

PETROLEUM WATCH

CALIFORNIA ENERGY COMMISSION

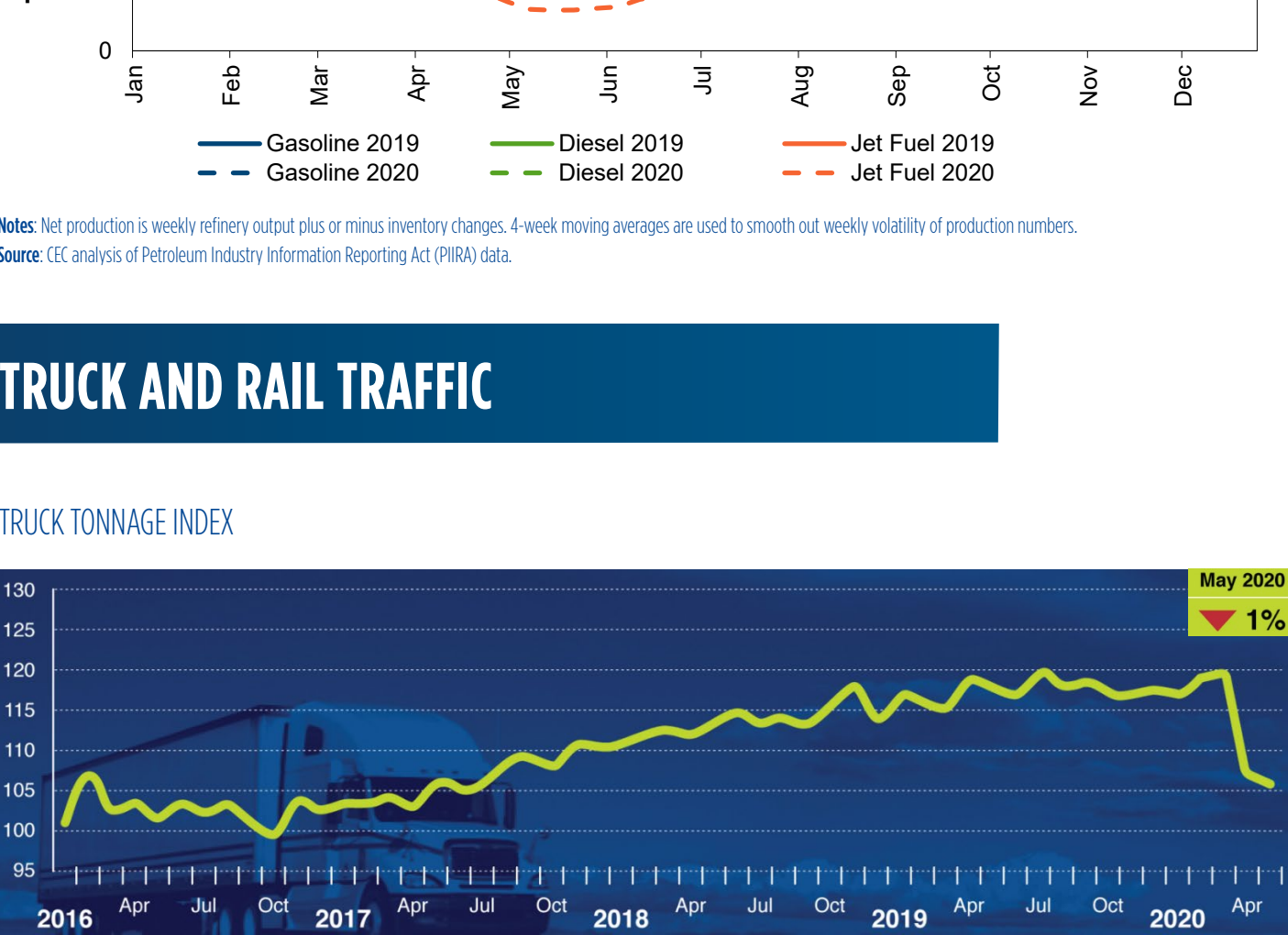
INSIDE

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- Bay Area Bridges
- California Refinery Production
- Truck and Rail Traffic
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- Jet Fuel and Ultra Low Sulfur Diesel Output
- Exports to Foreign Destinations from California
- Featured Topic: Coronavirus Fuel Demand Impacts and Refinery Operation Changes

