California Fuel Overview & Emergency Fuels Set-Aside Program

California Utilities Emergency Association

Annual Meeting

Mather, CA

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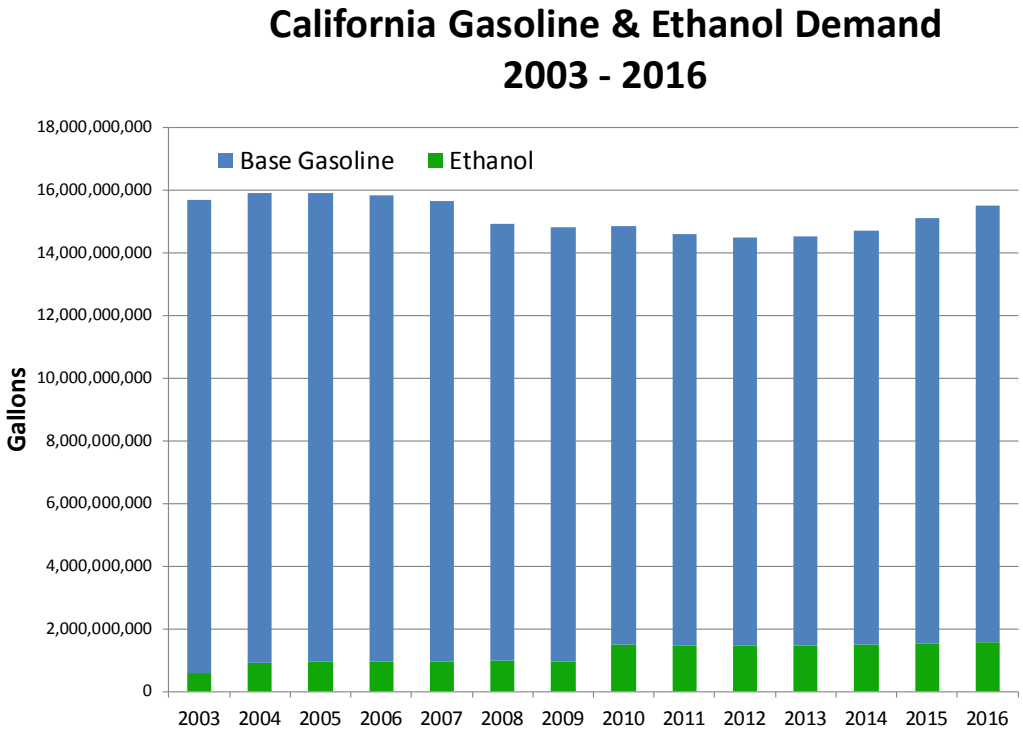
California Energy Commission

