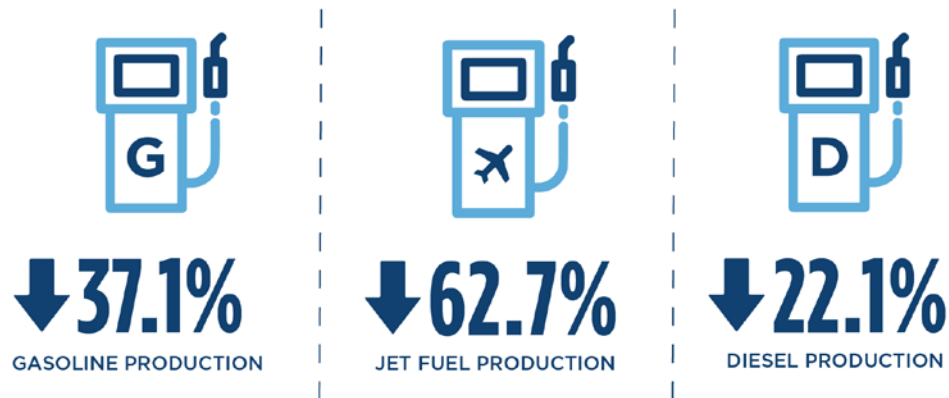
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<sup>3</sup> Natural gas usage is highly correlated with weather. Isolating the effects of the COVID-19 impacts requires more data and analysis.

## Key Highlights

### Transportation Fuels Sector

California transportation fuel production made the following declines over the last 10 weeks, for the week ending May 29, 2020, compared to the week ending March 20, 2020:



Refiners in California continue to operate their facilities at lower rates in response to decreased demand for transportation fuels. California's gasoline demand continues to recover as personal travel increases. Demand is expected to rise as stay-at-home restrictions are eased and businesses reopen.

## Additional Analysis and Trends

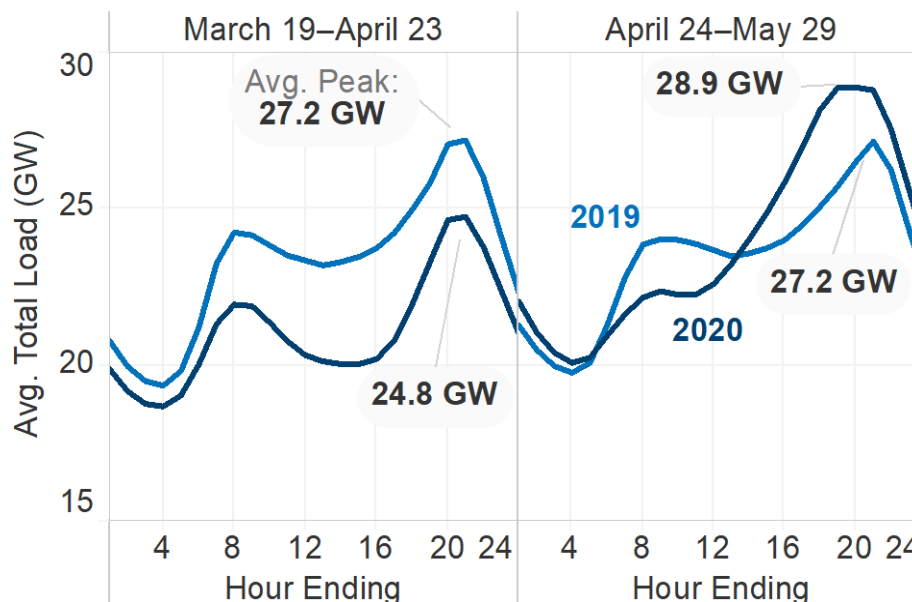
### Electricity Sector

Electricity demand decreased 6 percent relative to 2019 over the first two months of the stay-at-home order before increasing to 9 percent above in late May.

**Overall electricity consumption declined since the stay-at-home order, but peak demand bounced back in late April and May.** The California Independent System Operator (ISO) estimated a 4.5 percent decrease in weekday electricity demand from March 23 to May 11 after adjusting for weather. The decrease was greatest during morning and midday hours (7.4 percent) and evening peak hours (5.7 percent). Weekends experienced a smaller impact (3.8 percent, 1.3 percent).

