



Transportation Fuels Trends, Jet Fuel Overview, Fuel Market Changes & Potential Refinery Closure Impacts

BAAQMD Board of Directors Special Meeting

Via Zoom

May 5, 2021

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Overview

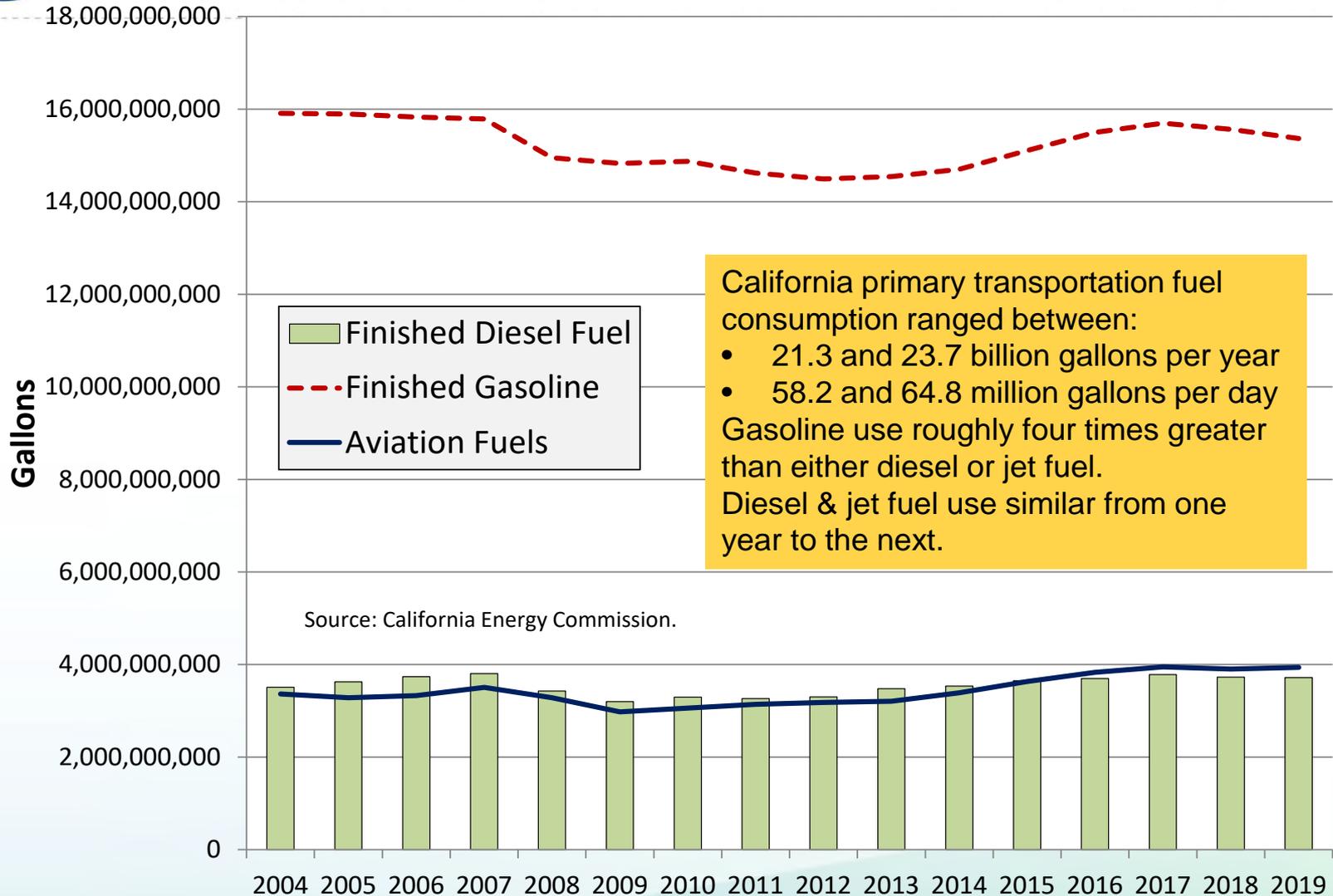
- Transportation Fuel Demand
 - California historical & pandemic demand impacts
 - Forecast trends
- California Jet Fuel Market & Infrastructure
 - SF Bay Area airport supply
- Refinery Closures & Potential Market Impacts
 - Decisions based on changing fuel demand & types
 - Consolidation & conversions
 - Decisions based on facility operational costs
 - Premature refinery closure



Transportation Fuel Demand - California



California Primary Transportation Fuels



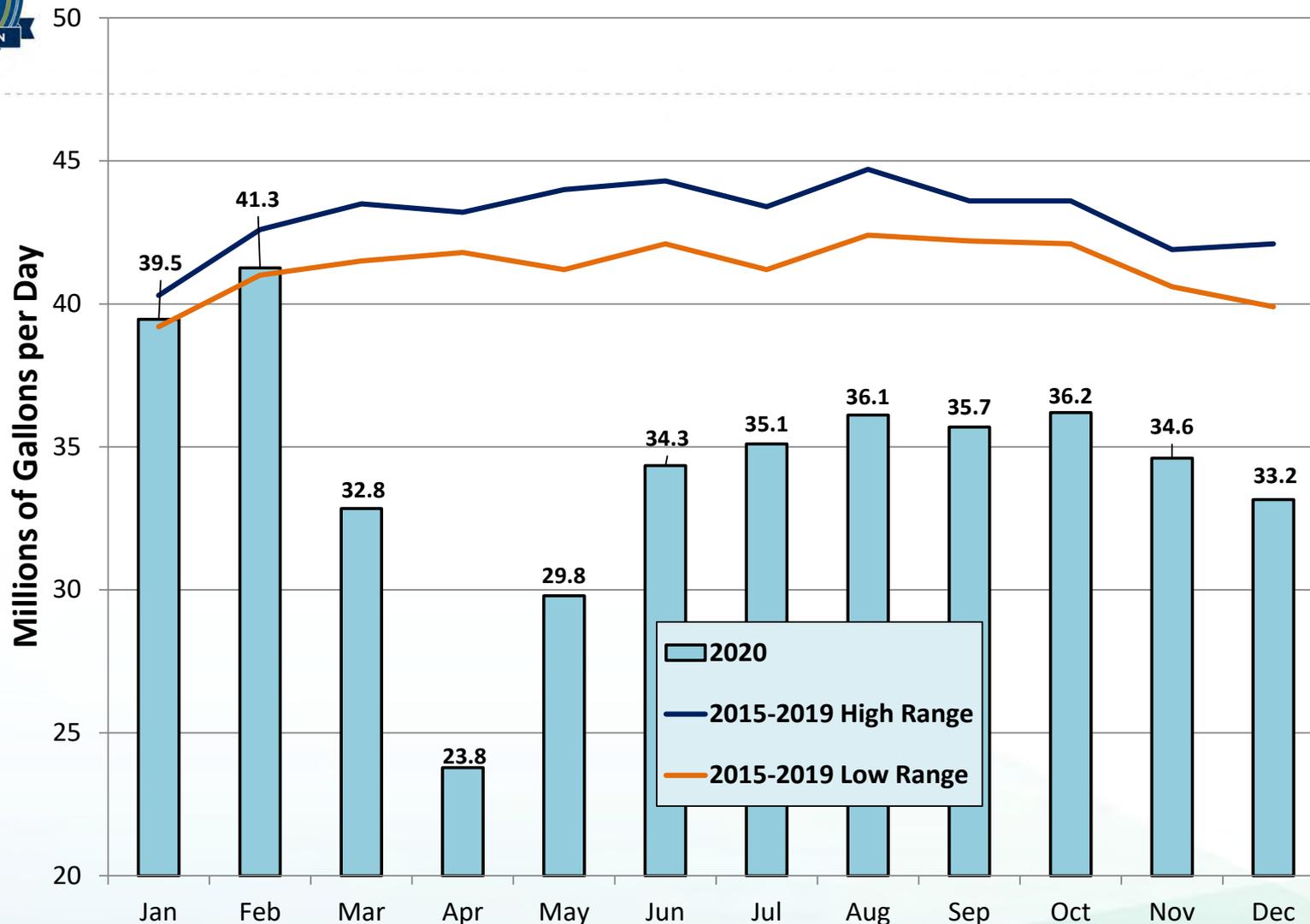


Pandemic Impacts & Outlook - Gasoline

- Gasoline demand declined 18.2 percent in 2020
 - 12.58 billion gallons - lowest level since 1987
- Continues to recover
 - Still not back to pre-pandemic levels
 - Most recent estimate – still down 8.0 percent compared to April 2019
 - 4-week average demand (through week ending April 16)
 - Traffic counts still lag 2019 levels, despite much lower transit ridership
 - Varying degrees of remote work continues for private sector & government
- Forecast to continue declining over the next several years
 - Increasing percentage of ZEV light-duty vehicle sales
 - California gasoline demand peaked in 2017
 - By 2026, drop in demand (statewide) could exceed 1.0 billion gallons per year compared to current levels



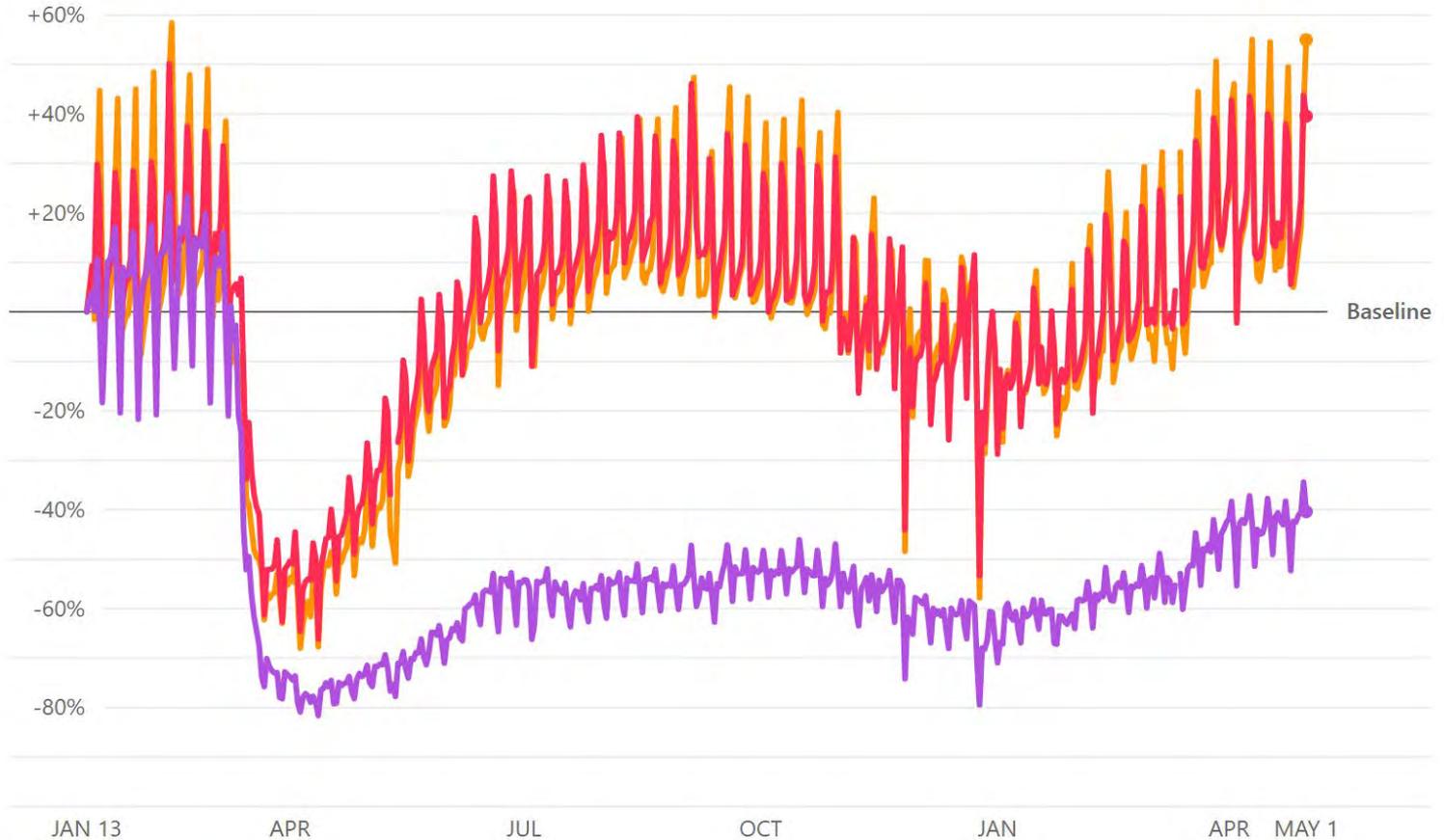
California Gasoline Demand - 2020



Data includes ethanol.



Mobility Trends – California

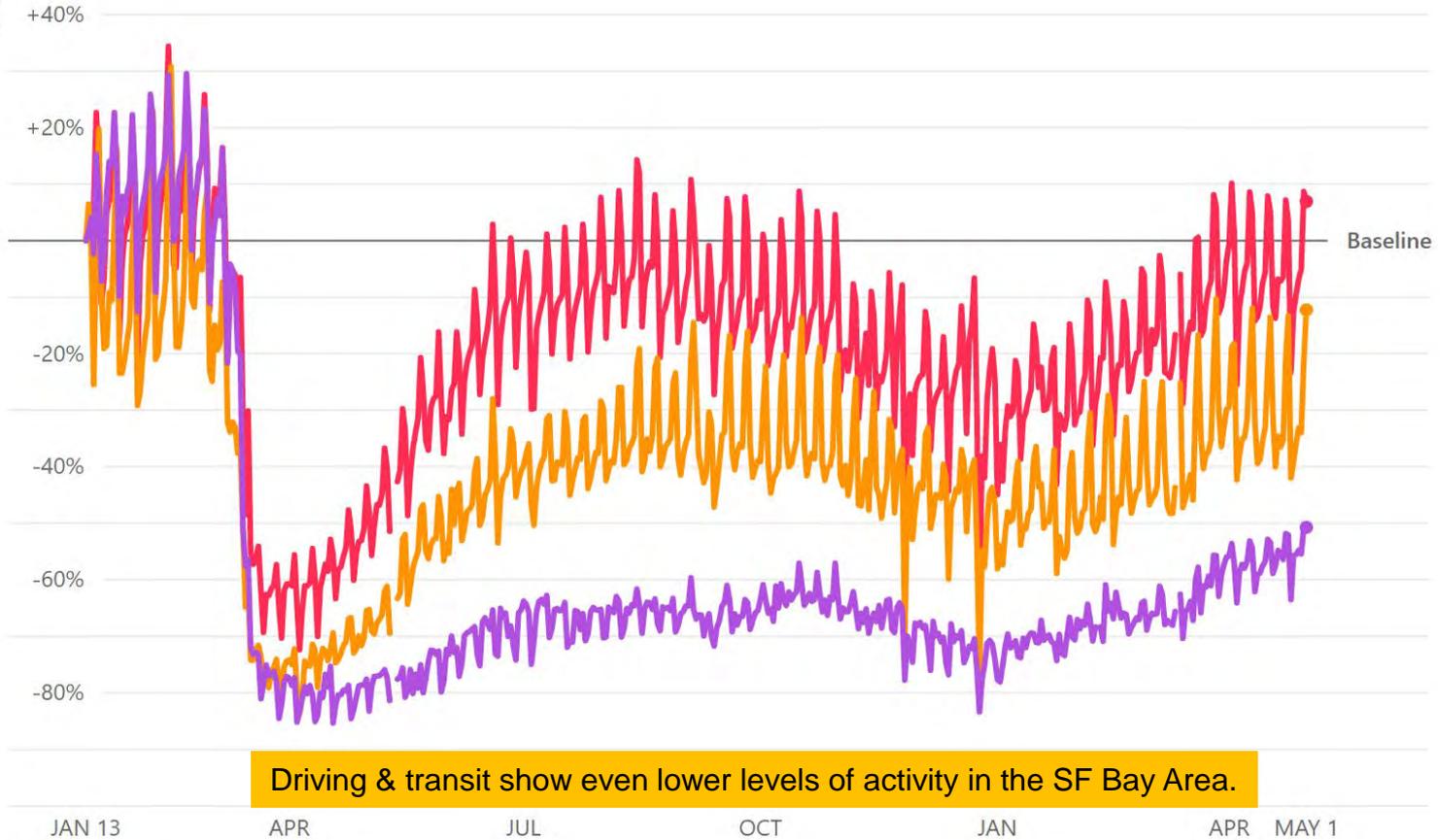


- Walking +55%
- Driving +40%
- Transit -40%

Source: Apple mobility trend reports – change in routing requests from baseline of January 13, 2020 – data through **5/1/2021**