REFINERY NEWS

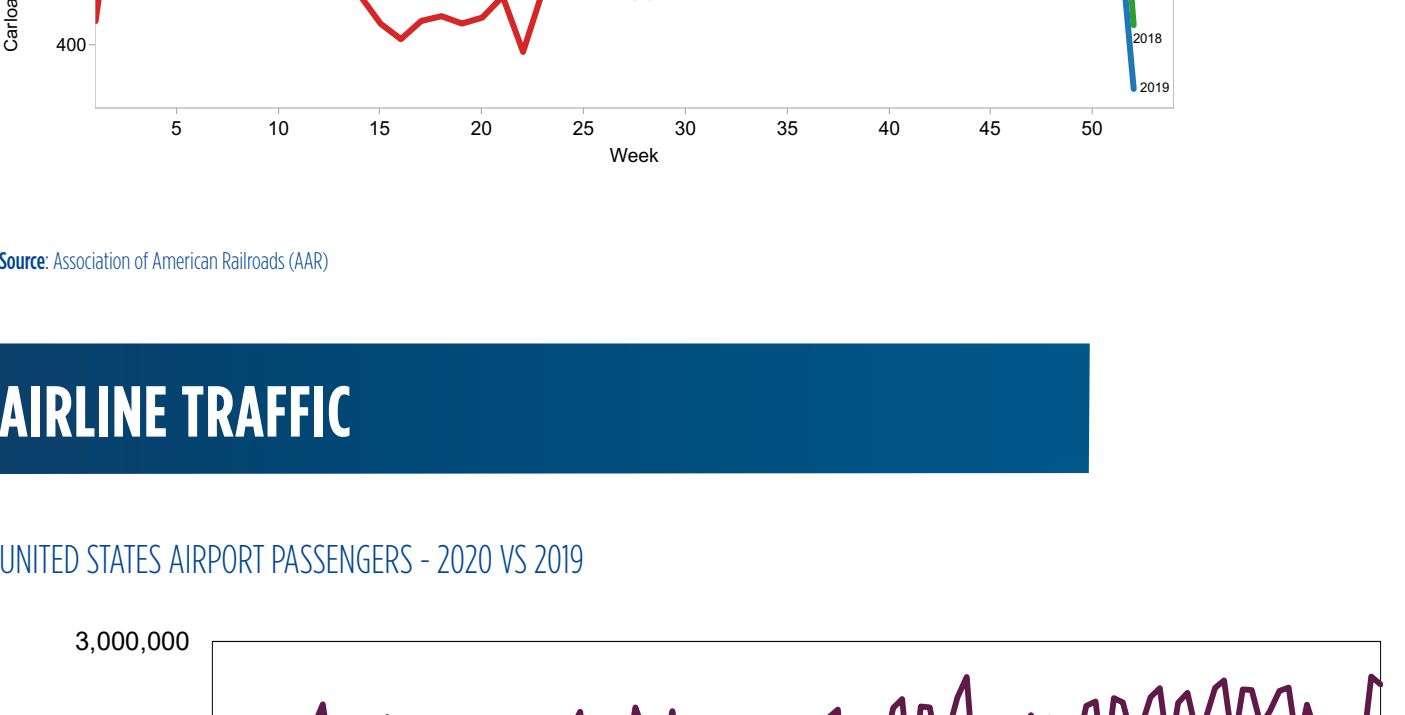
- Come-by-Chance:** On March 30, North Atlantic Refining announced temporary idling of the refinery in eastern Canada ([Reuters](#)).
 - The refinery has a crude oil processing capacity of 115,000 barrels per day.
 - Ten percent of its fuel production is provided to the local market, while 90 percent is exported.
 - The export market dried up because of the global reduced demand for gasoline and jet fuel.
- Marathon Gallup:** On April 8, the refinery announced temporary idling of its refinery in New Mexico ([Reuters](#)).
 - Refinery closure process was completed in mid-April.
 - The refinery has a crude oil processing capacity of only 26,000 barrels per day.
 - Provides all of their fuel production to the local market.
 - Marathon plans to meet all of their local supply obligations from refinery sources located nearby in El Paso, Texas.
- Marathon Martinez:** On April 16, Marathon announced temporary idling of its refinery in California ([SFGATE](#)).
 - The refinery closure process was completed on April 28.
 - The refinery has a crude oil processing capacity of 166,000 barrels per day.
 - The refinery is 4th largest in California and represents 9.1 percent of statewide capacity for facilities that produce California gasoline and diesel – 21 percent of refineries in the greater San Francisco Bay Area.
 - Marathon plans to meet its local supply obligations by sourcing from its other refineries and/or other California facilities.
 - This temporary closure has taken some pressure off of the other refiners still operating, bringing aggregate output closer to decreased demand levels.

VEHICLE TRAFFIC – SAN FRANCISCO BAY AREA BRIDGES



Notes: The following bridges are included in the aggregated totals: Antioch, Benicia, Carquinez, Dumbarton, Richmond, San Francisco-Oakland, and San Mateo.
Source: California Energy Commission (CEC) analysis of Metropolitan Transportation Commission (MTC) data.

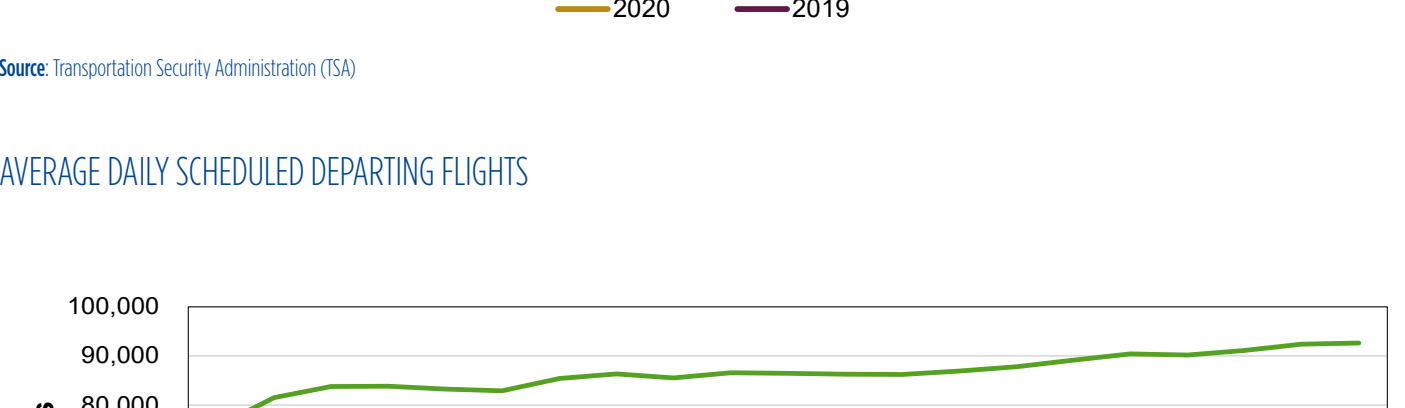
CALIFORNIA REFINERY PRODUCTION



Notes: Net production is weekly refinery output plus or minus inventory changes. 4-week moving averages are used to smooth out weekly volatility of production numbers.
Source: CEC analysis of Petroleum Industry Information Reporting Act (PIIRA) data.