Higher-than-normal temperatures in late April through May increased demand compared to the previous four weeks, as shown in Figure 1. During this period, loads remained below 2019 levels on milder days. On the hottest days, the late afternoon and evening peaks were higher than those observed in April and May of 2019 and were consistent with peak loads observed on similarly hot days last summer, according to the California ISO.

**Figure 1: California ISO Average Hourly Weekday Demand, 2020 and 2019**



Source: California ISO Renewables Watch

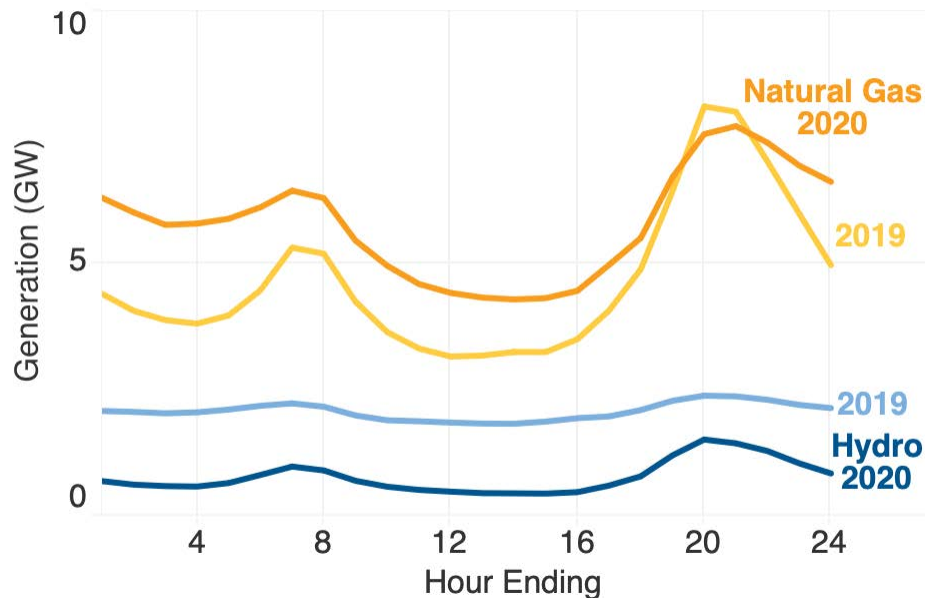
**Natural gas generation increased after the stay-at-home order despite the decline electricity consumption.** Despite the decrease in electricity demand from the stay-at-home order through the following four weeks, in-state natural gas generation increased during this period, as shown in Figure 2.<sup>4</sup> This increase was driven largely by low hydroelectric generation, which was down 57 percent (1.6 gigawatts [GW]) relative to the 2011–2019 average for March.

While reservoir levels are near normal, the water content of the Sierra snowpack is well below historical average. Low snowpack indicates reductions in dependable hydro capacity, especially in the second half of the summer.<sup>5</sup>

<sup>4</sup> California ISO’s “Thermal” generation type is reported as Natural Gas, which constitutes virtually all California’s in-state thermal generation. Hydroelectric includes small (Renewables Portfolio Standard-eligible) and large hydro.

<sup>5</sup> The ISO’s *Summer Loads and Resources Assessment* (published May 15) reports that, even under the current adverse water conditions, “base case assumptions” regarding demand and imports yield a 1.1 percent probability of load curtailments (Stage 3 emergency). The reduced availability of imports, for example, due to higher-than-expected demand in the Northwest, would increase the probability significantly (to 4.7 percent in scenarios modeled by the ISO).

**Figure 2: California ISO Average Hourly Weekday Natural Gas and Hydroelectric Generation, March 19–April 23, 2020 and Corresponding Period 2019**