Mobility Trends – SF Bay Area

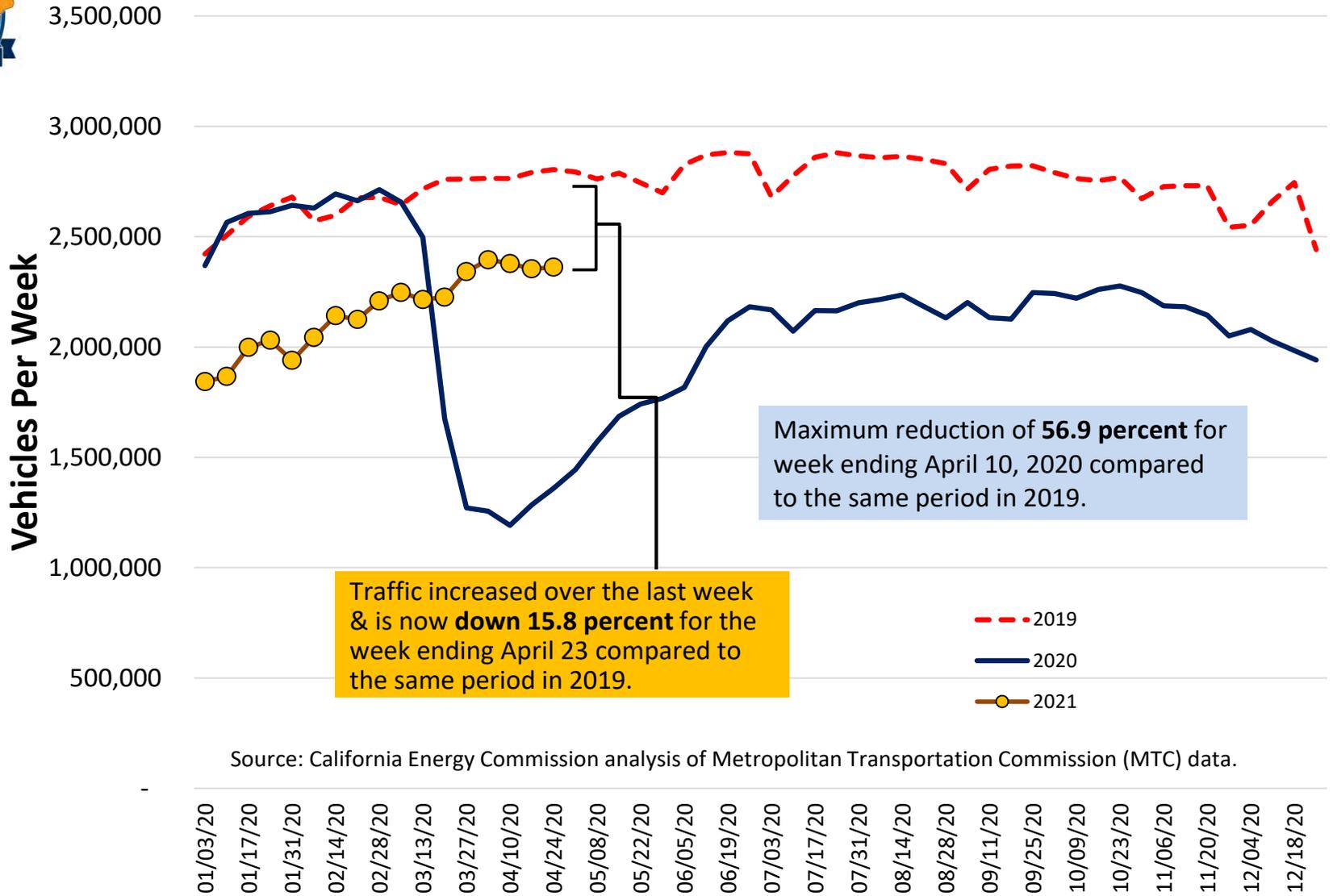


- Driving +7%
- Walking -12%
- Transit -51%

Source: Apple mobility trend reports – change in routing requests from baseline of January 13, 2020 – data through **5/1/2021**



Vehicle Counts - SF Bay Area Bridges

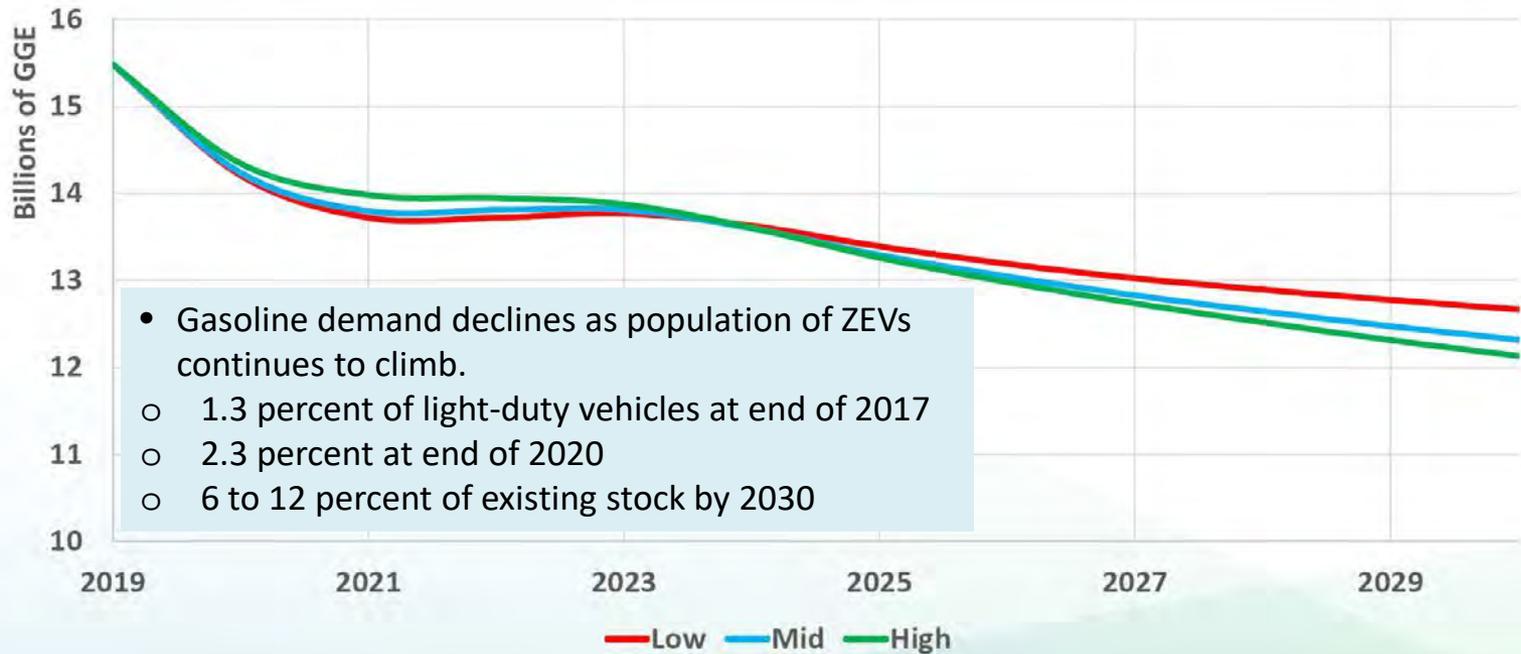


Source: California Energy Commission analysis of Metropolitan Transportation Commission (MTC) data.



Gasoline Demand Forecast

ZEV POPULATION			NON-ZEV POPULATION						
Total Light-Duty Vehicles end of 2020			Total Light-Duty Vehicles end of 2020						
635,602			28,030,332						
Battery Electric (BEV)	Plug-in Hybrid (PHEV)	Fuel Cell (FCEV)	Bio Diesel	Diesel	Flex Fuel	Gasoline	Gasoline Hybrid	Natural Gas	Propane
1.289%	0.904%	0.025%	0.470%	1.973%	3.993%	87.286%	4.031%	0.027%	0.003%
369,364	259,109	7,129	134,834	565,532	1,144,536	25,021,380	1,155,477	7,676	897



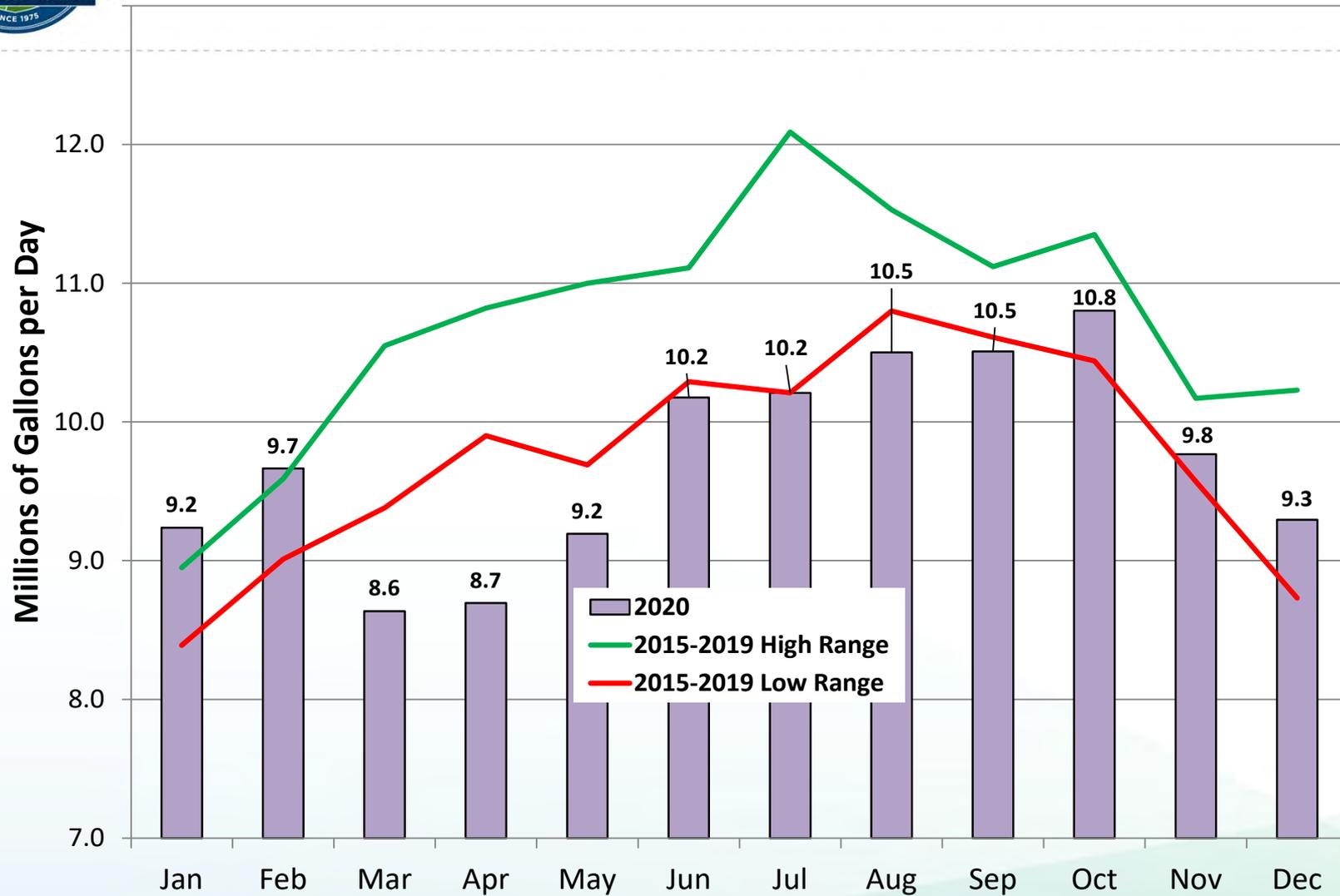


Pandemic Impacts & Outlook - Diesel

- Diesel fuel demand declined 4.3 percent in 2020
 - 3.56 billion gallons - lowest level since 2014
- Fully recovered
 - Higher than pre-pandemic levels
 - Most recent estimate – *up 12.6 percent* compared to April 2019
 - 4-week average demand (through week ending April 16)
 - Strong demand for goods movement – container imports & rail
- Forecast to continue rising over the next several years
 - However, recently adopted CARB standards for MD & HD vehicles will begin to erode those projections



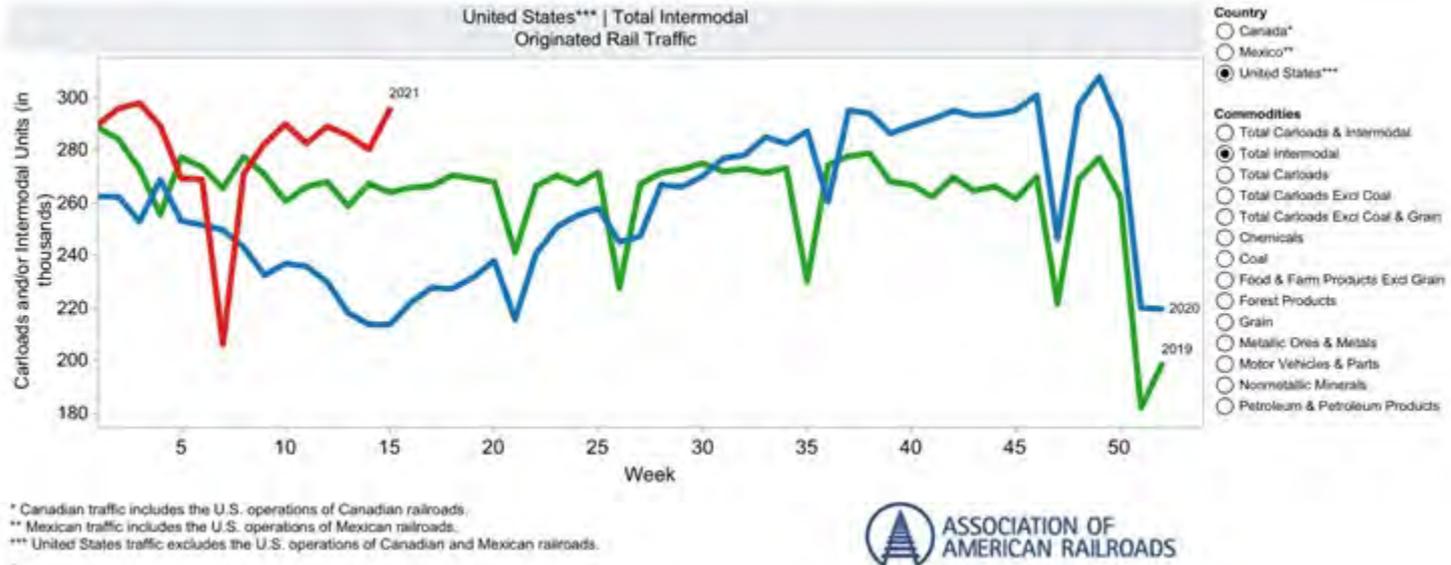
California Diesel Demand - 2020



Data includes renewable diesel and biodiesel.