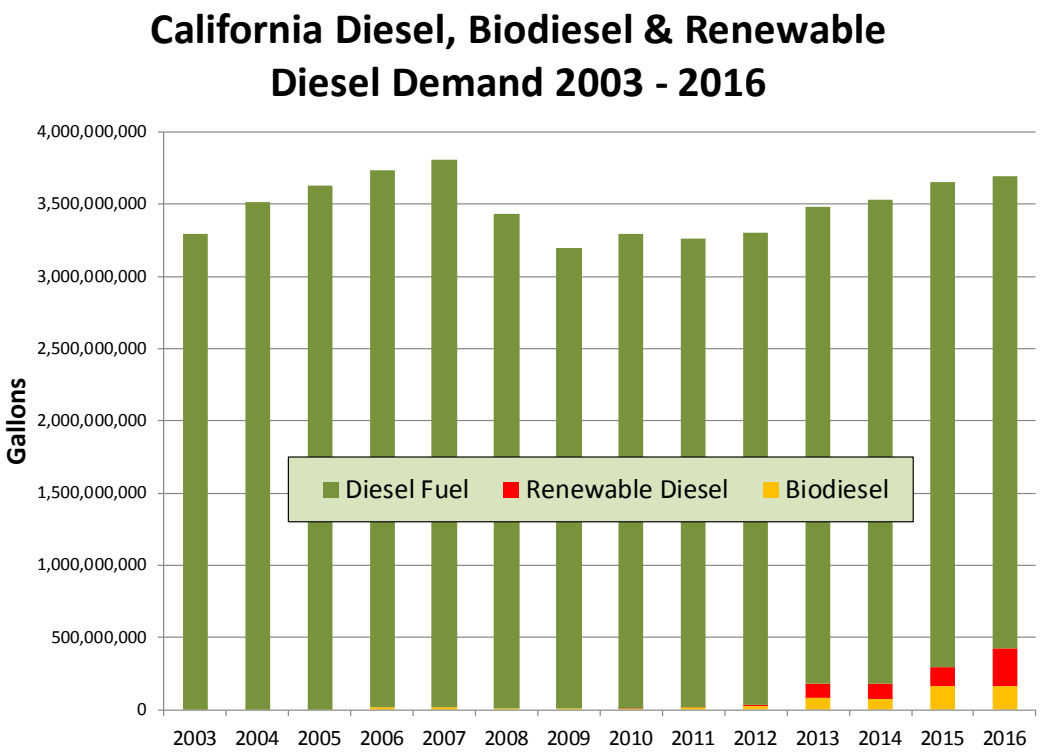
California On-road Transportation Fuels

- 15.49 billion gallons of gasoline consumed in 2016
- Base gasoline demand up 6.9 percent between 2012 and 2016
  - Ethanol use increasing due to Renewable Fuel Standard
  - Ethanol use up to 1.56 billion gallons during 2016
  - 165 percent increase since 2003
  - Ethanol accounted for 10.09 percent of total gasoline gallon during 2016



California On-road Transportation Fuels

- 3.70 billion gallons diesel consumed during 2016
- Base diesel fuel demand *unchanged* between 2013 and 2016
  - Biodiesel use increasing due to Renewable Fuel Standard and the Low Carbon Fuel Standard (LCFS)
    - 168 MM gallons during 2016
  - Renewable diesel fuel use up to 257 MM gallons during 2016 due to LCFS
  - Combined renewable component accounted for 11.5 percent of total diesel gallon



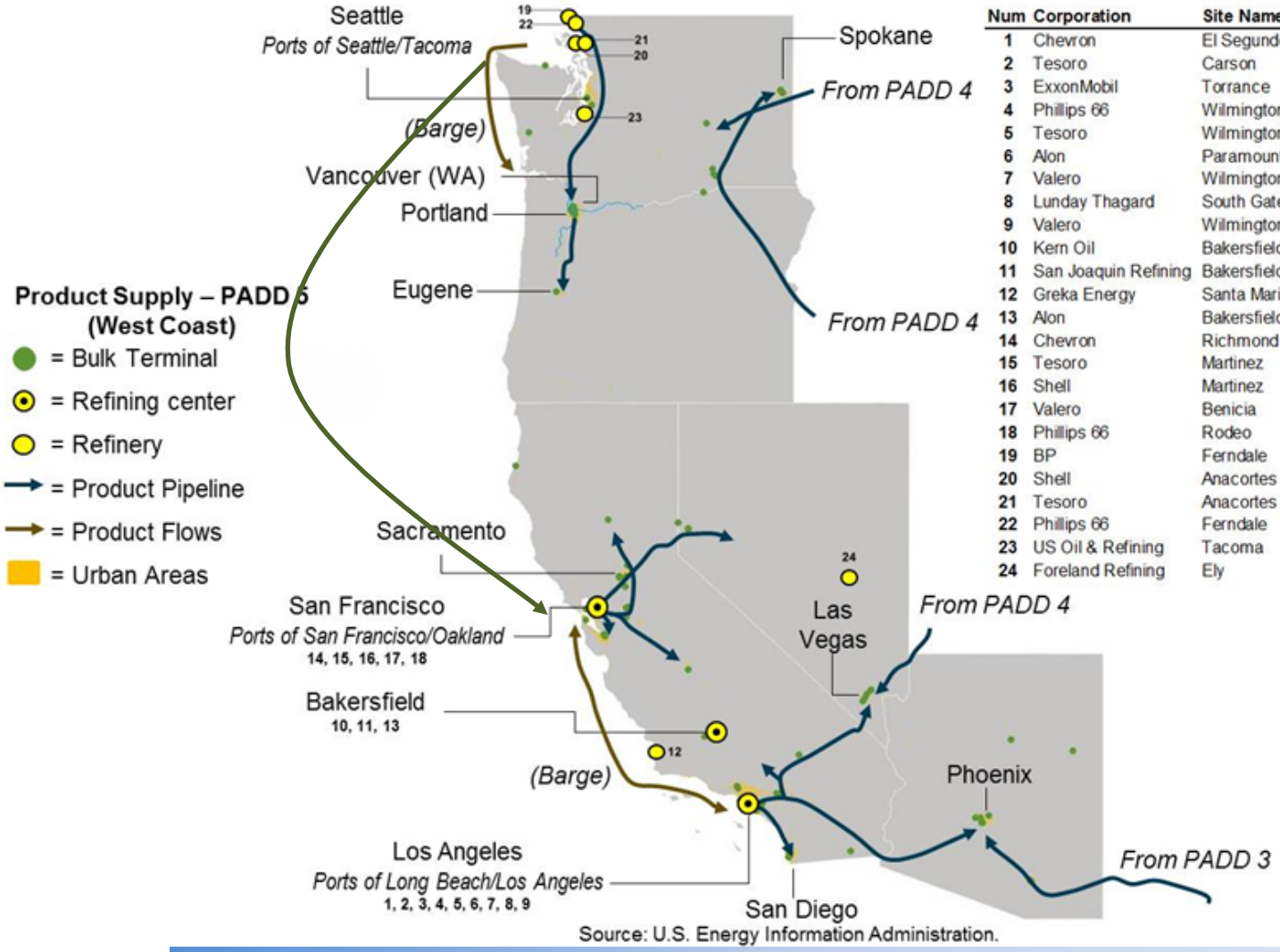
Transportation Fuel Infrastructure Overview