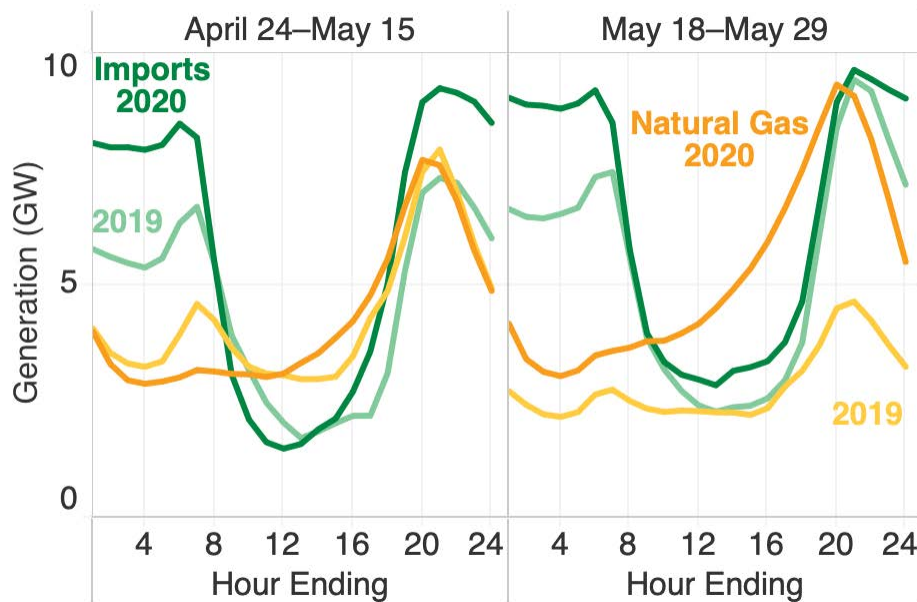
Source: California ISO Renewables Watch

**Imports offset natural gas generation in late April and early May, but natural gas rebounded in late May.** In late April and early May, imports increased during morning and evening peaks and overnight, as seen in Figure 3. Increased imports reduced in-state natural gas generation, even as peak demand remained high. Average weekday natural gas-fired generation fell 1.7 percent (0.1 GW) from April 24 to May 15 compared to 2019. Natural gas continued to contribute significantly to the evening peak, dropping less than 1 percent relative to 2019 from 7 to 9 p.m. but decreased 29 percent during the morning peak from 6 to 8 a.m.

Imports included energy from renewable, carbon-free, and nonrenewable resources, including large hydro generation. Abundant hydro generation in the Northwest contributed to the imports since May 1; estimates of flow on the Columbia River for April to September 2020 have been increased from 95 percent of normal to 103 percent.

In late May, natural gas generation increased dramatically to 84 percent (2.4 GW) compared to 2019. During this period, imports leveled off during peak hours, and demand continued climbing, particularly on hot afternoons and evenings. From 7 to 9 p.m., average in-state natural gas-fired generation doubled.

**Figure 3: California ISO Average Hourly Weekday Natural Gas Generation and Imported Electricity, April 24–May 15 and May 18–29, 2020, and Corresponding Periods in 2019**

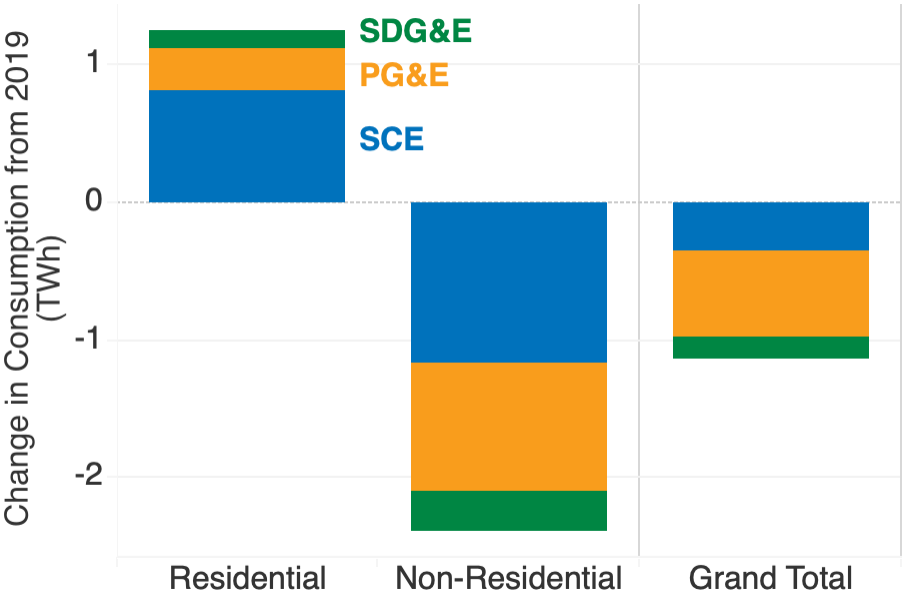


Source: California ISO Renewables Watch

**Declines in nonresidential loads offset the increase in residential consumption.** Overall demand decreased 4 percent compared to 2019 since the stay-at-home order, which was driven by the decrease in in nonresidential demand. The increased time at home shifted energy consumption to the residential sector. Across the three investor-owned utilities (IOUs), residential loads increased 18 percent since the stay-at-home order, but nonresidential load, which represents a larger share of total consumption, declined 14 percent.