Rail Activity – United States

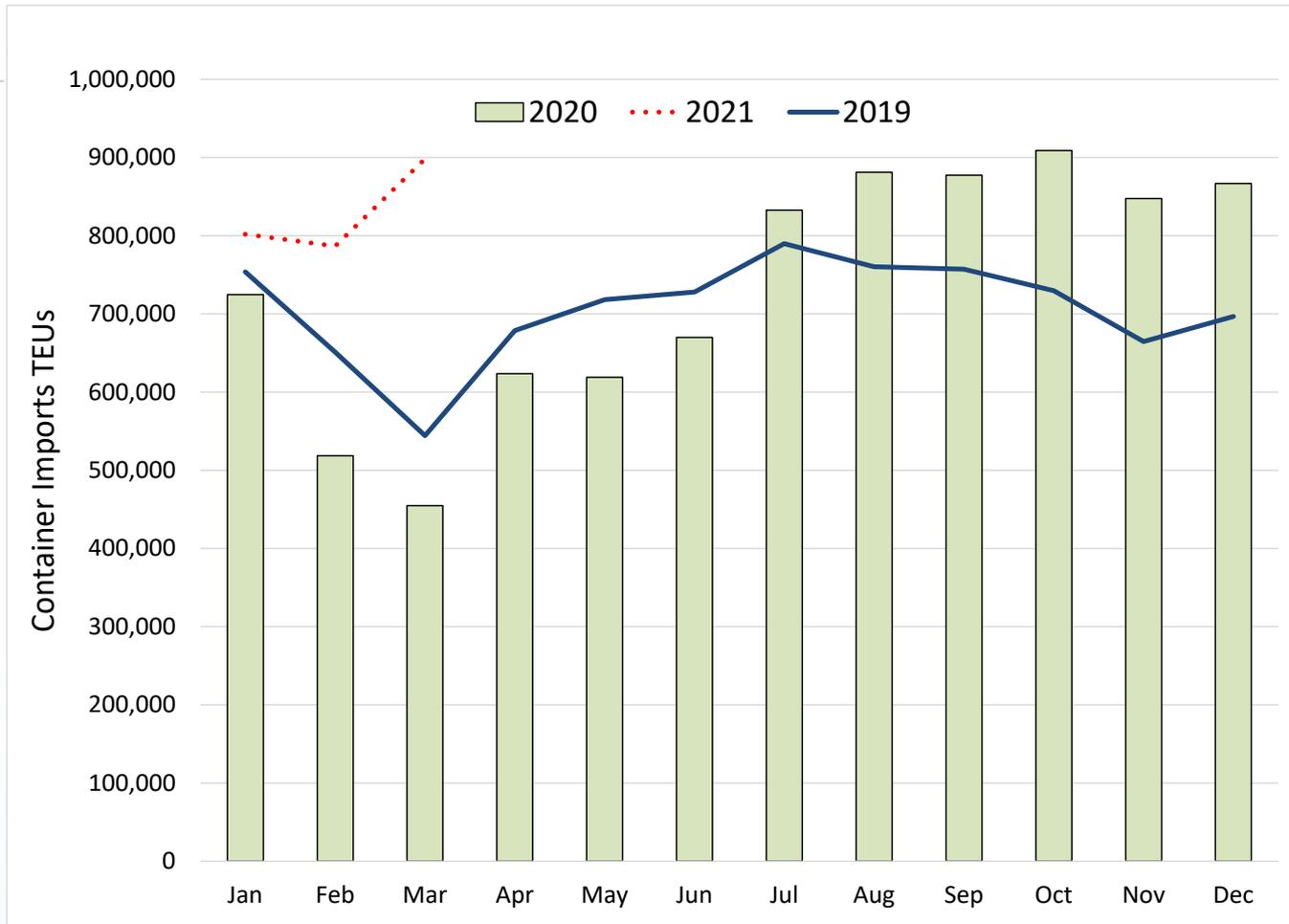


- Intermodal rail activity is reflective of goods movement and includes railcars transporting shipping containers and truck trailers. According to AAR, more than 90 percent of the rail activity originating in California is intermodal, while nearly 80 percent of the rail activity with California as the destination was intermodal.
- Intermodal rail activity recovered last summer to pre-covid levels and has continued to improve over 2019 volumes.

2021 Y-T-D **up 4.9 percent** for intermodal rail activity versus 2019 Y-T-D.



Ports of LA & LB – Container Imports



- Container imports recovery similar to rail recovery – summer of 2020
- 2021 Y-T-D through March **up 27.6 percent** versus same period in 2019
- 56 percent of all U.S. container imports went through the Ports of LA & LB during March 2021

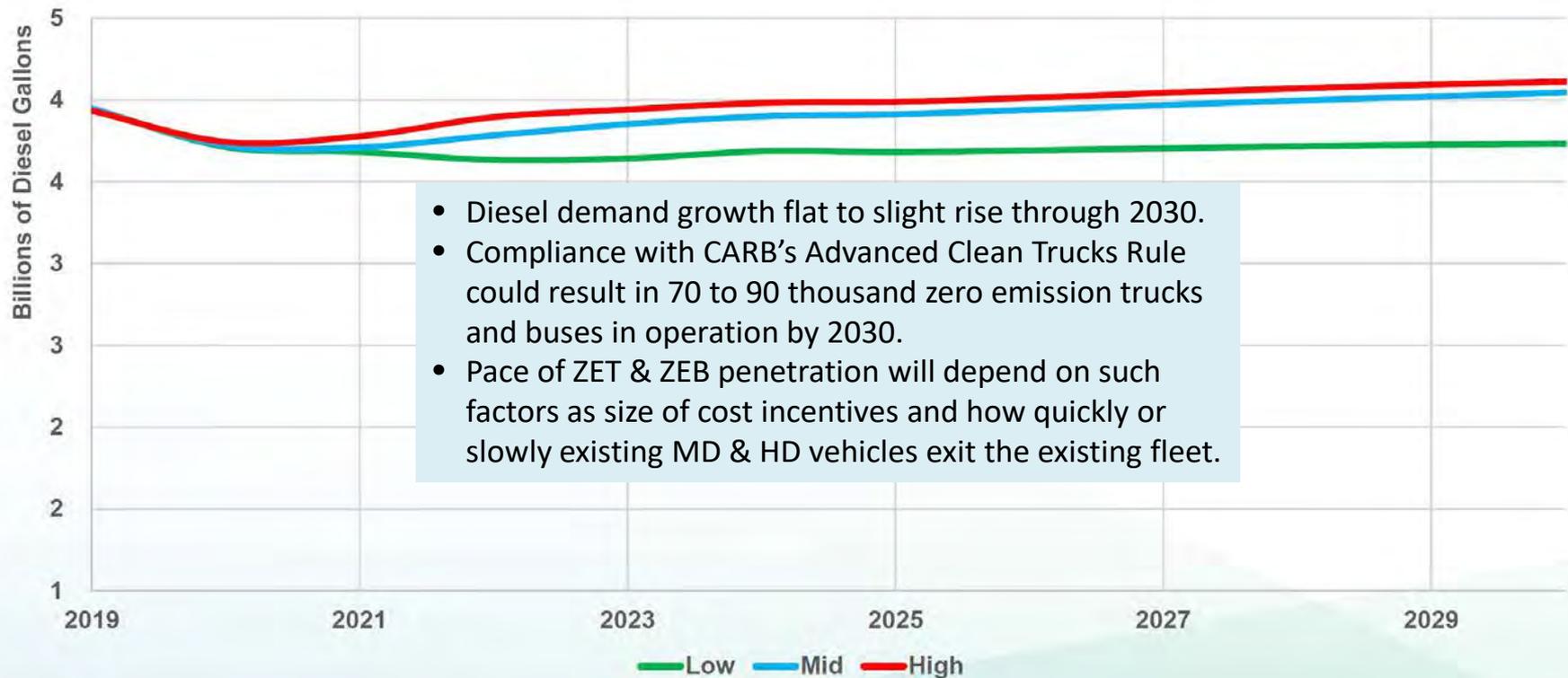


Diesel Demand Forecast

Regulations designed to replace existing medium duty (MD), heavy-duty (HD), and transit buses with zero emission makes and models (electric & hydrogen) will begin to push down diesel demand during the later portions of the forecast period.

- SCAQMD regulations – refuse and transit vehicles
- CARB Advanced Clean Trucks rule – MD & HD vehicles

Projections do not illustrate the commingled trends of **decreasing** fossil diesel demand & **increasing** renewable diesel demand



- Diesel demand growth flat to slight rise through 2030.
- Compliance with CARB's Advanced Clean Trucks Rule could result in 70 to 90 thousand zero emission trucks and buses in operation by 2030.
- Pace of ZET & ZEB penetration will depend on such factors as size of cost incentives and how quickly or slowly existing MD & HD vehicles exit the existing fleet.



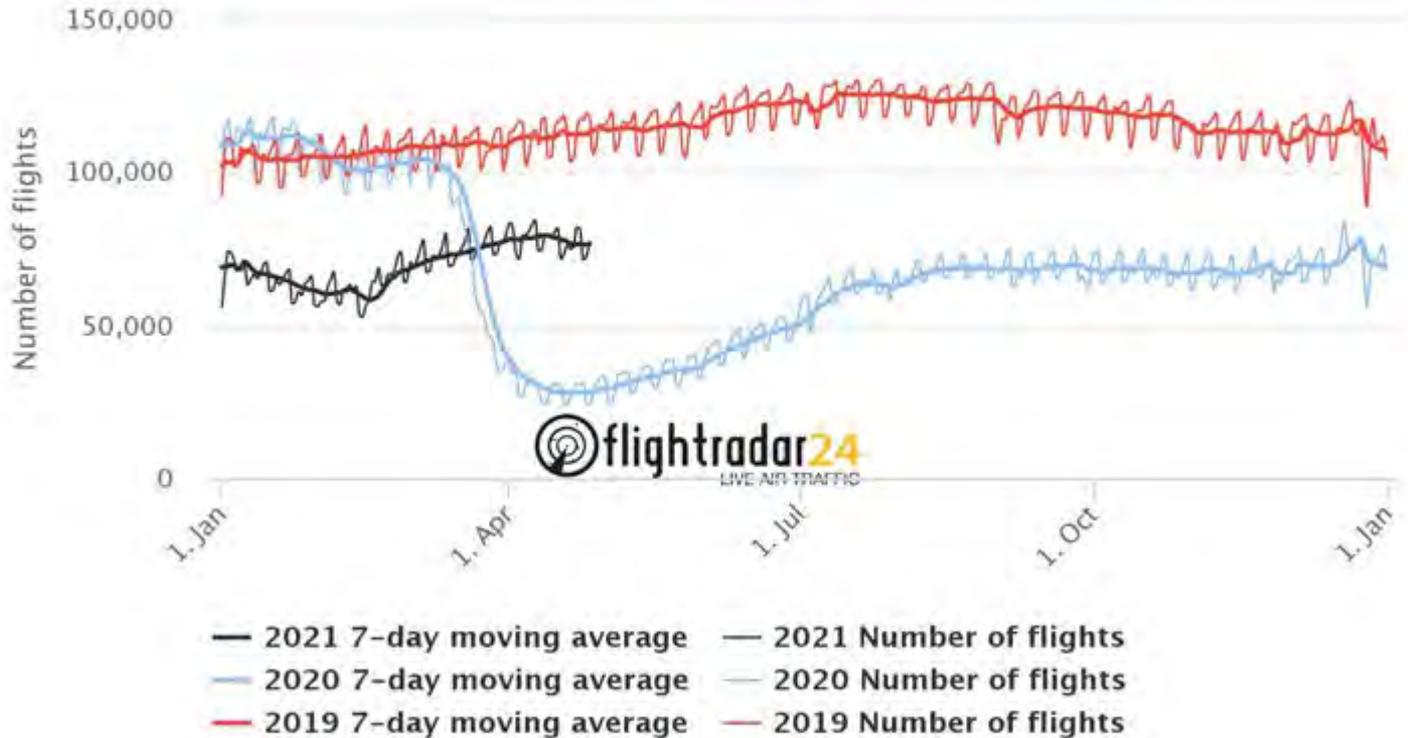
Pandemic Impacts & Outlook – Jet Fuel

- Jet fuel demand for West Coast declined 36.1 percent in 2020 compared to 2019
 - 348 thousand barrels per day - lowest level since 1989
- Fuel type hardest hit by pandemic
 - Much lower than pre-pandemic levels
 - Most recent California estimate – *down 31.9 percent* compared to April 2019
 - 4-week average demand (through week ending April 16)
 - Decreased international travel & business flying
- Forecast to slowly continue to recover over the next couple of years
 - However, recent Covid variant spikes around the world (Brazil, India, and parts of the European Union) could continue to depress international aviation activity longer than current forecasts



Global Flight Activity Still Down

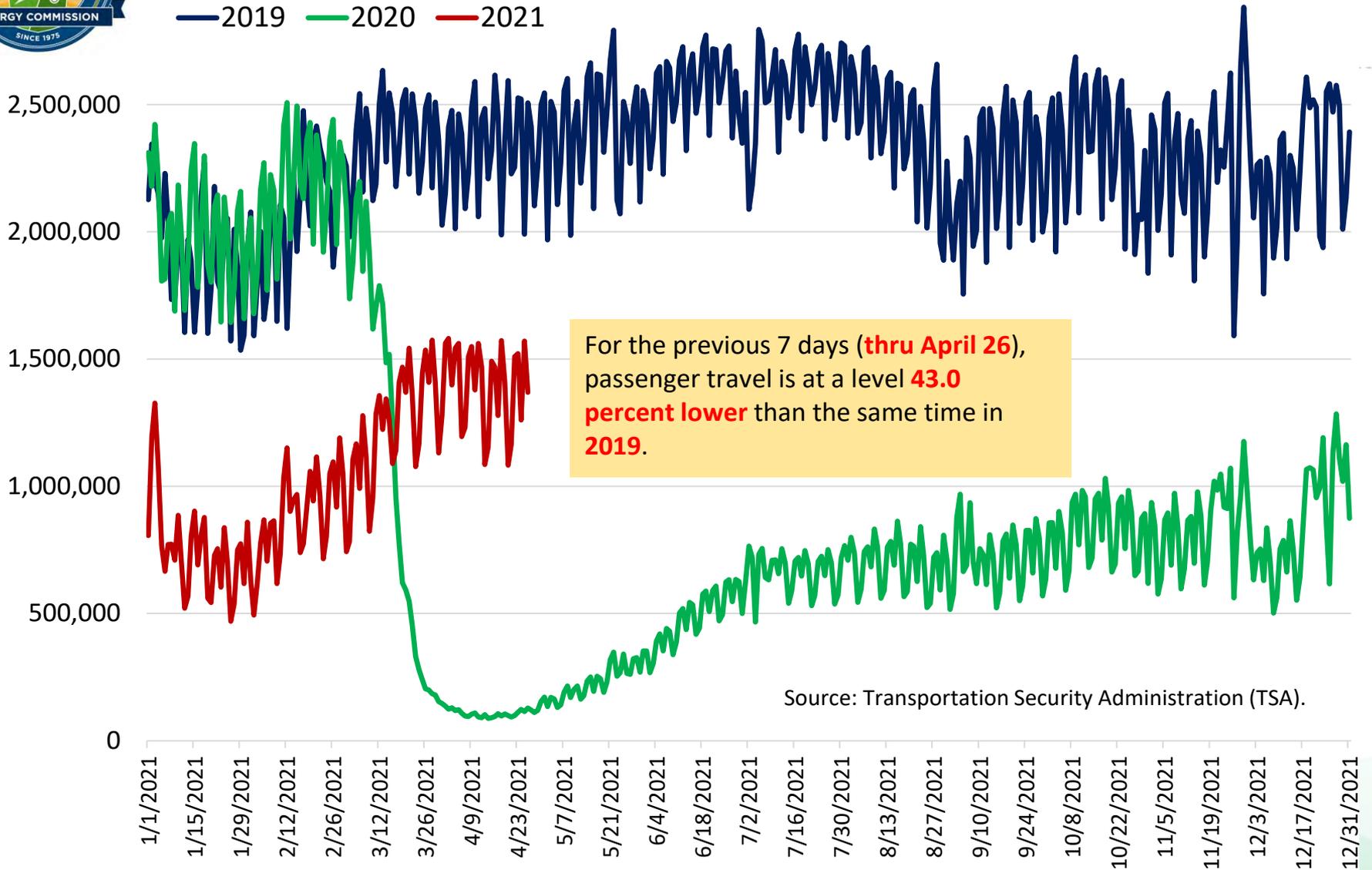
Number of commercial flights tracked by Flightradar24, per day (UTC time), 2019 vs 2020 vs 2021



- China & Hong Kong saw earliest impacts from coronavirus
- China showing nearly complete signs of recovery
- U.S. scheduled flights down by 50.2 percent for the week ending September 14