Fuel Infrastructure – Key Elements

- The California transportation fuel "infrastructure" consists of several interconnected assets operated by a combination of refiner and third-party companies
  - Refineries
  - Marine terminals
  - Pipelines
  - Storage tanks
  - Rail
- Crude oil and petroleum product infrastructure assets are separate and distinct from one another – not interchangeable
- Unlike with the electricity distribution system, Northern California is not directly connected to Southern California

Western States More Isolated than Rest of U.S.

West Coast petroleum product supply map



Num	Corporation	Site Name	Capacity (bbl/d)
1	Chevron	El Segundo	269,000
2	Tesoro	Carson	251,000
3	ExxonMobil	Torrance	149,500
4	Phillips 66	Wilmington	139,000
5	Tesoro	Wilmington	104,500
6	Alon	Paramount	Idle
7	Valero	Wilmington	78,000
8	Lunday Thagard	South Gate	8,500
9	Valero	Wilmington (asphalt)	6,300
10	Kern Oil	Bakersfield	26,000
11	San Joaquin Refining	Bakersfield	15,000
12	Greka Energy	Santa Maria	9,500
13	Alon	Bakersfield	No CDU
14	Chevron	Richmond	245,271
15	Tesoro	Martinez	166,000
16	Shell	Martinez	156,400
17	Valero	Benicia	132,000
18	Phillips 66	Rodeo	120,200
19	BP	Ferndale	225,000
20	Shell	Anacortes	145,000
21	Tesoro	Anacortes	120,000
22	Phillips 66	Ferndale	101,000
23	US Oil & Refining	Tacoma	40,700
24	Foreland Refining	Ely	2,000