**Figure 4: 2019–2020 Year-Over-Year Change in Electricity Consumption by IOU, March 22 through May 16**



Source: California Public Utilities Commission (CPUC) <sup>6</sup>

<sup>6</sup> PG&E Customer Usage impacts are preliminary, based on raw AMI data and subject to changes as updated data become available. PG&E data are not billing-quality, and only customers with interval meters are observed. SCE's load impact by customer class is estimated based on representative samples and does not reflect actual billed usage.

## Natural Gas Sector

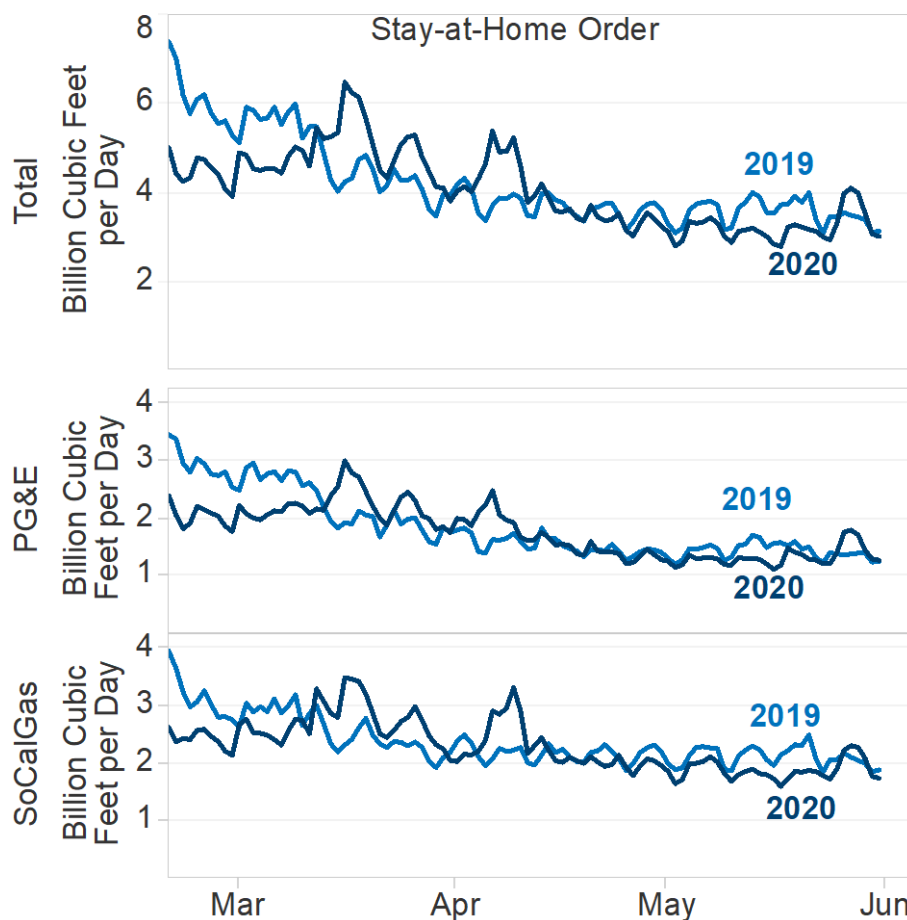
Natural gas demand increased 10 percent relative to 2019 at the start of the stay-at-home order before falling to 9 percent below during late April and May.

**Natural gas use across PG&E and SoCalGas declined 8.8 percent in the most recent weeks of the stay-at-home order compared to last year.** From the stay-at-home order through April 24, PG&E consumption increased 11 percent (7.0 billion cubic feet [Bcf]) compared to same period in 2019.<sup>7</sup> From April 25 through May 31, PG&E demand declined 6.8 percent (3.6 Bcf) below 2019, as shown in Figure 5. SoCalGas was up 8.7 percent (7.2 Bcf) before falling to 10 percent below (8.0 Bcf) during these periods.

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<sup>7</sup> Dates in 2020 have been matched to the corresponding weekday in 2019 to account for weekly patterns in demand.