United States Airport Passenger Counts 2019 thru 2021

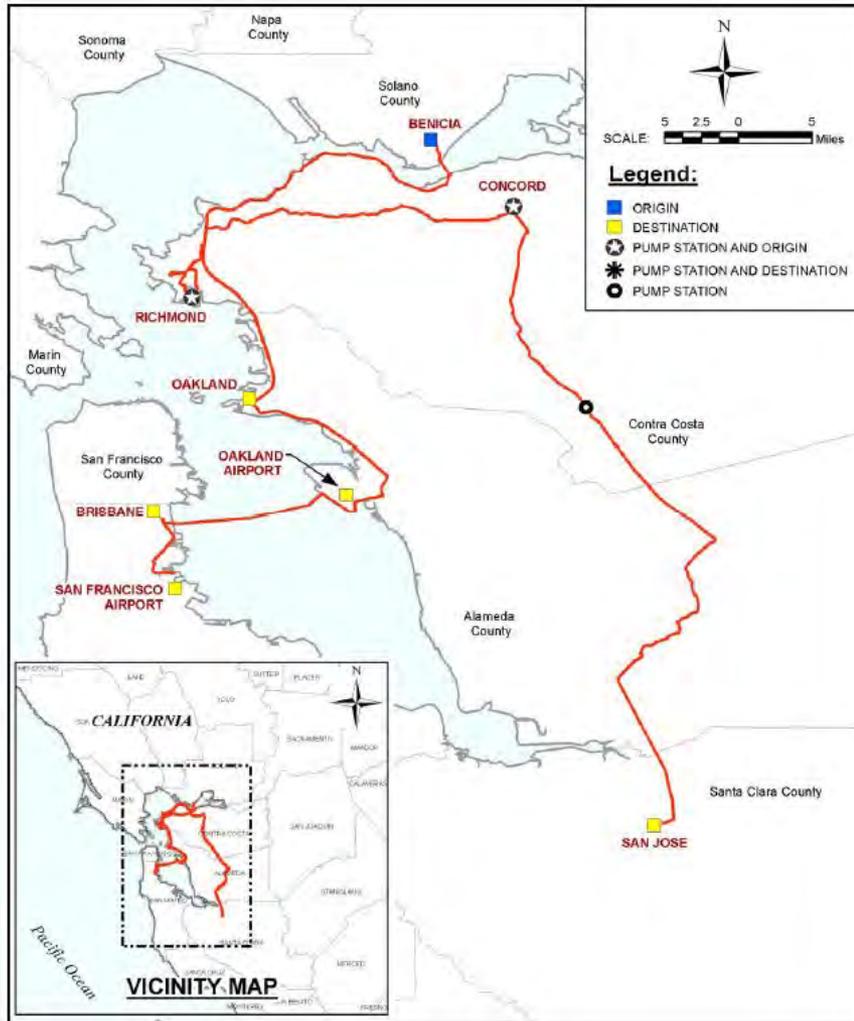




Jet Fuel Overview



SF Bay Area – Kinder Morgan Lines

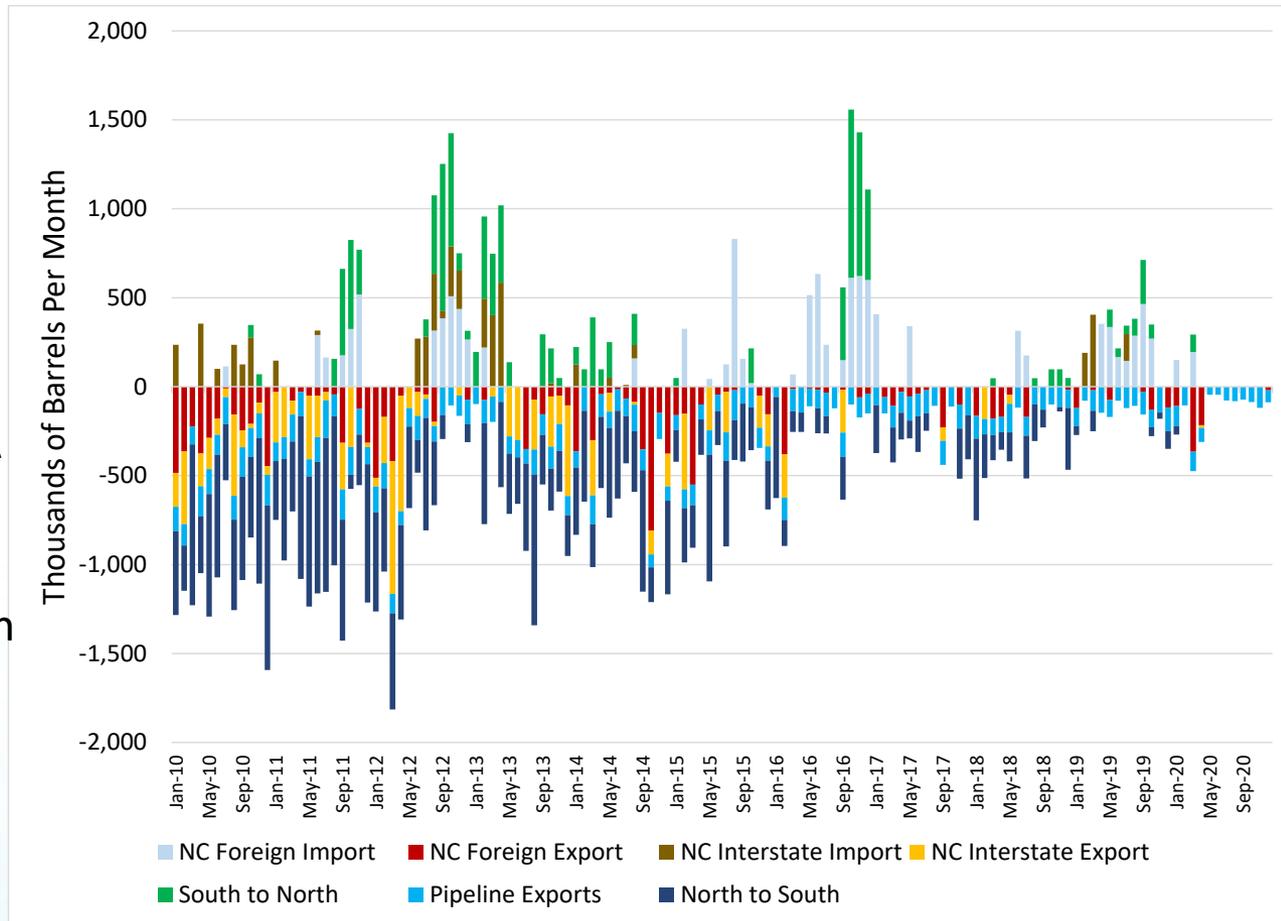


- The primary source of fuels for SF Bay Area airports is production from local refineries
 - Including supplies for Sacramento, Travis AFB, Fresno & Reno
- Trans-bay crossing to Brisbane & SFO
- Northern California refinery production periodically augmented with waterborne deliveries
 - Usually related to unplanned refinery outages
- At times, these imports have been as much as a third of average refinery production for a short period of time
- Marine terminals and pipeline connections not configured to transition to sustained marine importer of jet fuel



Jet Flows – Northern California

- Net exporter
- Imports intermittent – refinery outages
- Pipeline exports to Reno
- Domestic exports to PNW declined – replaced by WA refiners
- Exports to S. Calif. Have become a declining portion of their supply – recent volumes fluctuate based on refinery outages

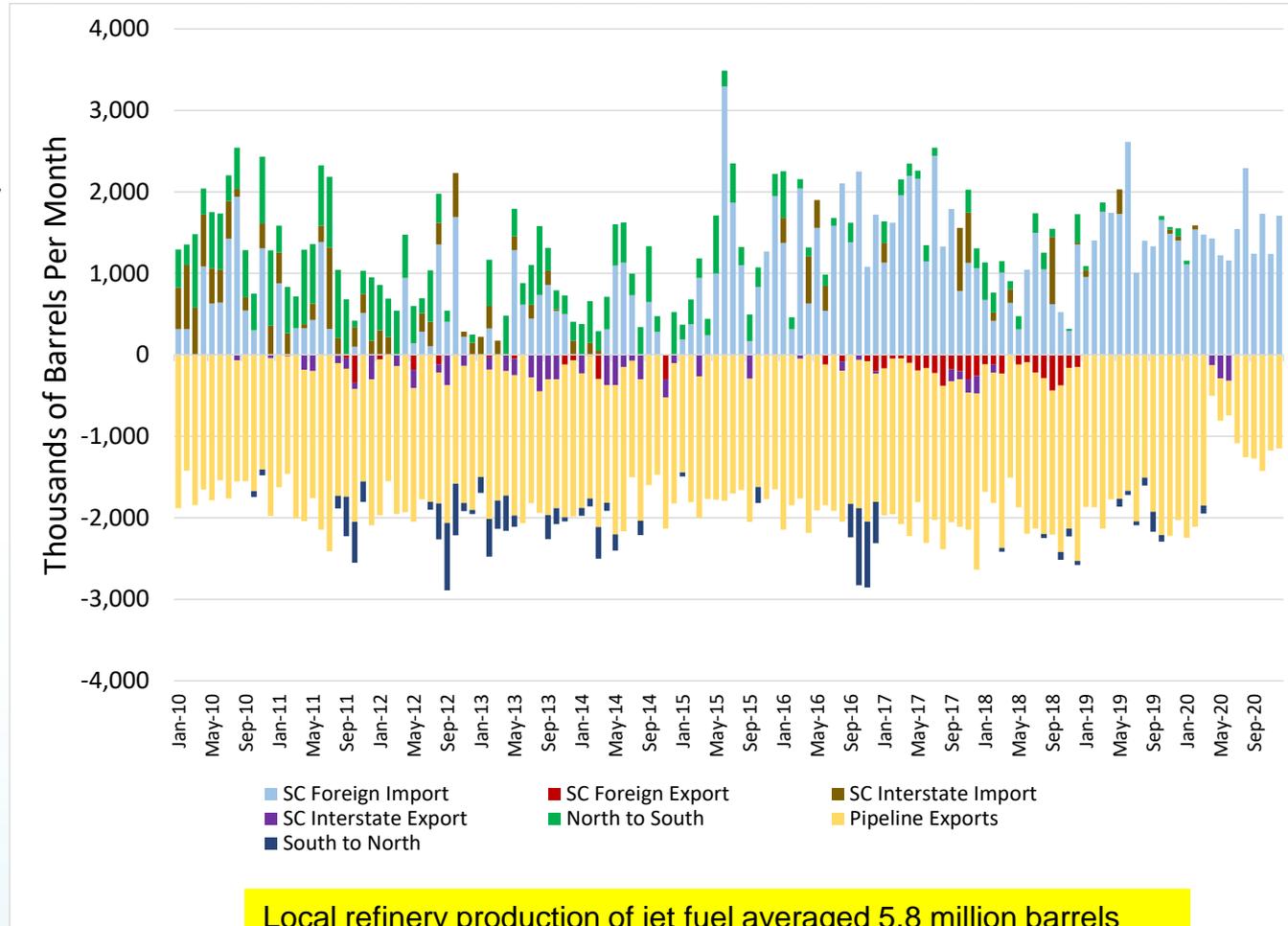


Local refinery production of jet fuel averaged 3.6 million barrels per month from 2017-2019



Jet Flows – Southern California

- Balanced imports & exports
- Foreign imports steady
- Other waterborne imports not needed
- Pipeline exports to AZ & NV
- Waterborne exports intermittent
- Exports to N. Calif. unusual

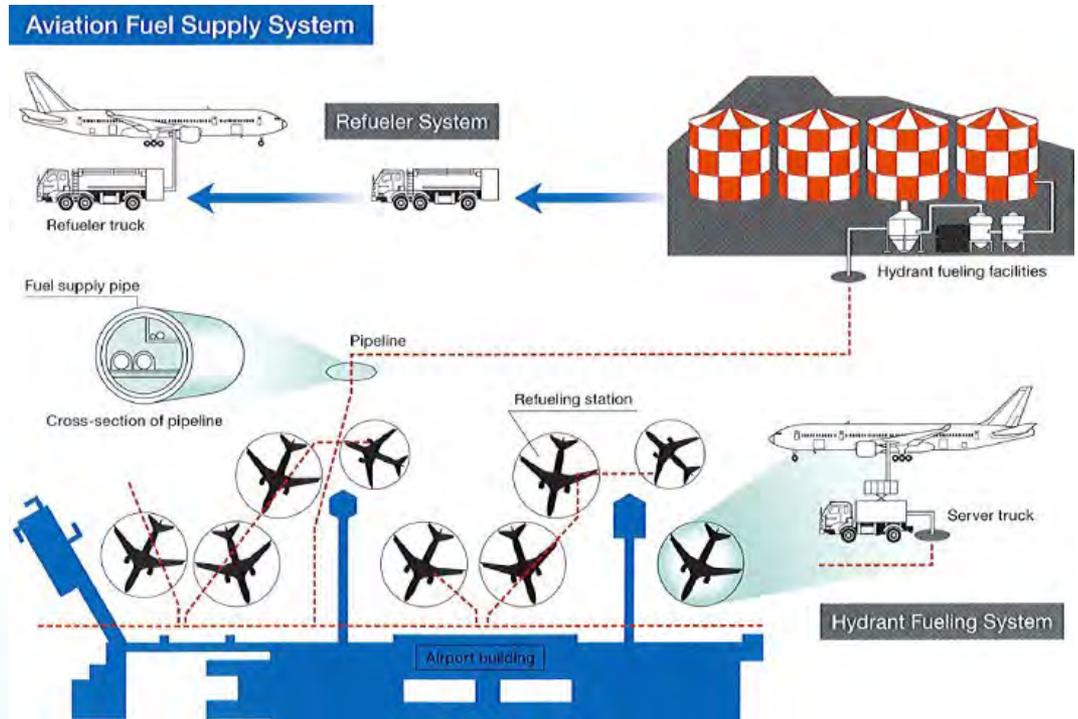


Local refinery production of jet fuel averaged 5.8 million barrels per month from 2017-2019



Jet Fuel - Logistics

- Nearly all commercial airports receive jet fuel via pipeline, not tanker truck
 - Very limited capability to unload tanker trucks
- Jet A dispensed into aircraft from:
 - Mobile refueling trucks sourcing fuel from onsite storage tanks
 - Server trucks sourcing from hydrant system
 - Both types of vehicles are specialized





Refinery Closures & Potential Impacts



Recent Refinery Closures

- Refinery closures can occur when conditions of oversupply develop in a regional market due to Covid-19 fuel demand destruction
 - Marathon Martinez and Gallup refinery permanent idling – April 2020
 - Royal Dutch Shell Convent, Louisiana refinery – November 2020
- Closures tend to improve market conditions for other refiners in the region, diminishing degree of oversupply
 - Adequate supplies of transportation fuels still available for consumers and businesses
 - Usually a shift in source of supply through existing logistical infrastructure adequate to handle the changes
 - Marine terminals, pipeline connections/capacity & spare storage tank capacities