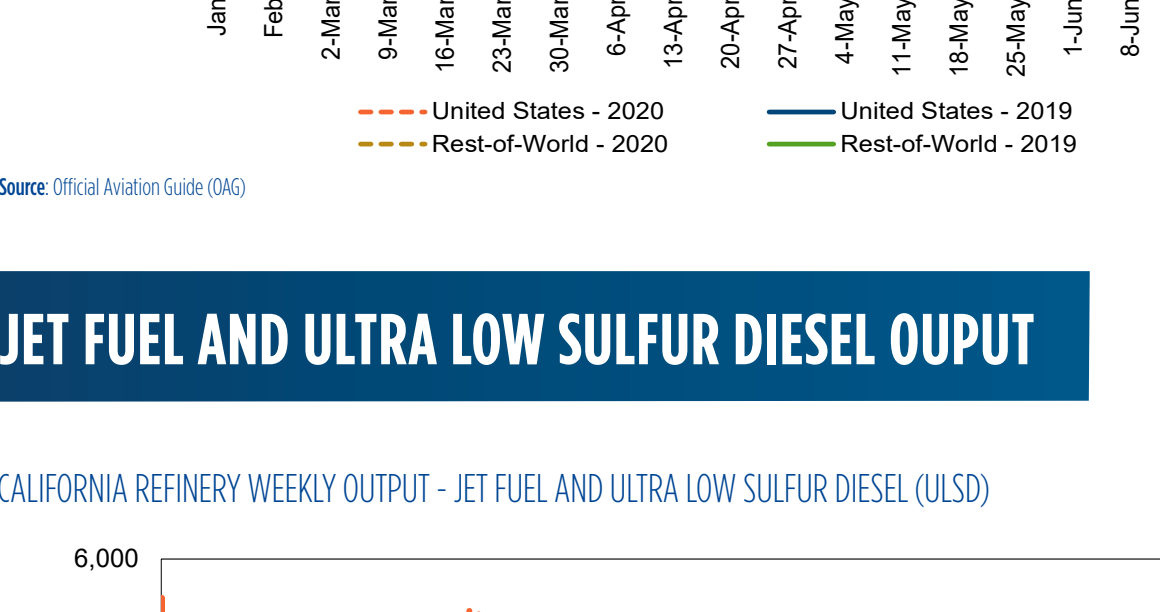
TRUCK AND RAIL TRAFFIC

TRUCK TONNAGE INDEX



Notes: Reported as a percentage, truck tonnage index compares current freight tonnage to 2005 tonnage (seasonally adjusted) – 2005 = 100.
Source: American Trucking Association (ATA)

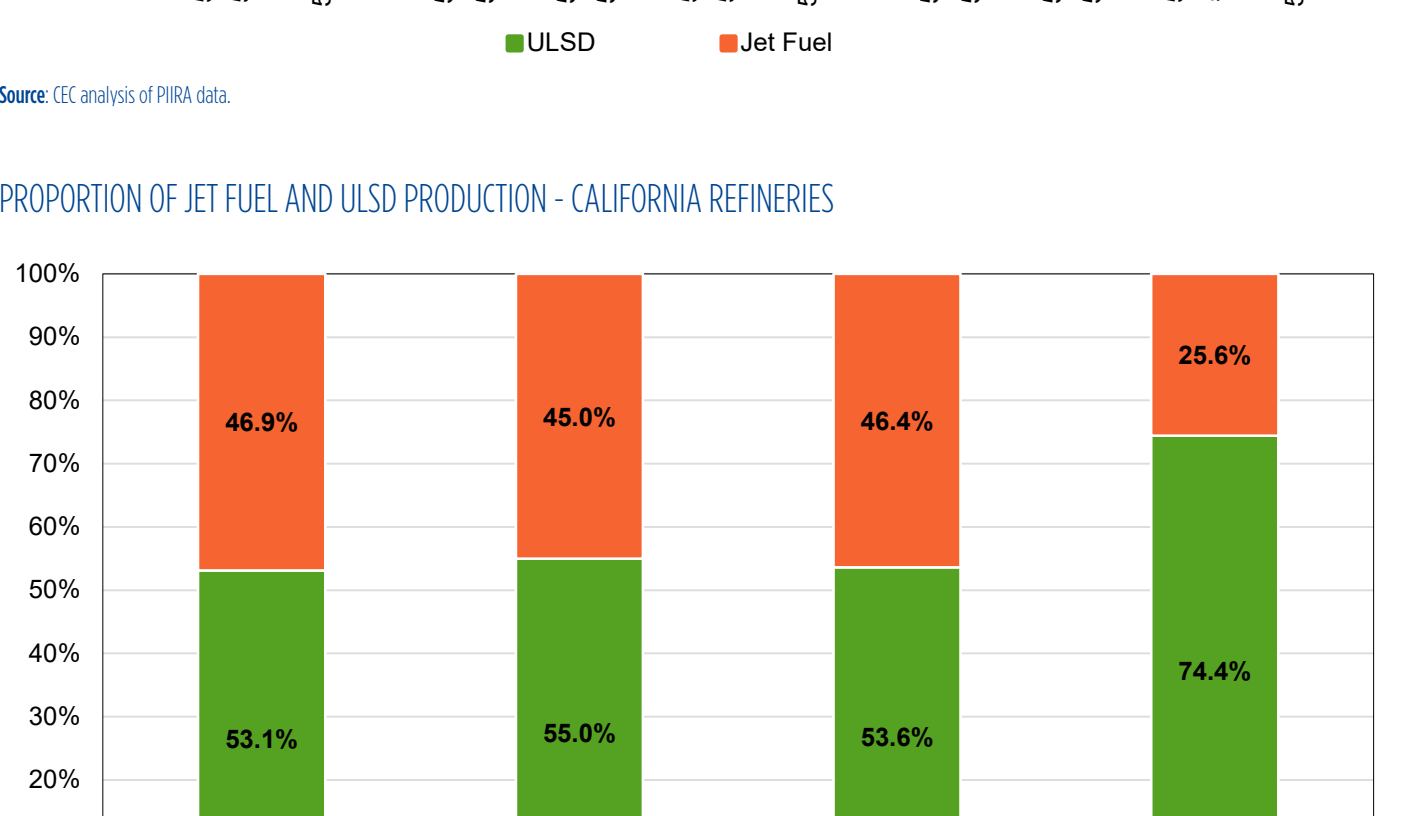
UNITED STATES TOTAL INTERMODAL ORIGINATED RAIL TRAFFIC



Source: Association of American Railroads (AAR)