**Figure 5: PG&E, SoCalGas, and Combined Natural Gas Demand, February 20–May 31 and Corresponding Period for 2019**



Source: PG&E Pipe Ranger, SoCalGas Envoy

**Residential and small commercial natural gas demand is down since the stay-at-home order after adjusting for weather in PG&E service territory.**<sup>8</sup> Since the beginning of the stay-at-home order through May 29, PG&E weekday residential and small commercial demand declined 5.6 percent (37.6 million cubic feet, or MMcf, per day) compared to the same period in 2019 after adjusting for temperature, as shown in Figure 6.<sup>9</sup> The residential and small commercial sectors are the primary users of natural gas for space

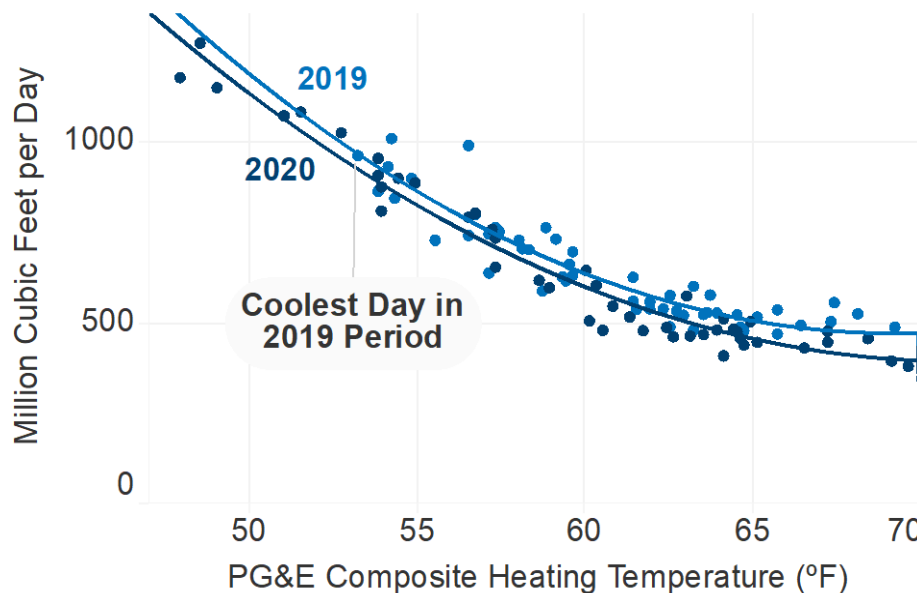
<sup>8</sup> Sector-level data (residential and small commercial, industrial and large commercial, and electric generation) are available only for PG&E.

<sup>9</sup> Temperatures above 70°F are shown at 70°F, above which heating demand is not observable in the data.

and water heating, which are most sensitive to temperature. The cooler temperatures in late March and early April 2020 compared to the same period in 2019 contributed to increased the demand for heating.

While sector-level data are not available for other gas utilities, similar patterns are likely occurring throughout California. Overall weekday natural gas demand for SoCalGas, which includes residential, commercial, industrial and electric generation demand, decreased 7.3 percent (177 MMcf/day) through the end of May after adjusting for temperature.

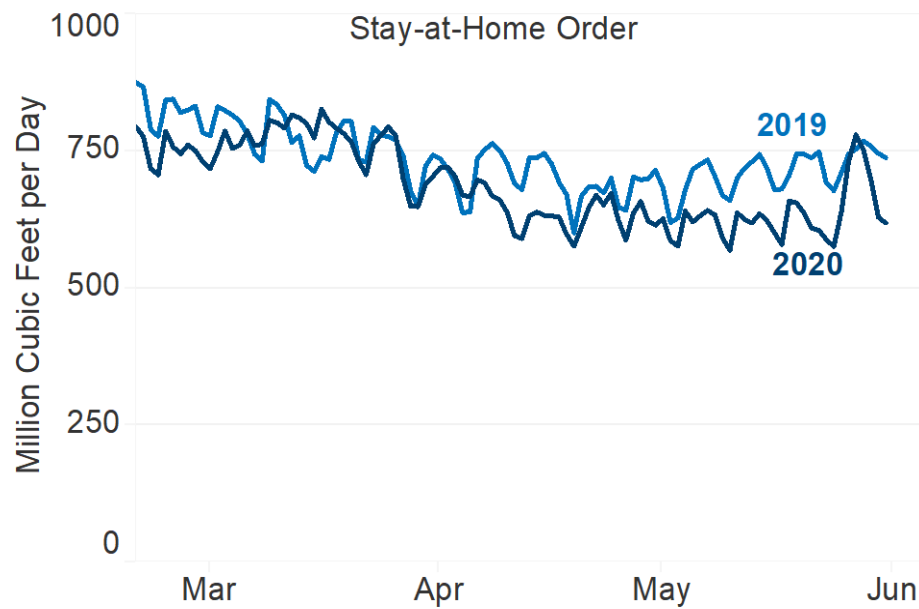
**Figure 6: PG&E Residential and Small Commercial Weekday Demand by Temperature, March 19–May 29, 2020, and Corresponding Period for 2019**