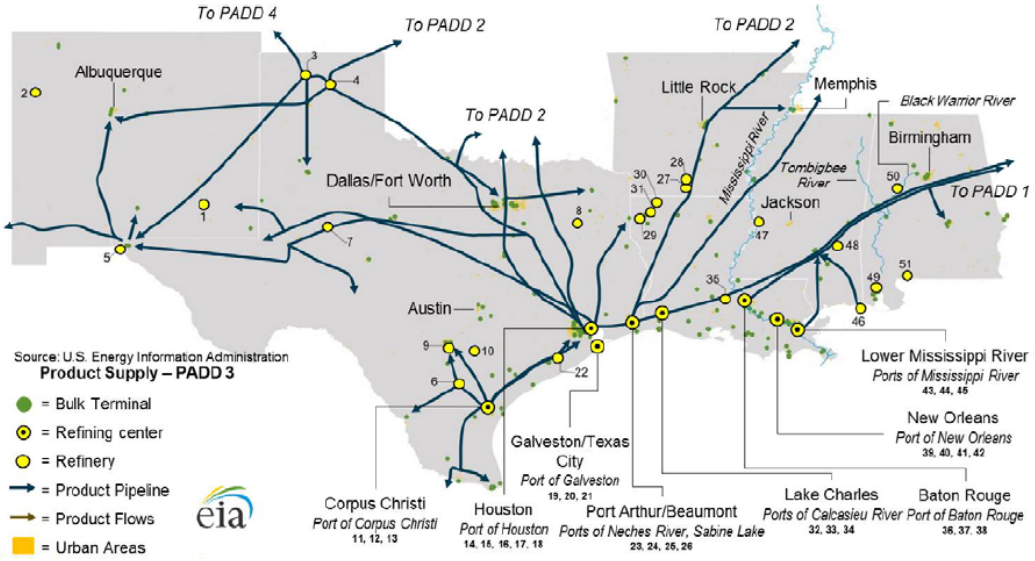
Source: U.S. Energy Information Administration.

California Gasoline Market - Isolated

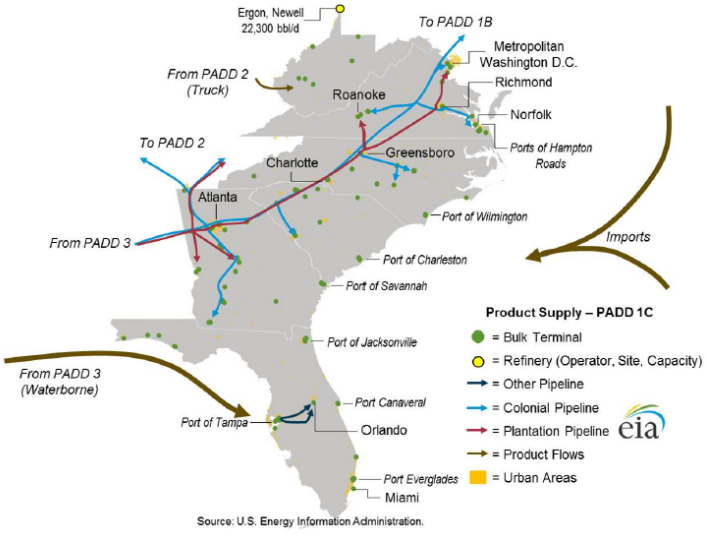
- California's gasoline market is nearly self-sufficient, so supplies of gasoline from outside of California are not routinely needed to balance out supply with demand
  - Imports of gasoline and blending components account for only 3 to 6 percent of supply
- The California market is geographically isolated from other locations in the United States that produce refined products
- Pipelines connect California refining centers to distribution terminals in Nevada and Arizona, but these pipelines only operate in one direction – sending gasoline and other transportation fuels to these neighboring states
- California market is isolated by time and distance from alternative sources of re-supply during unplanned refinery outages

Balance of Other Regions Varies

- Unlike other areas, California is nearly self-sufficient
  - Primary sources of transportation fuels originate from *inside* the state
  - Marine imports normally account for less than 5 percent of gasoline supply
- Catastrophic disaster in greater SF Bay Area directly impacts source of fuel supply



Large net ***exporting*** region



Large net ***importing*** region

Key Elements - Refineries

- 3 primary refinery locations
- 12 refineries produce transportation fuels that meet California standards
- 8 smaller refineries produce asphalt and other petroleum products
- California refineries provide majority of transportation fuel to neighboring states
- Processed 1.612 million barrels per day of crude oil during 2016