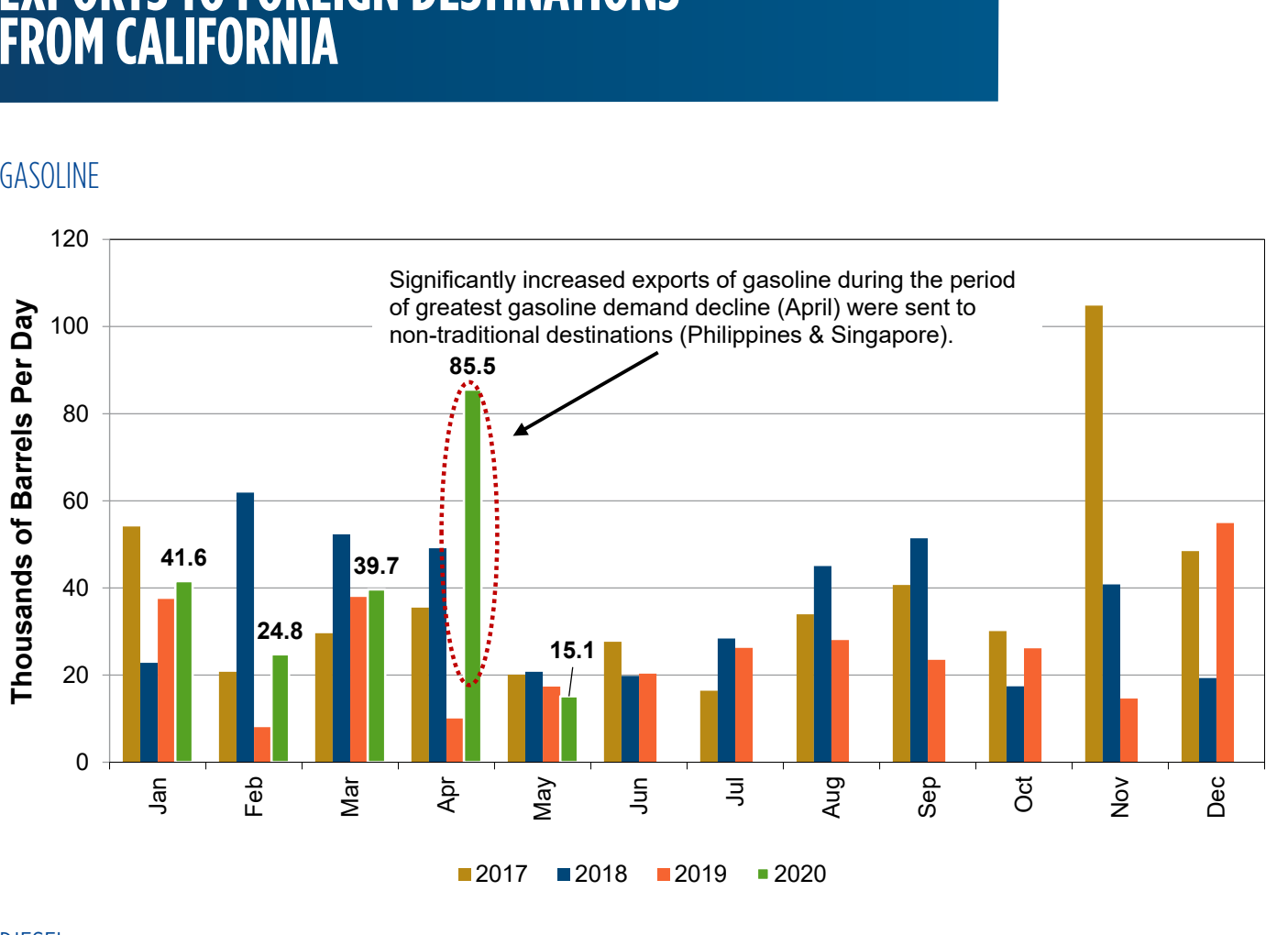
AIRLINE TRAFFIC

UNITED STATES AIRPORT PASSENGERS – 2020 VS 2019



Source: Transportation Security Administration (TSA)

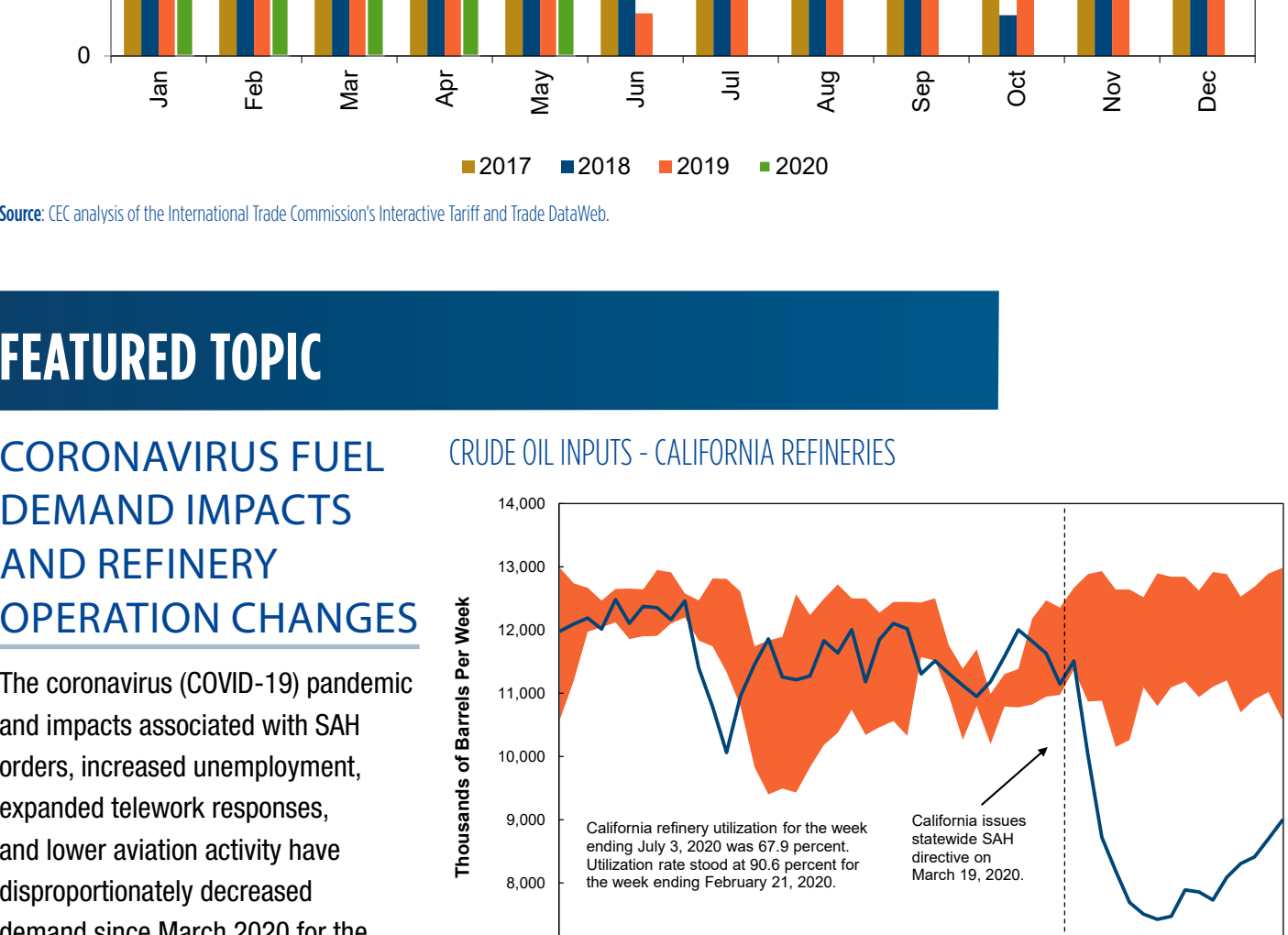
AVERAGE DAILY SCHEDULED DEPARTING FLIGHTS