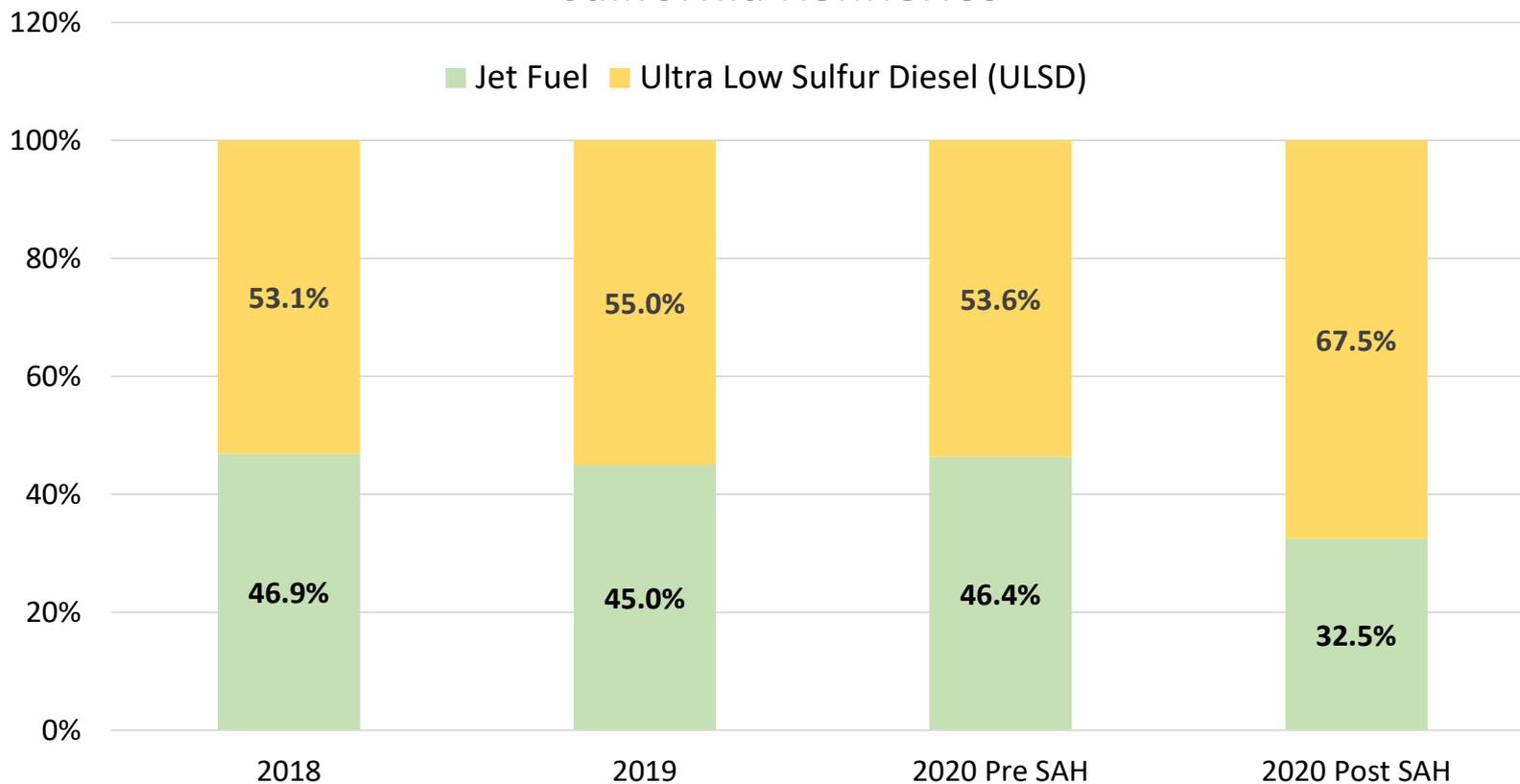
Recent Refinery Closures (cont.)

- Permanent idling of Marathon's Martinez refinery during late April 2020 did not result in any supply shortfall for transportation fuels due to:
 - Decreased gasoline demand related to pandemic
 - Full recovery of gasoline demand to pre-pandemic levels uncertain
 - Influenced by size of workforce that maintains remote working, along with pace of transit ridership recovery
 - Refinery operational changes to maximize diesel production at expense of jet fuel production
 - Diesel supplies still adequate since jet fuel demand remains depressed and renewable diesel imports and local production expected to grow over the near-term
- The Martinez refinery closure has decreased spare refinery production capacity in the state
 - As demand continues to recover for gasoline and jet fuel, future significant unplanned refinery outages could result in more severe and prolonged price spikes



Refiners Adjust Ratio of Jet Production

Proportion of Jet Fuel & ULSD Production California Refineries



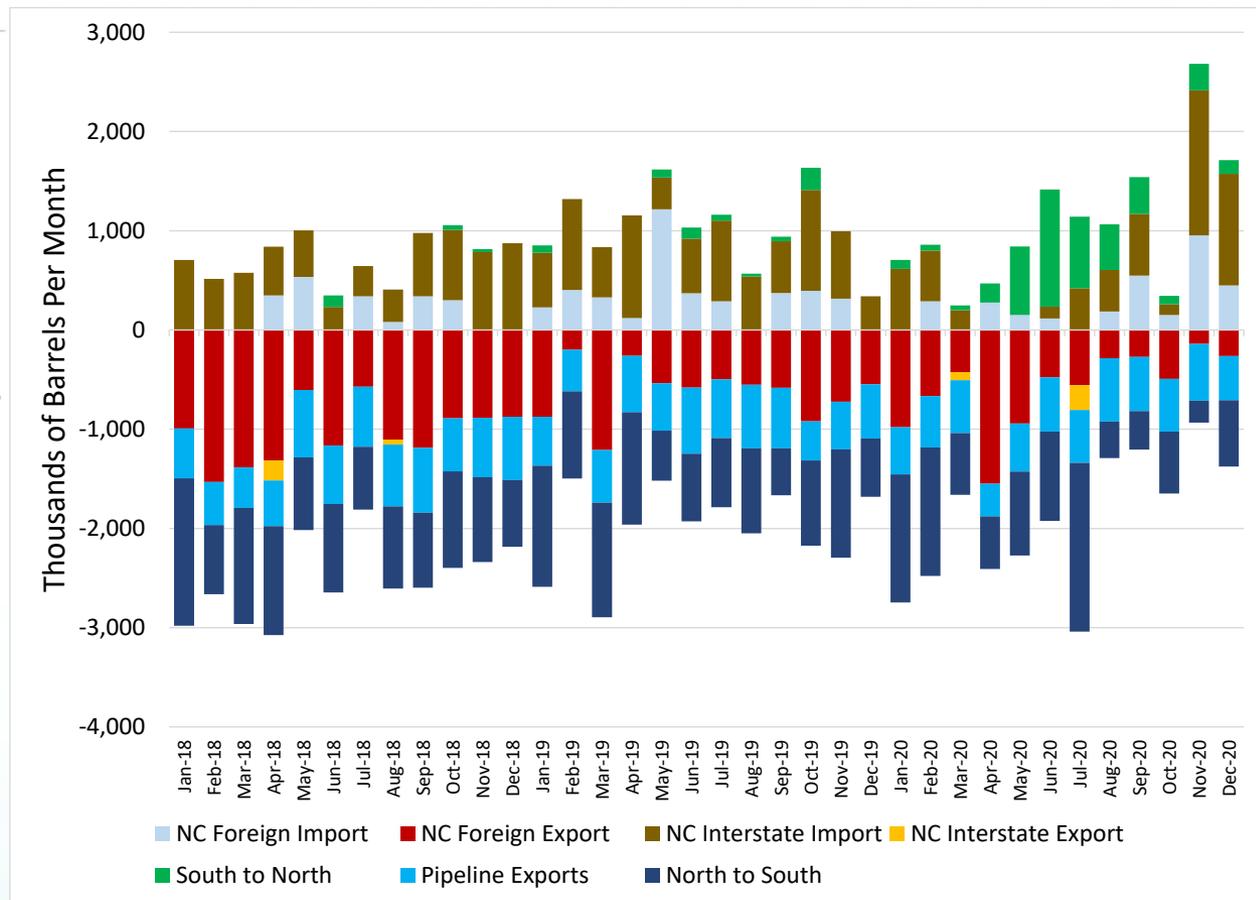
Source: Energy Commission analysis of Petroleum Industry Information Reporting Act data.

Note: 2020 Pre-Stay-at-Home (SAH) is average of data through week ending 3/13/20. Post SAH is average of data from week ending 3/20/2020 through week ending 4/23/2021.



Gasolines Flows – Northern California

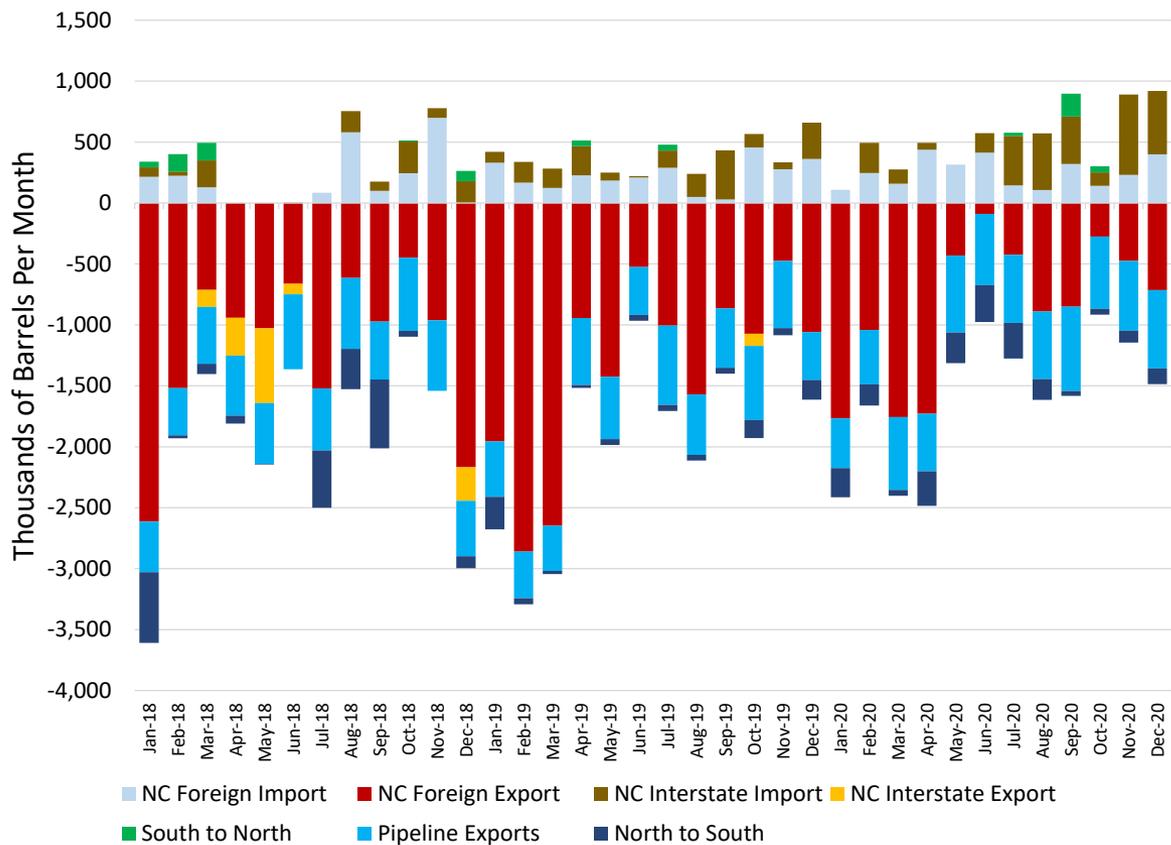
- Post closure of Martinez refinery – market rebalanced
- Marine exports declined
- Marine imports increased
- Most pronounced shift was increased reliance on supply from Southern California & the Pacific Northwest
- All of this change was manageable because demand was lower-than-normal due to the pandemic & incremental supply was readily available from nearby sources



Source: California Energy Commission.



Diesel Flows – Northern California



- Similar change for diesel
- Post closure of Martinez refinery – market rebalanced
- Marine exports declined
- Marine imports increased
- Most pronounced shift was increased reliance on supply from Southern California & the Pacific Northwest
- All of this change was manageable, despite rebounding demand
 - Incremental supply was readily available from nearby sources
 - Higher ratio of diesel output from local refiners due to low jet fuel demand

Source: California Energy Commission



Refinery Conversion Projects

- A refinery closure due to oversupply can also be accompanied by plans to cease traditional refining operations but convert some existing process equipment to produce different types of transportation fuels to meet new trends
 - Marathon – Martinez & Phillips 66 – Rodeo renewable fuel projects reflect such changes in operational plans
- Both companies see strong demand growth for renewable diesel fuel & sustainable aviation fuels
 - California Low Carbon Fuels Standard (LCFS), as well as other West Coast LCFS current (Oregon & British Columbia) and expected (Washington) regulations
 - Increasing demand for renewable diesel & jet fuel will displace additional volumes of fossil diesel and jet fuel over time, placing increased pressure on local refiners that continue producing fossil diesel
 - Decreased fossil diesel production and increased production/imports of renewable diesel help to better align with these growing trends

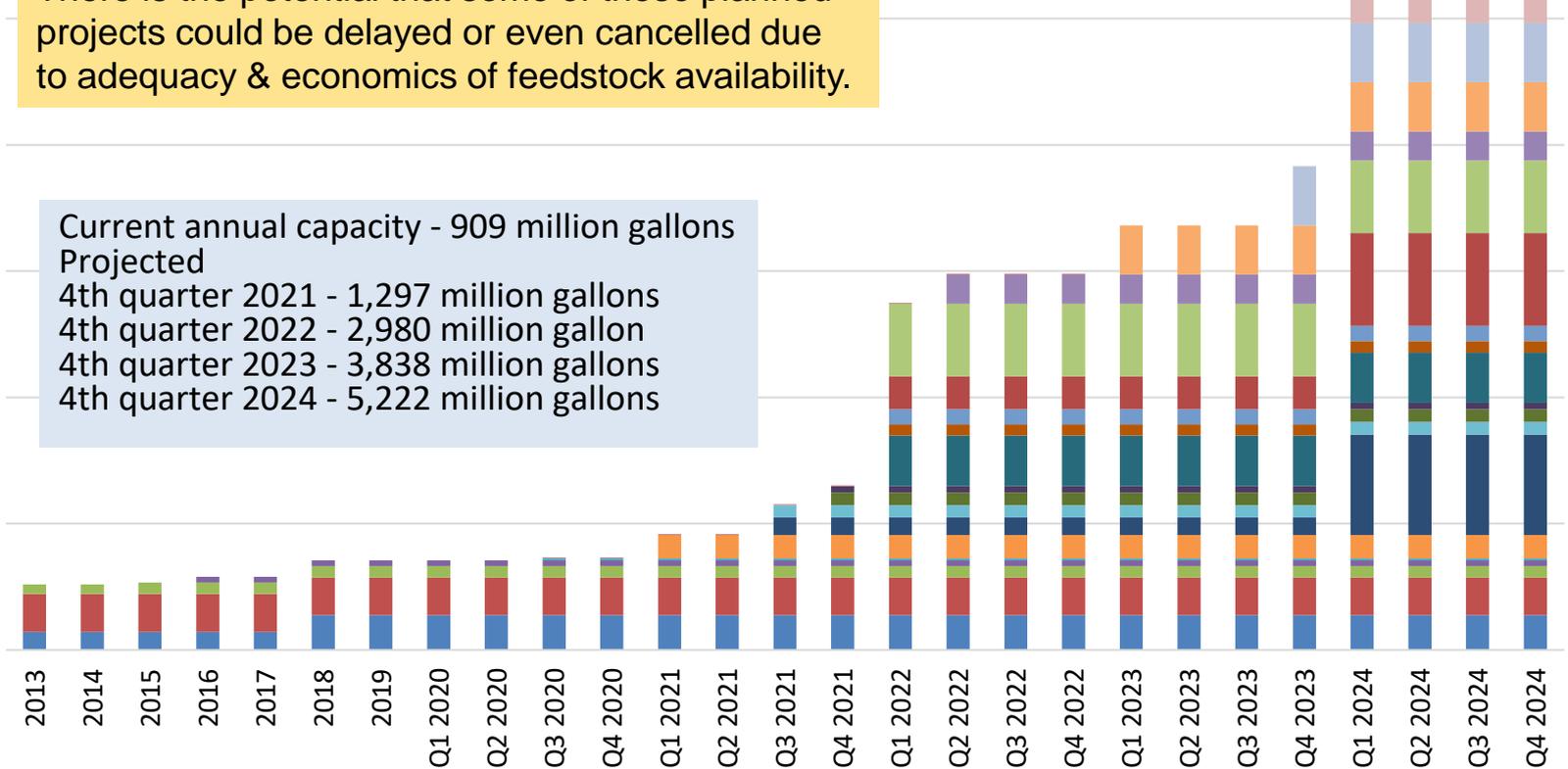


Increasing Renewable Diesel Availability

There is the potential that some of these planned projects could be delayed or even cancelled due to adequacy & economics of feedstock availability.