Source: PG&E Pipe Ranger

**Industrial and large commercial natural gas demand remained below 2019 levels since early April in PG&E.** PG&E demand is down 8.1 percent since the stay-at-home order compared to 2019. Daily demand fell below 2019 levels on April 5, where it has remained except for May 27, as shown in Figure 7: PG&E Industrial and Large Commercial Natural Gas Demand, February 20–May 24, 2020, and Corresponding Period for 2019.

**Figure 7: PG&E Industrial and Large Commercial Natural Gas Demand, February 20–May 24, 2020, and Corresponding Period for 2019**



Source: PG&E Pipe Ranger

## Transportation Fuels Sector

Despite increased demand, gasoline production declined over the last three weeks as refiners drew down inventories. Diesel fuel output over the last two weeks dropped below the bottom of the normal seasonal range, while jet fuel production remains at historically low levels because of a significant decline in air travel. Diesel fuel inventories are above normal levels for this time of year. Gasoline inventories continue to drift lower and are nearing the bottom of the seasonal range, while jet fuel inventories declined to below the bottom of the seasonal range.

The most recent CEC report on refinery operations for the week ending May 29, 2020, shows, compared to the previous week jet fuel production rose 1.2 percent, while gasoline output declined about 4 percent, and California diesel fuel rebounded 2.1 percent. Jet fuel production remains at levels last seen during the early 1960s.

Changes to California refinery operations for the week ending May 29, 2020, compared to the week ending March 20, 2020, show:

- Gasoline production declined 37.1 percent; inventories decreased 18.6 percent.
- Jet fuel production dropped 62.7 percent; inventories up by 3.4 percent.
- California diesel production decreased 22.1 percent; inventories up by 22.7 percent.

Based on CEC refinery production and inventory data from the week ending May 29, 2020, apparent demand calculations show a continued steep decline for jet fuel and a moderate drop for gasoline compared to the week ending March 20, 2020. Diesel fuel demand has declined the least of the three primary transportation fuels. The changes were the following:

- California gasoline demand declined 30.2 percent.
- Jet fuel demand dropped 65.8 percent.
- California diesel demand decreased 14.3 percent.

Changes in apparent demand for the most recent week compared to the monthly average for May 2019 were the following:

- California gasoline demand declined 32.7 percent.
- Jet fuel demand dropped 75 percent.
- California diesel demand declined 16.9 percent.

California's average retail price for regular grade gasoline dropped below \$3 per gallon on April 3, 2020. This is the first time that the average price has dropped below \$3 since August 28, 2017. Current fuel and crude oil prices compared to last week, month, and year are shown in Table 1.

- California statewide average retail gasoline price increased for the first time on May 6, 2020, following 75 consecutive days of decline.
- California and U.S. retail gasoline prices are gradually rising in response to slightly higher crude oil costs and rebounding demand associated with increased personal travel.
- U.S. average retail gasoline price on June 5, 2020, surpassed \$2 per gallon for the first time in 68 days because of higher crude oil prices and rebounding gasoline demand.