Source: Official Aviation Guide (OAG)

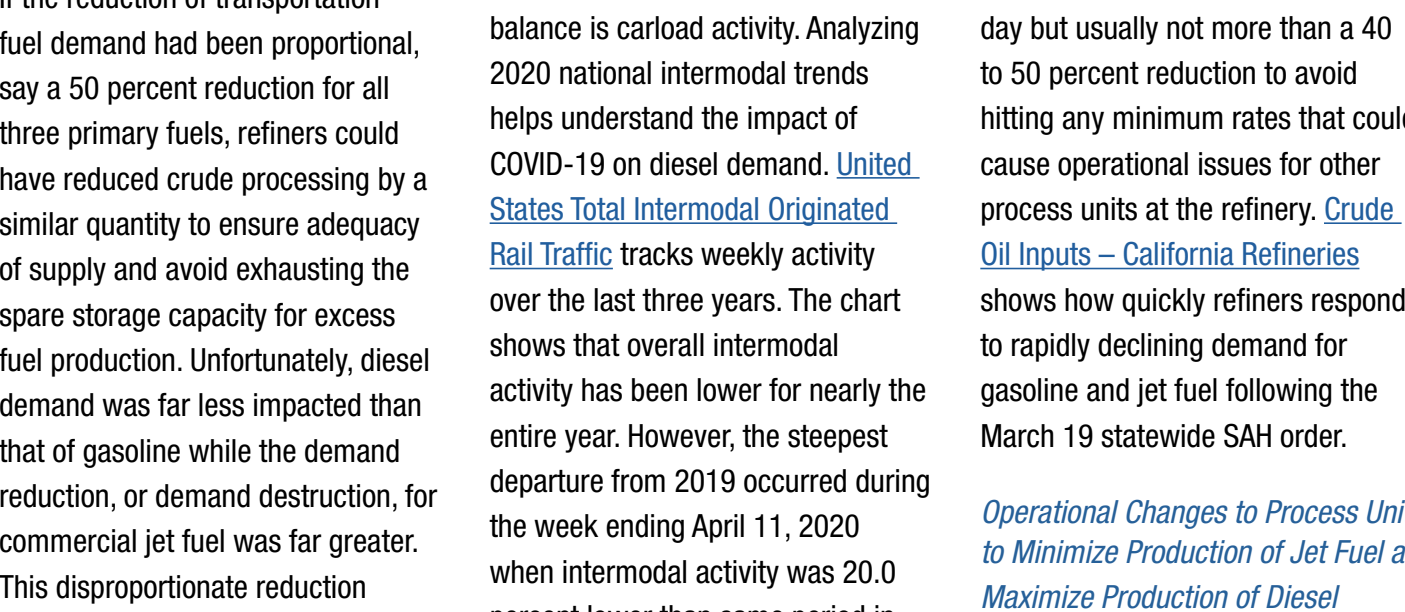
JET FUEL AND ULTRA LOW SULFUR DIESEL OUTPUT

CALIFORNIA REFINERY WEEKLY OUTPUT – JET FUEL AND ULTRA LOW SULFUR DIESEL (ULSD)



Source: CEC analysis of PIIRA data.