Millions of Gallons Per Year

Current annual capacity - 909 million gallons
 Projected
 4th quarter 2021 - 1,297 million gallons
 4th quarter 2022 - 2,980 million gallon
 4th quarter 2023 - 3,838 million gallons
 4th quarter 2024 - 5,222 million gallons



- Diamond Green Diesel - 1st Plant
- Neste - Singapore - 1st Plant
- Renewable Energy Group (REG)
- AltAir - Paramount Refinery
- Phillips 66 - Humber Refinery
- Marathon - Dickinson Refinery
- Rhyze Renewables - Las Vegas
- Phillips 66 - Rodeo Refinery
- CVR - Wynnewood Refinery
- HollyFrontier - Cheyenne Refinery
- Rhyze Renewables - Reno
- Diamond Green Diesel - 2nd Plant
- NEXT - Port Westward - 1st Plant
- HollyFrontier - Navajo Refinery
- Marathon - Martinez Refinery
- Neste - Singapore - 2nd Plant
- Global Clean Energy Holdings
- Red Rock Biofuels
- REG - Expansion Project
- Diamond Green Diesel - 3rd Plant
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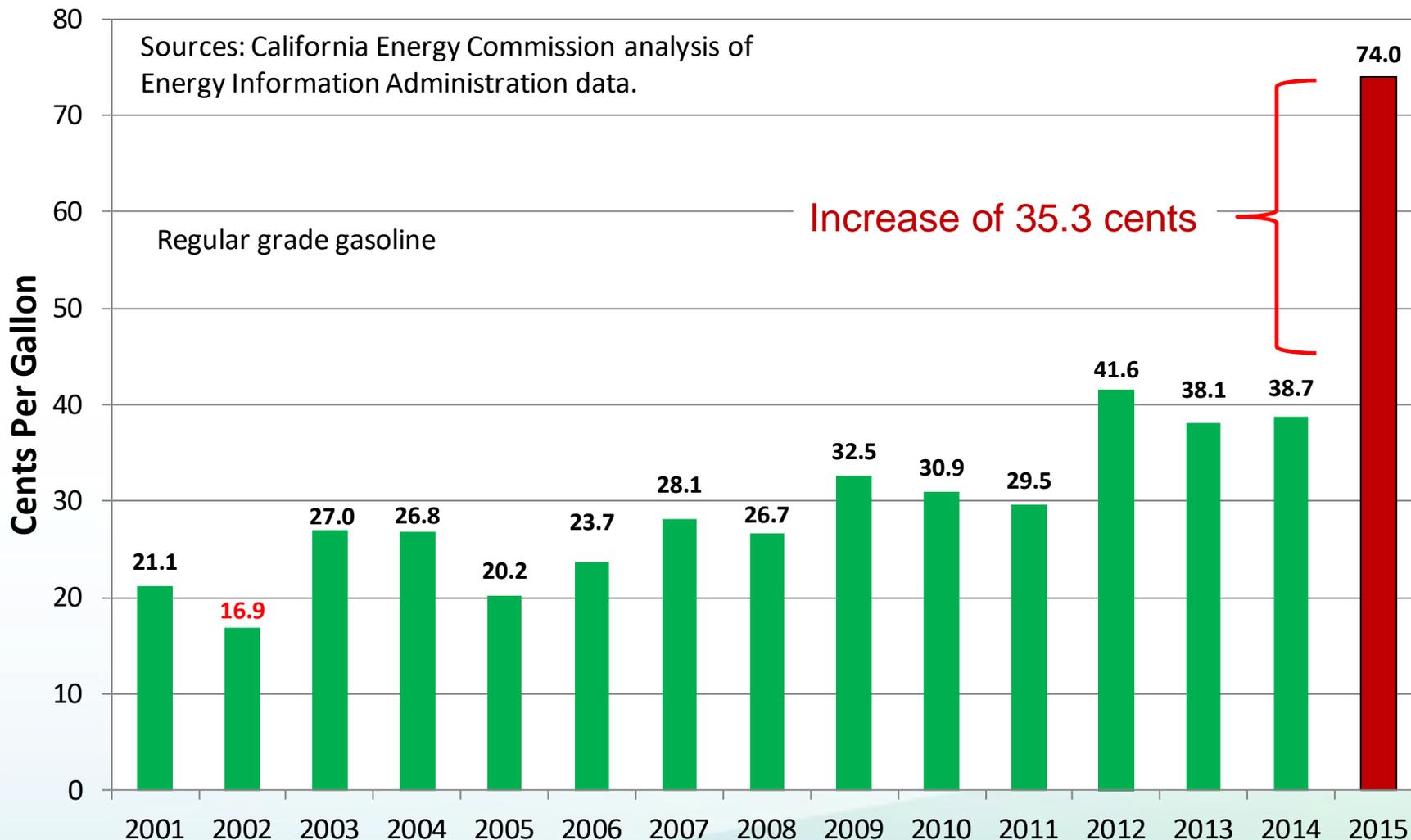


Potential Impacts of Refinery Closures

- Refinery closures can also occur when proposed refinery modification requirements exceed a company capital expenditure threshold that compels a premature refinery consolidation unrelated to changing fuel market trends
 - PBF Energy's letter & stated position to close facility if more stringent proposed standard is adopted
- A premature refinery closure could result in temporary fuel supply constraints that increase costs
 - Recent history illustrates the potential for fuel price increases
 - Torrance ESP explosion in 2015 & subsequent idling of gasoline producing equipment for 17 months
 - Statewide gasoline prices increased an average of 35 cents per gallon for drivers and businesses during 2015



Retail Gasoline Price Differences California Less U.S. Average

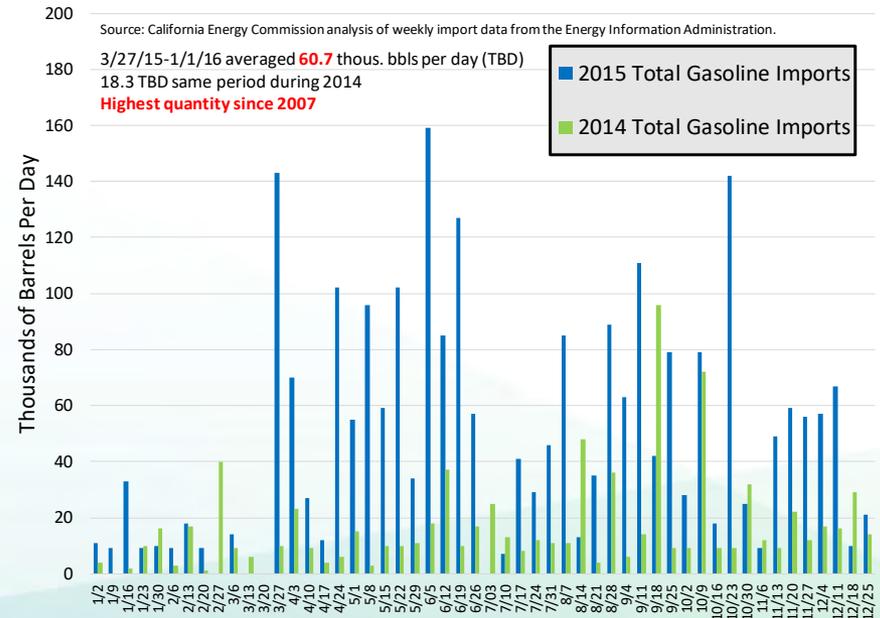
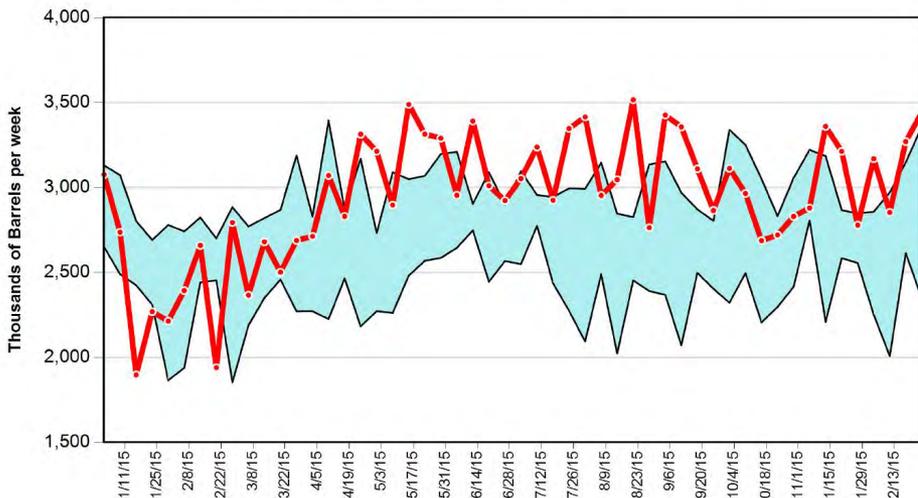




Torrance Refinery Outage – Market Changes

- The loss of gasoline supply from the Torrance refinery resulted in a price spike of sufficient magnitude to incentivize:
 - Other California refiners to consistently over-produce gasoline during the higher demand season
 - Increased imports of more expensive gasoline and blending components at a higher level for a sustained period of time

Northern California CARB Gasoline Production (with 5-Year High-Low Band)





Potential Impacts of Refinery Closures (cont.)

- A premature refinery closure over the near-term could result in even greater market impacts compared to the Torrance refinery outage in 2015-2016:
 - Could be worse due to decreased refinery spare production capacity in the state that has been diminished due to the permanent idling of the Marathon – Martinez refinery
 - Gasoline & diesel fuel supply/demand balances have been tightening with strong diesel fuel demand growth & continued gradual rebound in gasoline consumption
 - A return to higher jet fuel demand levels will remove additional flexibility from the marketplace
- However, over the longer-term, continued demand declines for gasoline & the continued erosion of fossil diesel fuel demand can create conditions of oversupply that could result in additional refinery consolidation due to these trends



Additional Questions



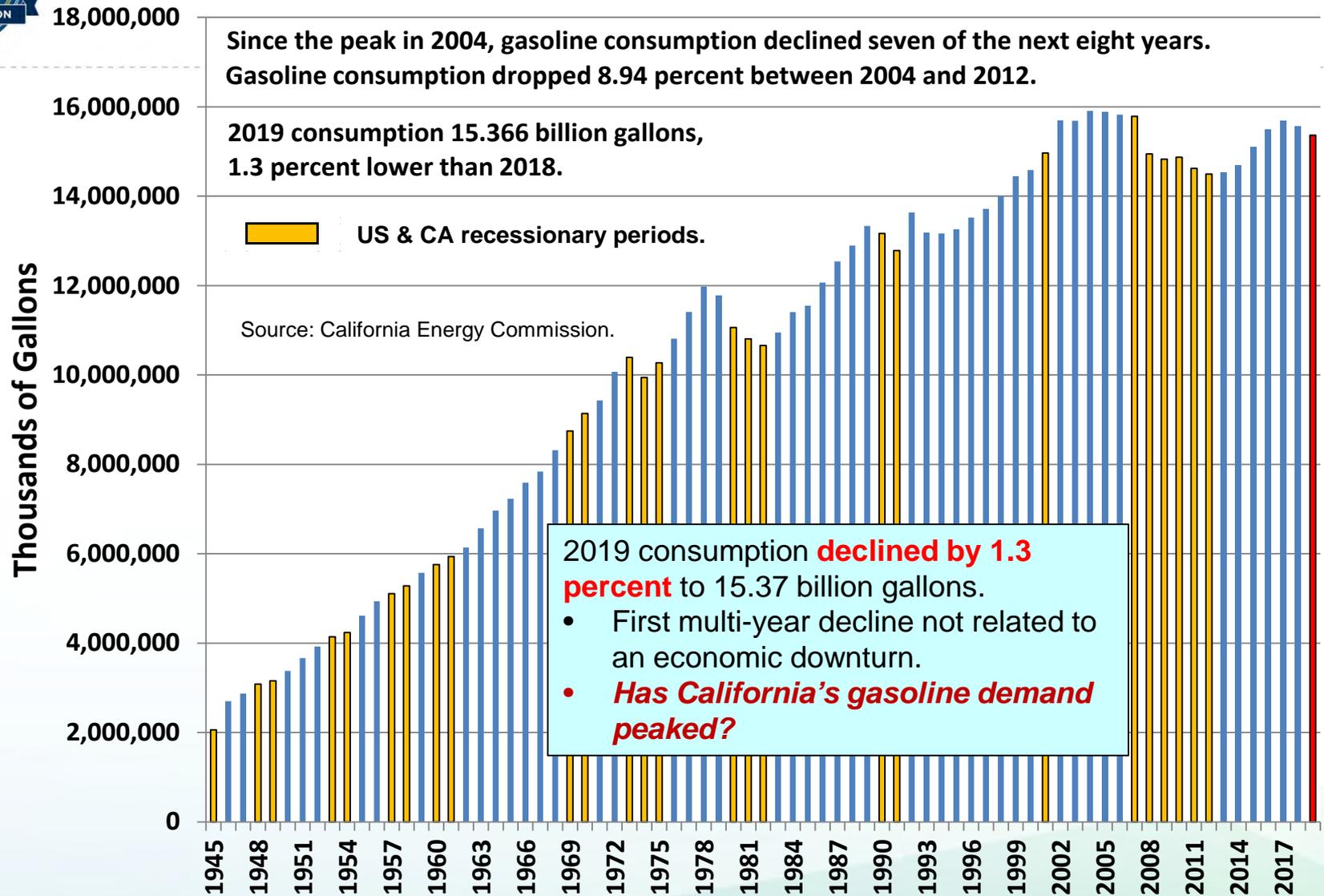
Scott's Oriole (male), Cat Creek, Palm Desert, CA - March 31, 2021.