**Table 1: Retail Prices for Regular Grade Gasoline, Diesel Fuel, and Crude Oil**

	6/05/2020	Same Time Last Week	Same Time Last Month	Same Time Last Year
Retail Gasoline	Cents/Gallon	Cents/Gallon	Cents/Gallon	Cents/Gallon
California	292.8	288.6	274.0	392.8
United States	200.3	197.2	178.5	279.5
Price Change				
California		<b>4.2</b>	<b>18.8</b>	<b>-100.0</b>
United States		<b>3.1</b>	<b>21.8</b>	<b>-79.2</b>
Retail Diesel Fuel	Cents/Gallon	Cents/Gallon	Cents/Gallon	Cents/Gallon
California	326.3	324.9	324.2	413.1
United States	241.0	241.1	242.9	307.2
Price Change				
California		<b>1.4</b>	<b>2.1</b>	<b>-86.8</b>
United States		<b>-0.1</b>	<b>-1.9</b>	<b>-66.2</b>
Crude Oil	\$/Barrel	\$/Barrel	\$/Barrel	\$/Barrel
California	32.21	27.00	10.08	56.60
International - Brent	39.99	35.29	27.20	61.97
Price Change				
California		<b>5.21</b>	<b>22.13</b>	<b>-24.29</b>
International - Brent		<b>4.70</b>	<b>12.79</b>	<b>-21.98</b>

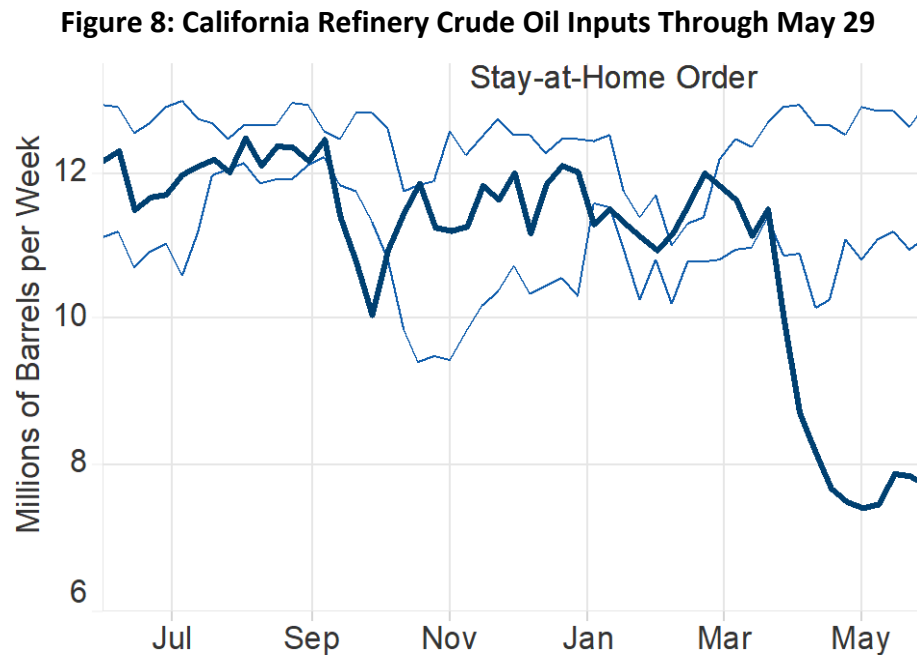
Source: Retail prices, AAA; crude oil prices, Oil Price Information Service

To date, three temporary refinery shutdowns were announced in the United States and Canada, with one in California. On April 16, 2020, Marathon announced a plan to idle its refinery in Martinez, California. The plan was completed April 28, 2020, and the facility remains temporarily closed. The temporary closure does not pose any near-term risks to the adequacy of California fuel supply since the inventory levels for all fuel types remain normal or higher than normal. No other California refineries have shut down and the CEC continues to monitor for any refinery closures.

California refiners have decreased the amount of crude oil being processed to help reduce the excess gasoline, diesel, and jet fuel output. Some refineries are operating at minimum levels. Crude oil inputs to California refineries for the week ending May 29, 2020, were down 32.8 percent compared to the week ending March 20, 2020.



The quantity of crude oil processed at California refineries for the week ending May 1, 2020, was lower than at any other point in the CEC data series going back to 1981. Although crude oil inputs have dropped off over the last three weeks, inputs may begin to rise over the next several weeks as refiners respond to a continued rebound in gasoline demand. California refiners are processing 3.4 million barrels per week less than the lower end of the seasonal range as shown in Figure 8.



Source: CEC–Petroleum Industry Information Reporting Act weekly refinery reports

## Contact

For more information, contact the CEC's Media and Public Communications Office at [mediaoffice@energy.ca.gov](mailto:mediaoffice@energy.ca.gov) or (916) 654-4989.



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**JUNE 2020**