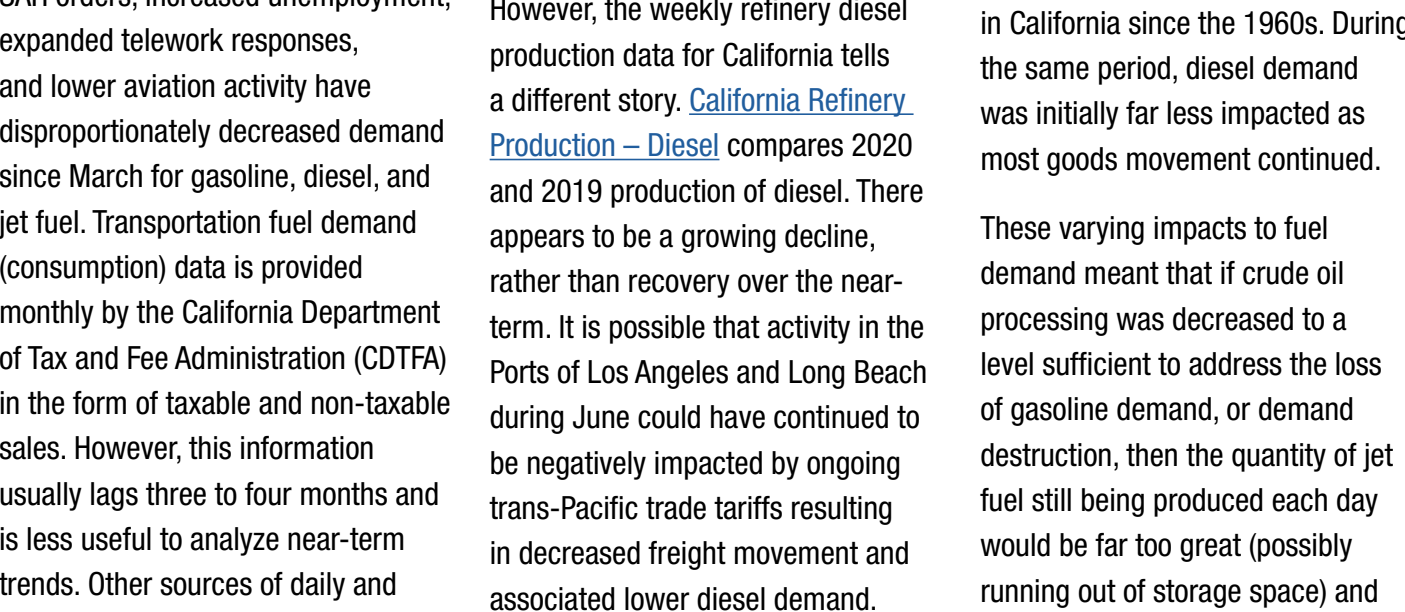
PROPORTION OF JET FUEL AND ULSD PRODUCTION – CALIFORNIA REFINERIES



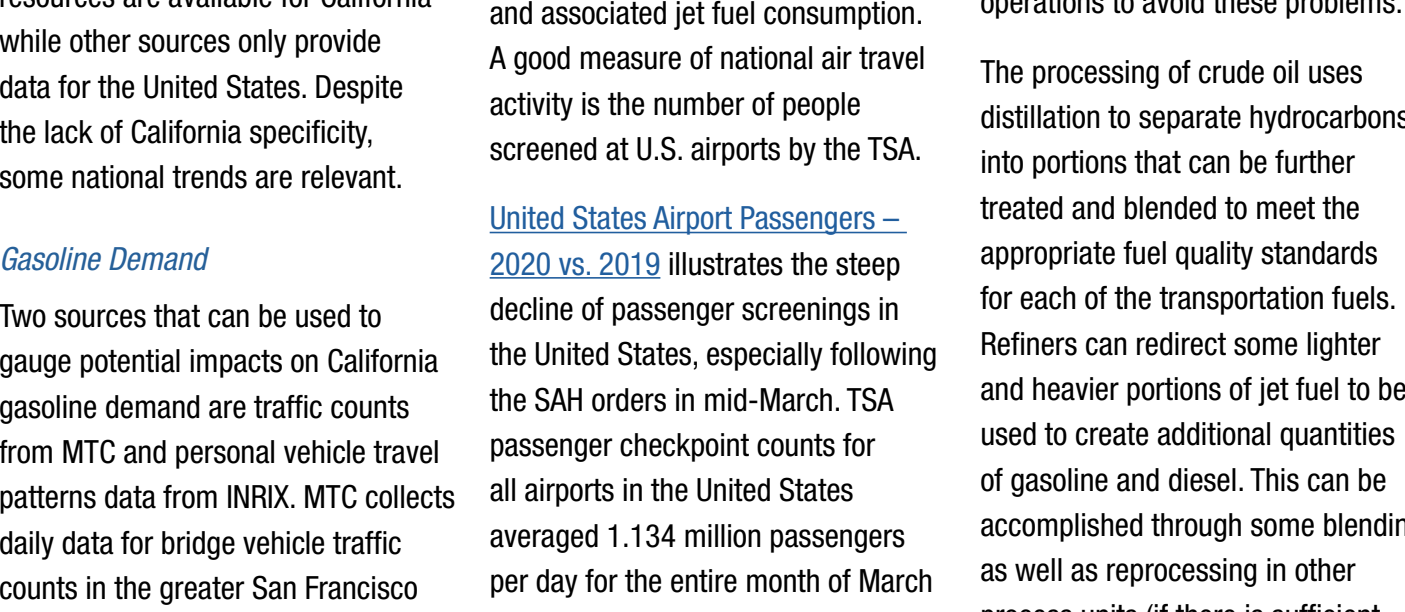
Notes: 2020 pre-SAH is average of data through week ending 3/2/20. 2020 post-SAH is average of data from week ending 3/20/20 through week ending 7/5/20.
Source: CEC analysis of PIIRA data.

EXPORTS TO FOREIGN DESTINATIONS FROM CALIFORNIA

GASOLINE



DIESEL



FEATURED TOPIC

CORONAVIRUS FUEL DEMAND IMPACTS AND REFINERY OPERATION CHANGES

The coronavirus (COVID-19) pandemic and impacts associated with SAH orders, increased unemployment, expanded telework responses, and lower aviation activity have disproportionately decreased demand since March 2020 for the three primary transportation fuels – gasoline, diesel, and jet fuel. Refiners had to adjust operations so that transportation fuels production output was not too high, in light of the drop in fuel demand, to overwhelm their finite storage capacity forcing entire refineries to be temporarily idled. If the reduction of transportation fuel demand had been proportional, say a 50 percent reduction for all three primary fuels, refiners could have reduced crude processing by a similar quantity to ensure adequacy of supply and avoid exhausting the spare storage capacity for excess fuel production. Unfortunately, diesel demand was far less impacted than that of gasoline while the demand reduction, or demand destruction, for commercial jet fuel was far greater. This disproportionate reduction of demand created challenges for refiners that required them to reduce the quantity of crude oil being processed and alter daily operations of some process units demonstrating a new level of operational flexibility. California refiners used a variety of strategies to ensure there was an adequate supply of transportation fuels for consumers and businesses.

FUEL DEMAND IMPACTS

SAH orders, increased unemployment, expanded telework responses, and lower aviation activity have disproportionately decreased demand since March for gasoline, diesel, and jet fuel. Transportation fuel demand (consumption) data is provided monthly by the California Department of Tax and Fee Administration (CDTFA) in the form of taxable and non-taxable sales. However, this information usually lags three to four months and is less useful to analyze near-term trends. Other sources of daily and weekly information that can be good indicators of fuel demand have been used to gauge potential near-term changes in demand. Some of these resources are available for California while other sources only provide data for the United States. Despite the lack of California specificity, some national trends are relevant.

Gasoline Demand

Two sources that can be used to gauge potential impacts on California gasoline demand are traffic counts from MTC and personal vehicle travel patterns data from INRIX. MTC collects daily data for bridge vehicle traffic counts in the greater San Francisco Bay Area. Compared to the same time last year, MTC data showed a steep decline in traffic following the SAH orders issued in multiple San Francisco Bay Area counties and the state during mid-March.