Additional Information

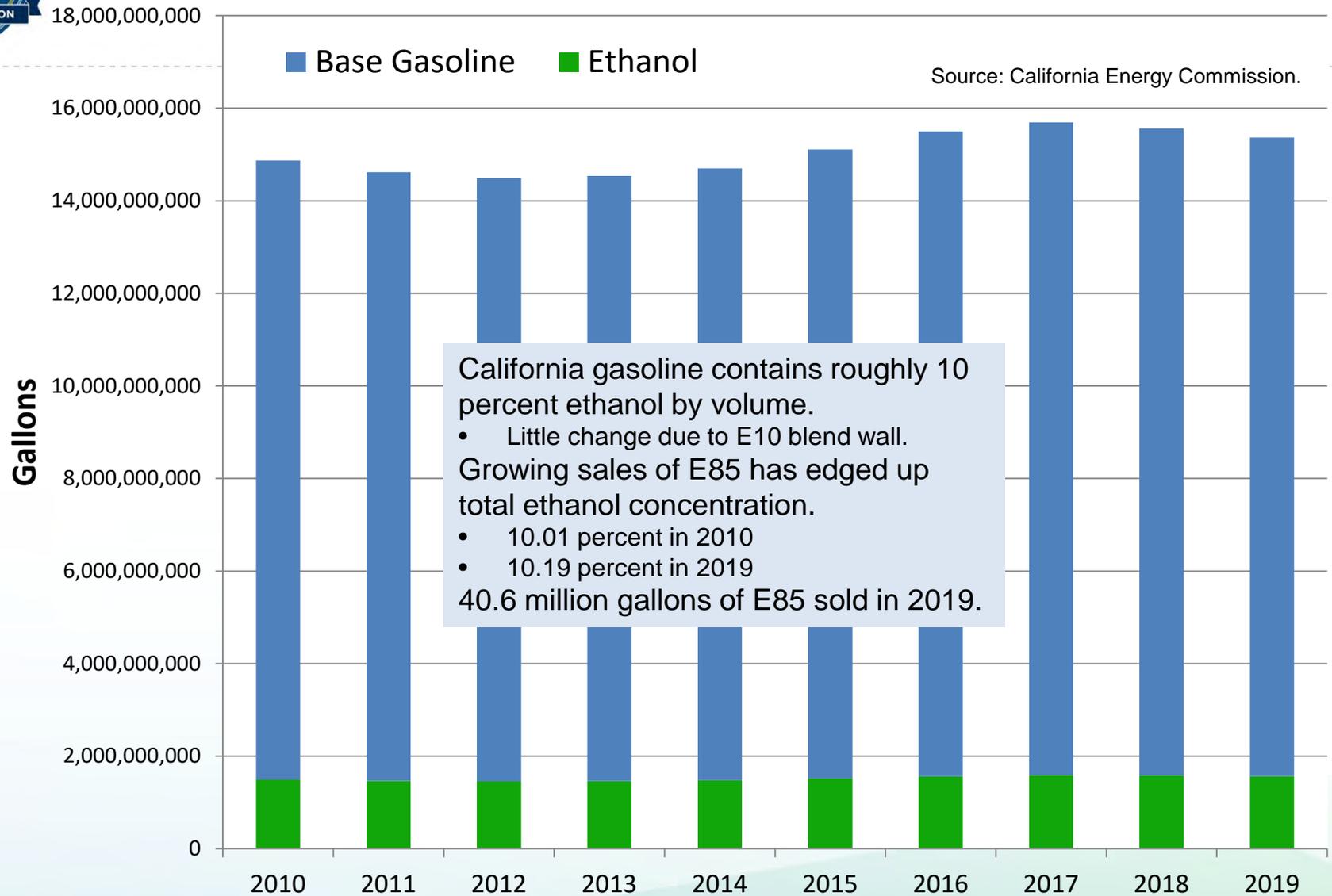


California Gasoline Use 1945-2019



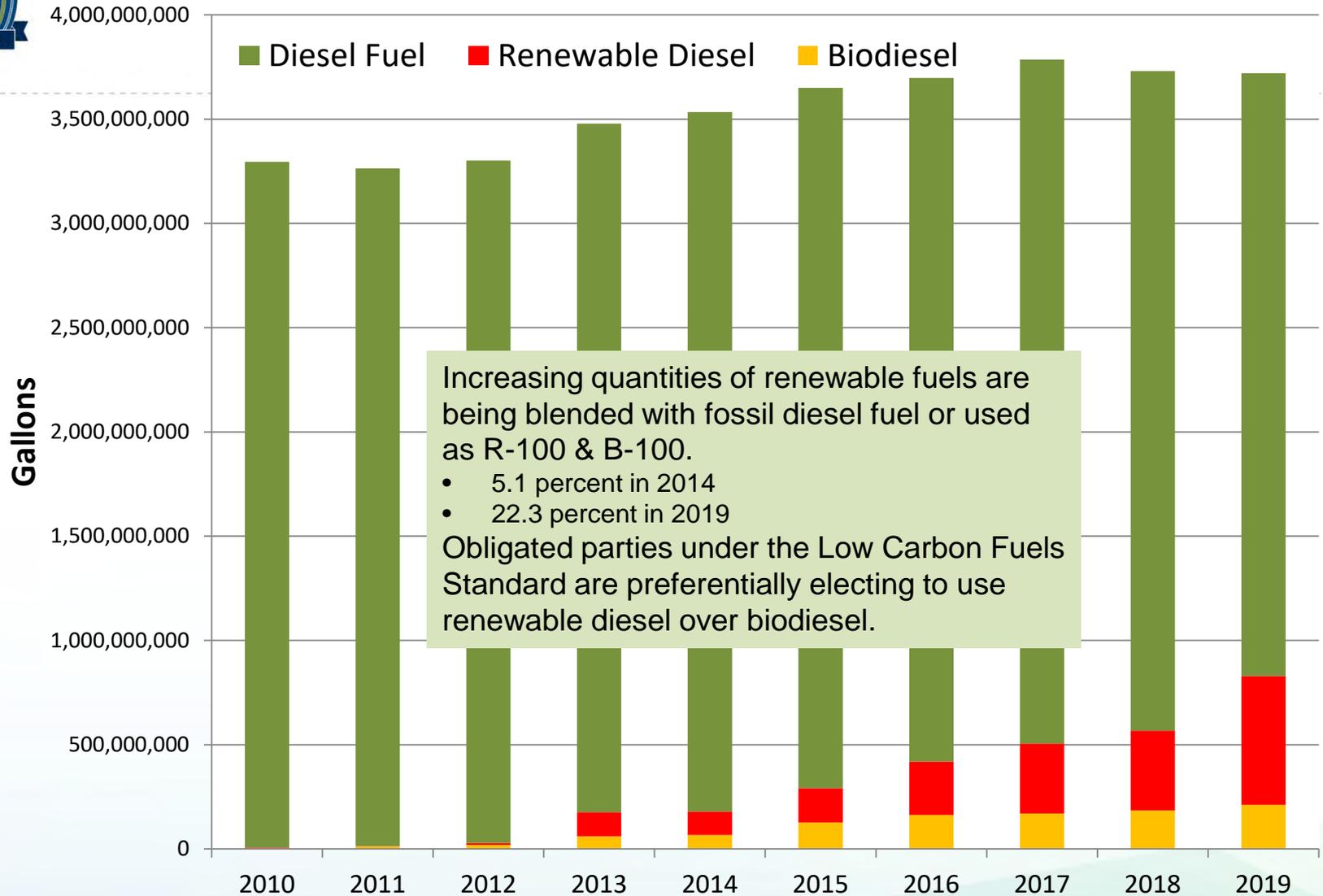


Gasoline & Ethanol





Diesel & Renewables



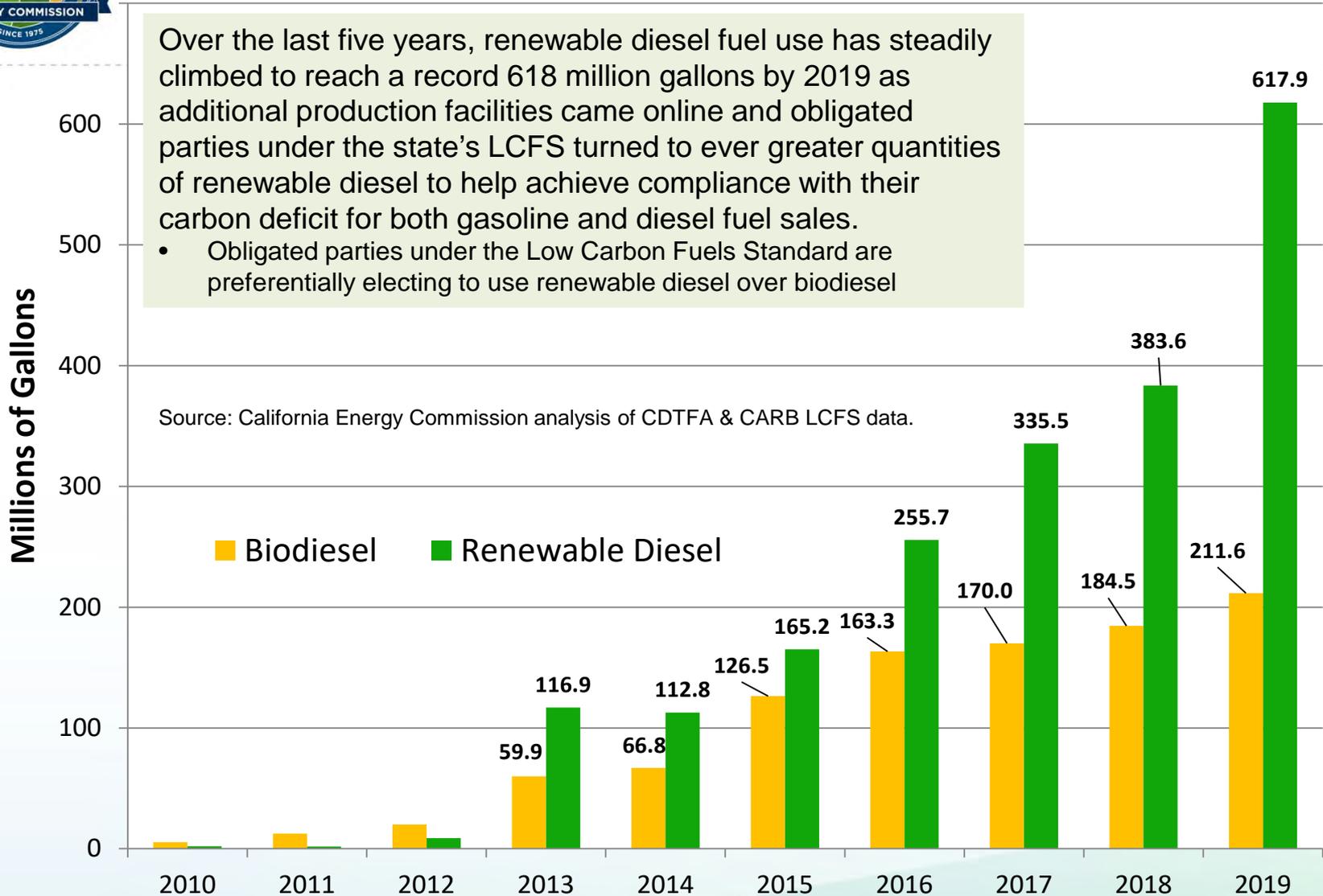
Source: California Energy Commission analysis of CDTFA & CARB LCFS data.



California Bio & Renewable Diesel Use

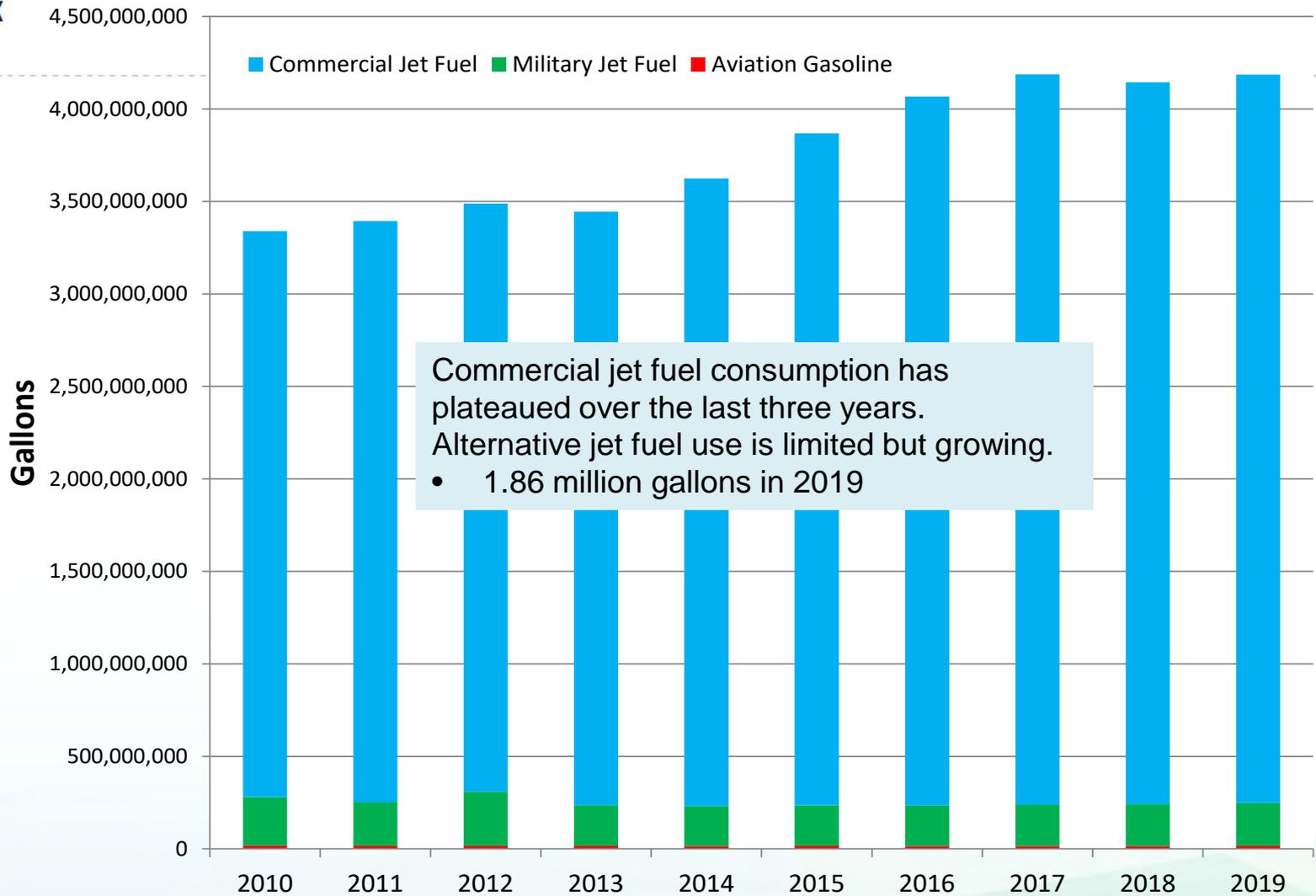
Over the last five years, renewable diesel fuel use has steadily climbed to reach a record 618 million gallons by 2019 as additional production facilities came online and obligated parties under the state's LCFS turned to ever greater quantities of renewable diesel to help achieve compliance with their carbon deficit for both gasoline and diesel fuel sales.

- Obligated parties under the Low Carbon Fuels Standard are preferentially electing to use renewable diesel over biodiesel





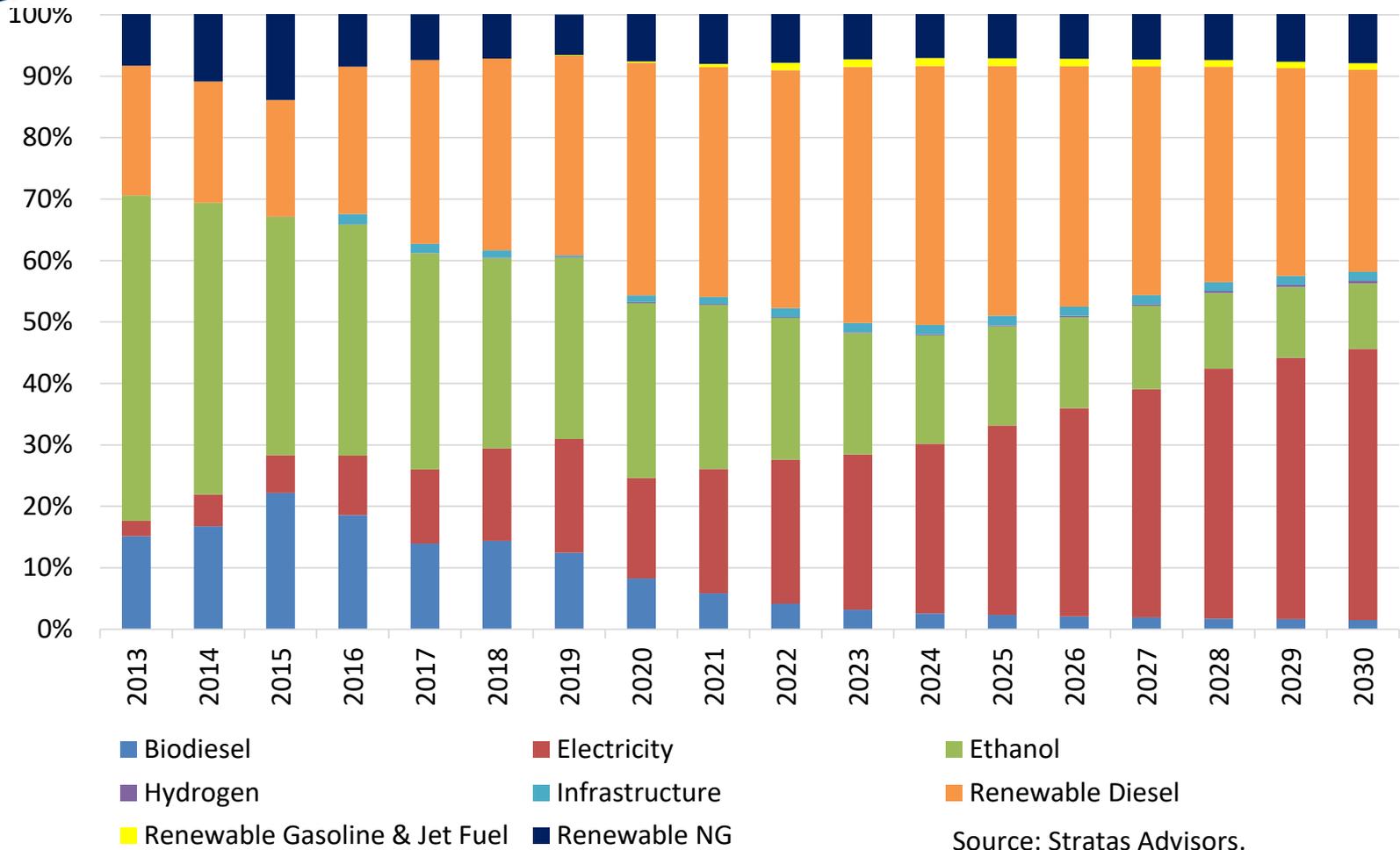
Aviation Fuels



Sources: California Energy Commission analysis of Petroleum Industry Information Reporting Act (PIIRA) & Energy Information Administration (EIA) data.