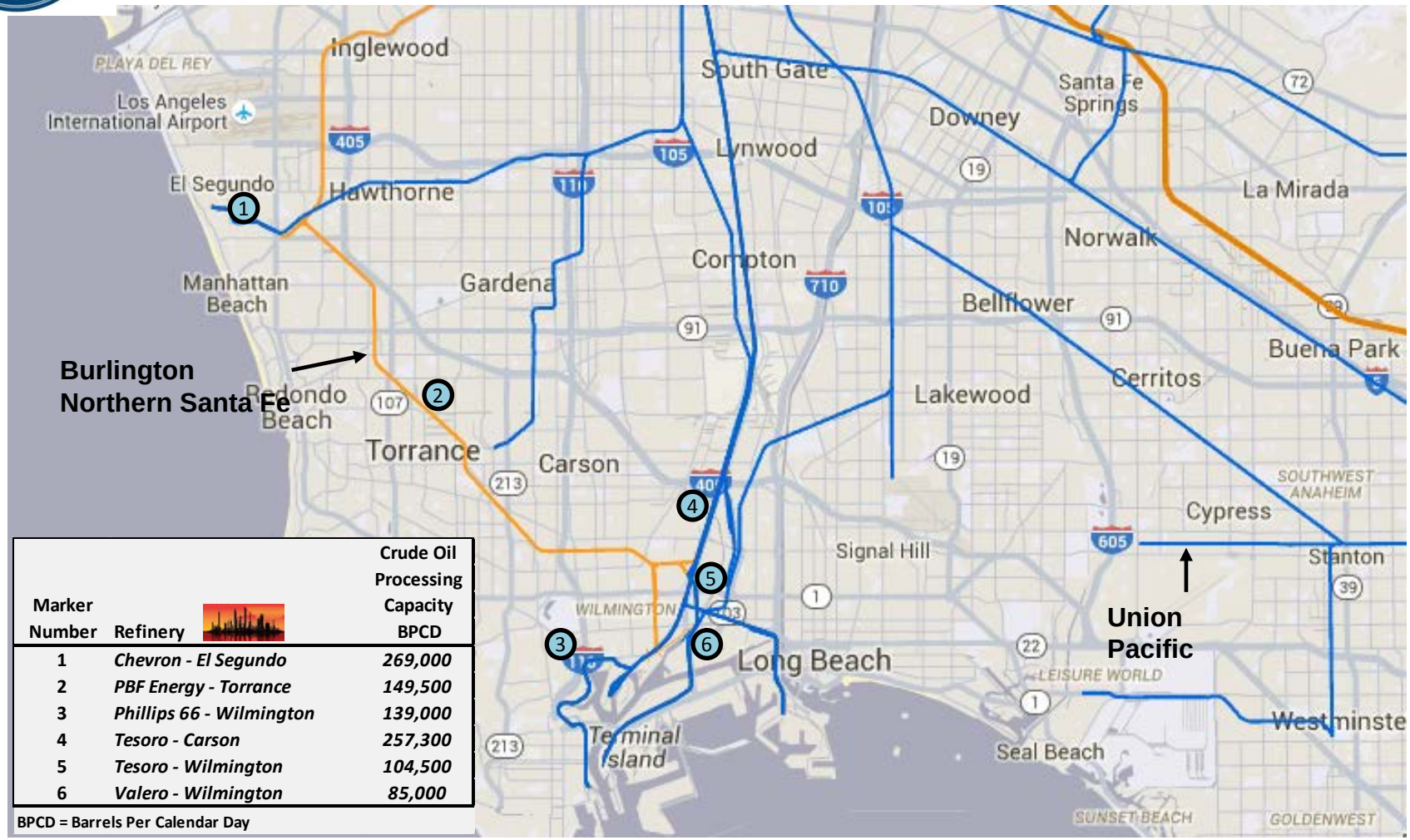
Northern California Refineries

Marker Number	Refinery	Crude Oil Processing Capacity BPCD
1	*Chevron - Richmond*	*245,271*
2	*Phillips 66 - Rodeo*	*120,200*
3	*Shell - Martinez*	*156,400*
4	*Tesoro - Golden Eagle*	*166,000*
5	*Valero - Benicia*	*145,000*

BPCD = Barrels Per Calendar Day

Sources: Oil Change International base map, Energy Information Administration refinery data and California Energy Commission analysis.