Vehicle Traffic – San Francisco Bay Area Bridges showed weekly traffic since January 1, 2019, for seven bridges within the greater San Francisco Bay Area – Antioch, Benicia, Carquinez, Dumbarton, Richmond, San Francisco-Oakland, and San Mateo. There was a significant decline in traffic immediately following the SAH orders. Within three weeks, traffic reached a maximum decline of nearly 57 percent compared to the same period in 2019.

Personal vehicle travel patterns also illustrate changes in gasoline consumption. INRIX is a company that collects and analyzes personal travel data throughout the United States. California's average personal travel was down approximately 55 percent during early to mid-April compared to the end of February 2020 (the control period used by INRIX to measure changes in activity). This reduction is similar in magnitude and timing to that of the drop in vehicle traffic for the greater San Francisco Bay Area. California personal travel was estimated by INRIX to be off by only 9 percent for the week ending July 3, 2020.

The drastic drop in vehicle traffic and changes in personal travel can be a good measure of gasoline consumption that should be reflected in the weekly refinery production data collected by the California Energy Commission (CEC). **California Refinery Production – Gasoline** compares 2020 and 2019 refinery production of reformulated gasoline. The chart illustrates that the quantity of gasoline produced declines and rebounds similar to the MTC traffic counts.

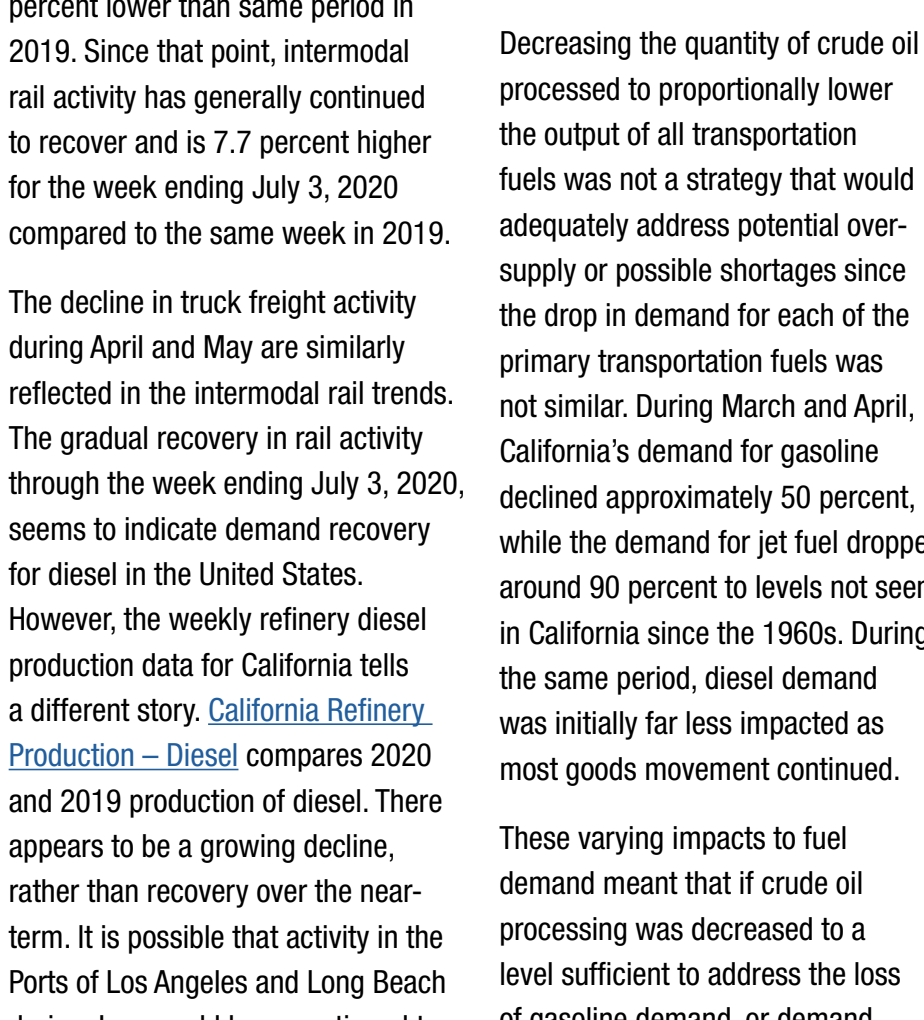
Diesel Demand

Good indicators of diesel demand are trucking and rail activity.

ATA publishes a monthly analysis of truck freight hauling tonnage that is seasonally adjusted. **Truck Tonnage Index** shows a modest 1.0 percent decline for May 2020 compared to the previous year. This is an improvement over the 10.3 percent decline in April 2020 but is still down 9.6 percent compared to May 2019, the largest single month year-over-year drop since 2009. The impact was most profound during April but persisted in May as commerce for many types of businesses were impacted by SAH orders. Since this information is published monthly, more near-term analysis is better left to weekly sources of information such as railroad activity.

AAR tracks intermodal and carload movements within the United States on a weekly basis. Intermodal rail activity is reflective of goods movement and includes railcars transporting shipping containers and truck trailers. Carloads consist of bulk cargo such as coal, grains, and crude oil. According to AAR,

CRUDE OIL INPUTS – CALIFORNIA REFINERIES



Source: CEC analysis of PIIRA data.

more than 90 percent of the rail activity originating in California is intermodal, while nearly 80 percent of the rail activity with California as the destination was intermodal. The decline is carload dependent. Analyzing 2020 national intermodal trends helps understand the impact of COVID-19 on diesel demand. **United States Total Intermodal Originated** **Rail Traffic** tracks weekly activity over the last three weeks. The chart shows that overall intermodal activity has been lower for nearly the entire year. However, the steepest departure from 2019 occurred during the week ending April 11, 2020 when intermodal activity was 20.0 percent lower than same period in 2019. Since that point, intermodal rail activity has generally continued to recover and is 7.7 percent higher for the week ending July 3, 2020 compared to the same week in 2019.