Low Carbon Fuels Standard Historical & Projected Credit Usage

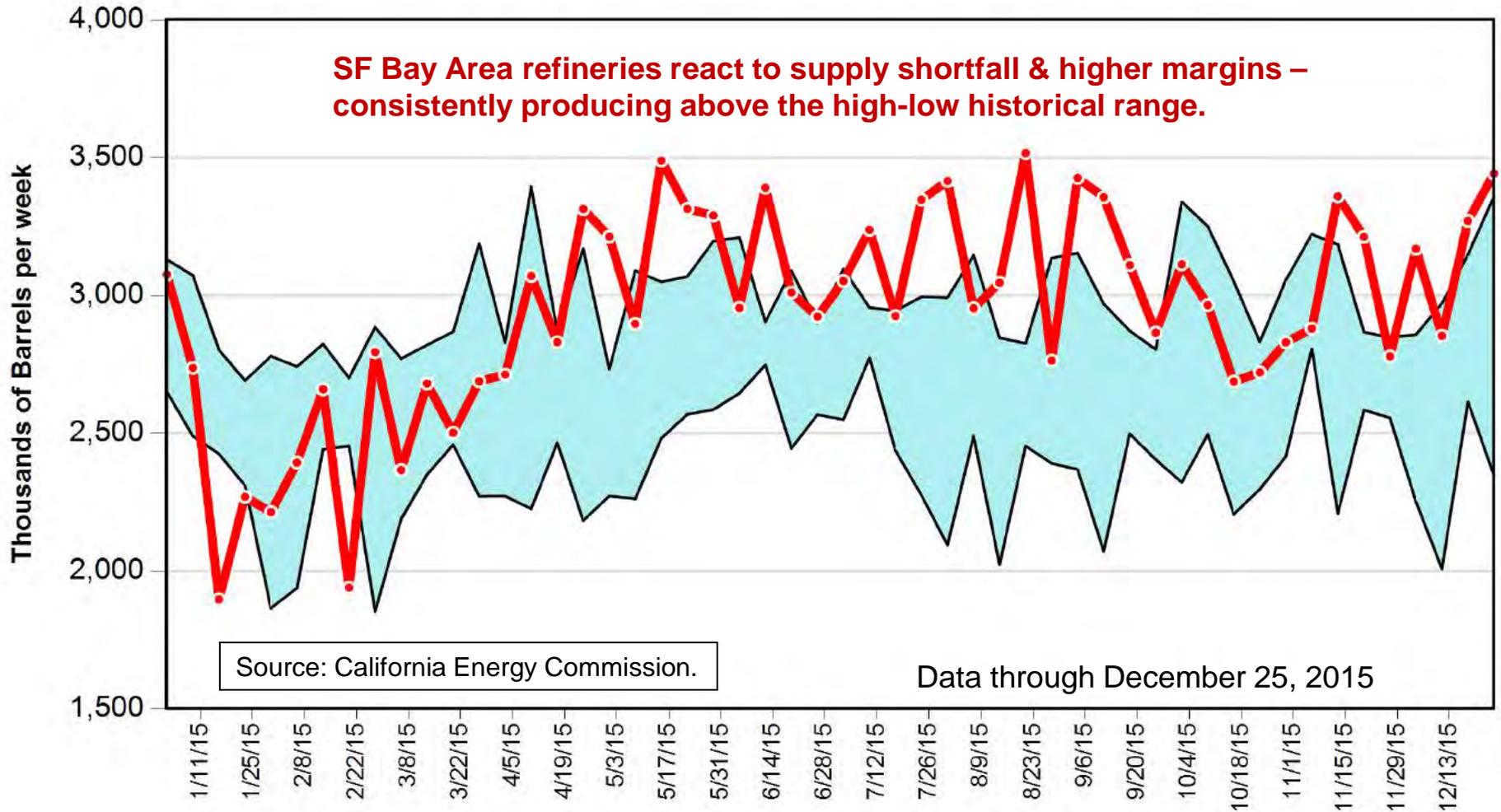


Importance of renewable diesel for LCFS compliance forecast to grow and remain strong through 2030.



Gasoline Production - North

Northern California CARB Gasoline Production (with 5-Year High-Low Band)





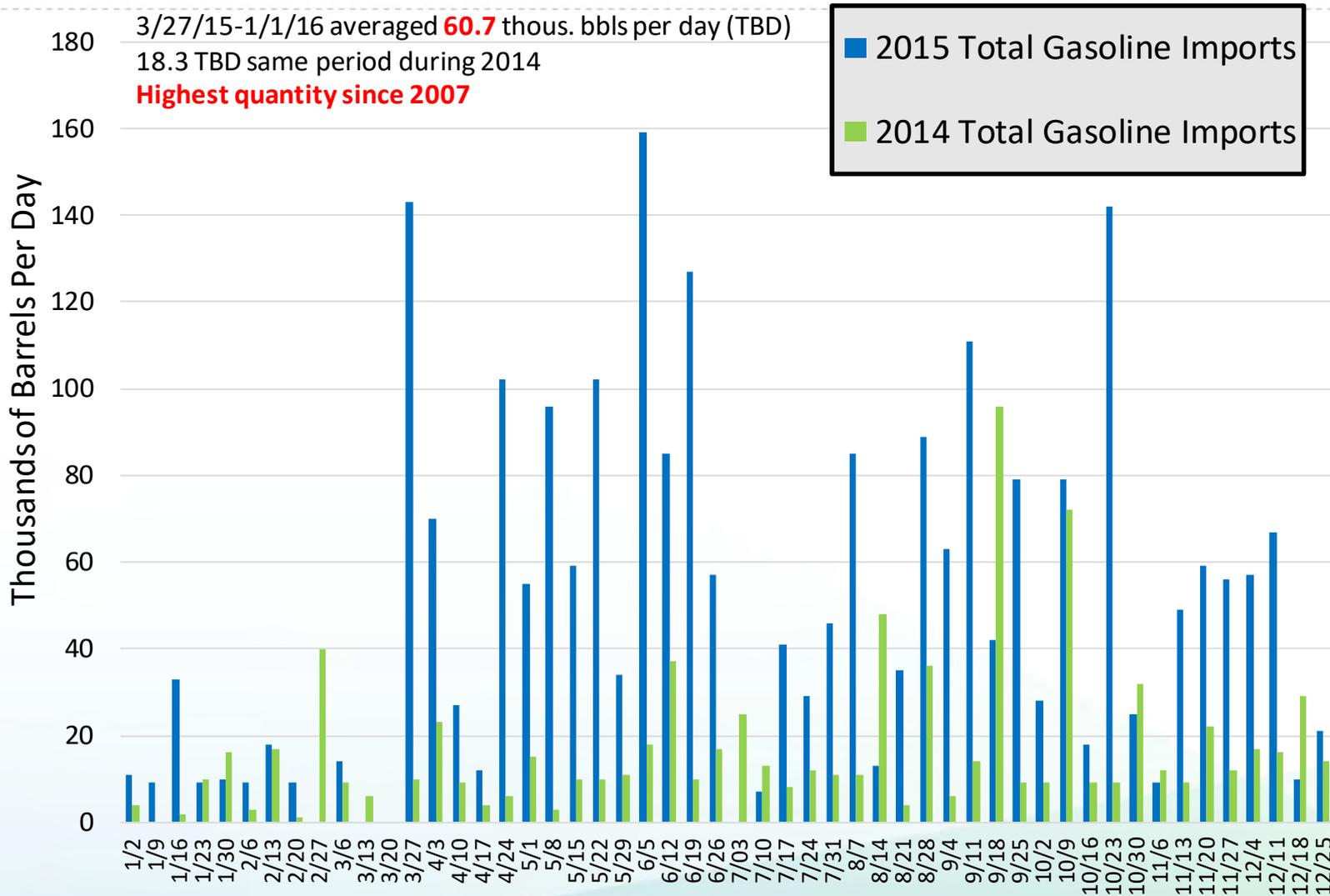
West Coast Foreign Gasoline Imports

Source: California Energy Commission analysis of weekly import data from the Energy Information Administration.

3/27/15-1/1/16 averaged **60.7** thous. bbls per day (TBD)

18.3 TBD same period during 2014

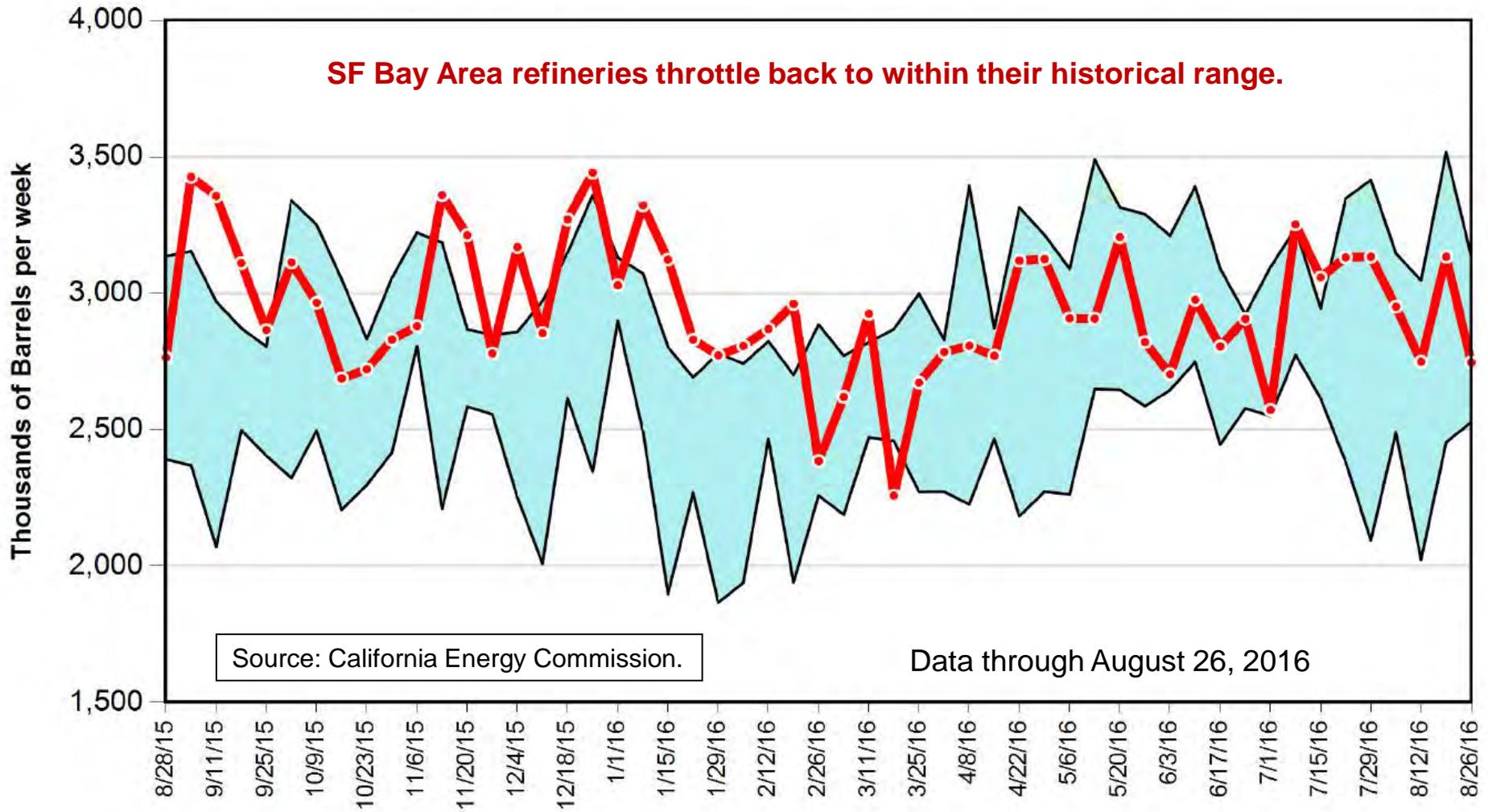
Highest quantity since 2007





Gasoline Production - North

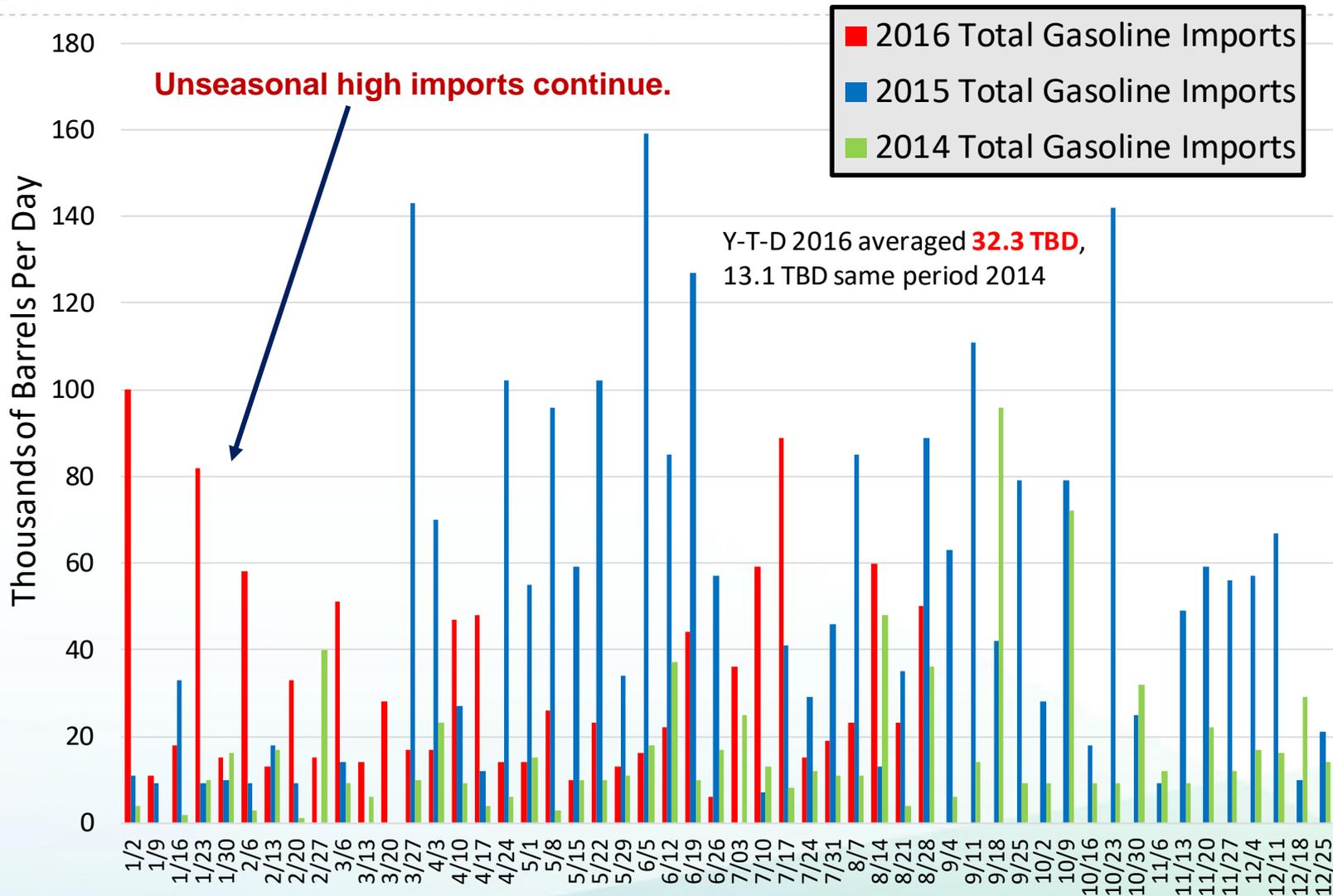
Northern California CARB Gasoline Production (with 5-Year High-Low Band)





West Coast Foreign Gasoline Imports

Source: California Energy Commission analysis of weekly import data from the Energy Information Administration.





Retail Gasoline Price Differences California Less U.S. Average