The decline in truck freight activity during April and May are similarly reflected in the intermodal rail trends. The gradual recovery in rail activity through the week ending July 3, 2020, seems to indicate demand recovery for diesel in the United States. However, the weekly refinery diesel production data for California tells a different story. **California Refinery Production – Diesel** compares 2020 and 2019 production of diesel. There appears to be a growing decline, rather than recovery over the near-term. It is possible that activity in the Ports of Los Angeles and Long Beach during June could have continued to be negatively impacted by ongoing trans-Pacific trade tariffs resulting in decreased freight movement and associated lower diesel demand.

Jet Fuel Demand

SAH orders and travel restrictions have drastically reduced aviation travel and associated jet fuel consumption. A good measure of national air travel activity is the number of people screened at U.S. airports by the TSA.

United States Airport Passengers – 2020 vs. 2019 illustrates the steep decline of passenger screenings in the United States, especially following the SAH orders in mid-March. TSA passenger checkpoint counts for all airports in the United States averaged 1.134 million passengers per day for the entire month of March 2020. But as travel restrictions increased, along with SAH orders, those counts plummeted to an average of 98 thousand passengers per day between April 9 and April 22. After plateauing at a 96 percent reduction for April, passenger counts have started to rise over the last several weeks following relaxation of SAH orders in various states.

The number of daily departures also provides insight on jet fuel demand. OAG tracks scheduled departures globally. **Average Daily Scheduled** **Departures** **Flights** depicts departures for the United States and the rest-of-the-world from the beginning of the year. Since the week ending May 4 (low point for activity), scheduled departures in the U.S. have increased 92.8 percent. For the most recent week ending July 6 average daily scheduled departures are still 53.1 percent lower compared to same period last year. Scheduled departures in the United States over the latest week improved, rising 22.9 percent compared to the previous week. TSA passenger counts over the same period rose 16.0 percent. This means that aviation activity continues to improve at a gradual pace but remains far below that of 2019 for this time of year.

California Refinery Production – Jet Fuel compares 2020 and 2019 production of jet fuel. The shape of the jet fuel production decline and near-term rebound appear consistent with the TSA and OAG trends.

REFINERY OPERATIONAL CHANGES IN RESPONSE TO DECREASED DEMAND FOR TRANSPORTATION FUELS

The disproportionate reduction of demand for transportation fuels created challenges for refiners that required them to employ various strategies including temporary closure of an entire refinery, decreased processing of crude oil, operational changes to some process units to alter the ratio of jet fuel and diesel produced, and incremental exports of excess gasoline to non-traditional markets.

Temporary Closure of Refineries

As demand for gasoline and jet fuel sharply declined some refiners elected to temporarily idle some refineries based on local market conditions and access to replacement fuel supplies to continue meeting contractual obligations. To date, there have been three publicly announced temporary shutdowns of refineries in the United States and Canada, with one in California. See **Refinery News** for descriptions of the three facilities and additional details associated with each location.

Reduced Processing of Crude Oil

Refiners in California and elsewhere decreased the quantity of crude oil processed at their facilities to minimize the production of excess transportation fuels. There are two approaches being used to decrease oil processing. The first option is to

idle a smaller crude processing unit for facilities that have more than one. A couple of California refiners have done this. Most refiners lowered the quantity of crude oil processed each day but usually not more than a 40 to 50 percent reduction to avoid hitting any minimum rates that could cause operational issues for other process units at the refinery. **Crude Oil Inputs – California Refineries** shows how quickly refiners responded to rapidly declining demand for gasoline and jet fuel following the March 19 statewide SAH order.

Operational Changes to Process Units to Minimize Production of Jet Fuel and Maximize Production of Diesel

Decreasing the quantity of crude oil processed to proportionally lower the output of all transportation fuels was not a strategy that would adequately address potential oversupply or possible shortages since the drop in demand for each of the primary transportation fuels was not similar. During March and April, California's demand for gasoline declined approximately 50 percent, while the demand for jet fuel dropped around 90 percent to levels not seen in California since the 1960s. During the same period, diesel demand was initially far less impacted as most goods movement continued.

These varying impacts to fuel demand meant that if crude oil processing was decreased to a level sufficient to address the loss of gasoline demand, or demand destruction, then the quantity of jet fuel still being produced each day would be far too great (possibly running out of storage space) and the amount of diesel created would be too little (possibly resulting in a shortage of diesel). Refiners needed to make other adjustments to their operations to avoid these problems.

The processing of crude oil uses distillation to separate hydrocarbons into portions that can be further treated and blended to meet the appropriate fuel quality standards for each of the transportation fuels. Refiners can redirect some lighter and heavier portions of jet fuel to be used to create additional quantities of gasoline and diesel. This can be accomplished through some blending as well as reprocessing in other process units (if there is sufficient capacity). One example would be to take some of the heavier portion of jet fuel, which has a higher sulfur content than diesel, and reprocess this material to lower the sulfur content enough to be able to be blended with diesel, as described by **Stillwater Associates**. **California Refinery Weekly Output – Jet Fuel and ULSD** shows that California refiners altered their process unit operations to greatly diminish the quantity of jet fuel being produced each week while maintaining diesel output at near-normal levels.

Proportion of Jet Fuel and ULSD – California Refineries

California Refineries breaks down the relative share of jet fuel and diesel for the previous couple of years and the period just before the SAH order in California. The relative proportions prior to the SAH order were very consistent with a nearly even split. However, post-SAH the ratio of the two fuels produced shifted to a diesel-heavy ratio to help address continued near-normal demand for diesel during a period of significantly lower jet fuel demand. These changes in refinery operations successfully avoided any temporary supply shortages for diesel.

California refiners avoided an oversupply of gasoline during the initial month following the SAH order by temporarily increasing gasoline exports to foreign destinations. This approach may seem like a logical option, but it should be noted that the COVID-19 pandemic also decreased fuel demand to a similar degree in most other countries throughout the world. This means that opportunities to export incremental quantities of gasoline were diminished, rather than increased. **Exports to Foreign Destinations from California – Diesel** shows that diesel exports were within the normal range for the most recent couple of months.

OPERATIONS ALTERED AND FUELING DEMANDS MET

The COVID-19 pandemic impacts to transportation fuel demand are of historic scope and magnitude for modern times. The ability of refiners in California and throughout the rest of the world to alter operations were testimony to the depth of engineering flexibility and degree of operational skillability sufficient to continue adequately meeting the fueling demands of consumers and businesses over the last several months.