Southern California Refineries

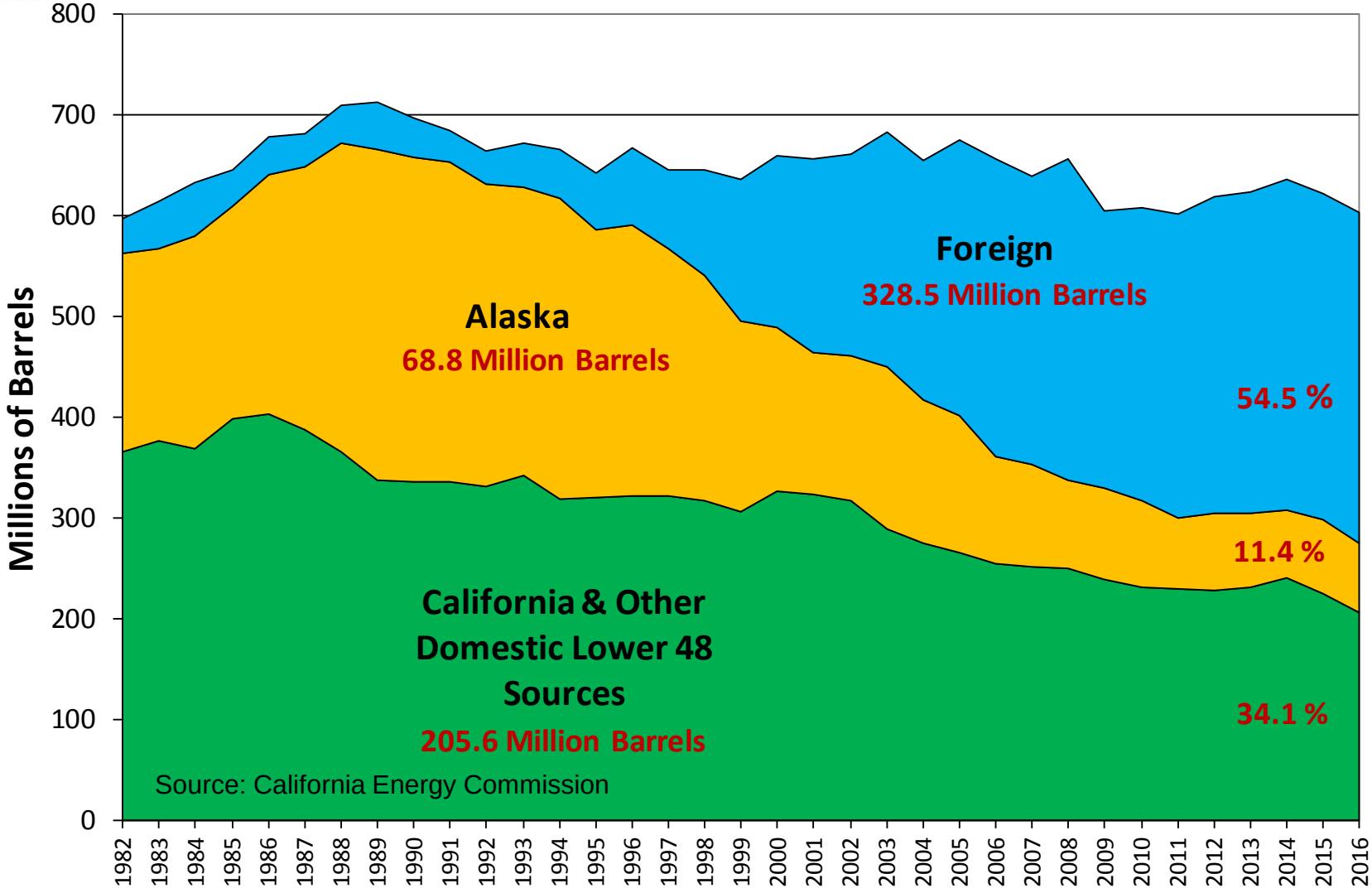


Marker Number	Refinery	Crude Oil Processing Capacity BPCD
1	*Chevron - El Segundo*	*269,000*
2	*PBF Energy - Torrance*	*149,500*
3	*Phillips 66 - Wilmington*	*139,000*
4	*Tesoro - Carson*	*257,300*
5	*Tesoro - Wilmington*	*104,500*
6	*Valero - Wilmington*	*85,000*

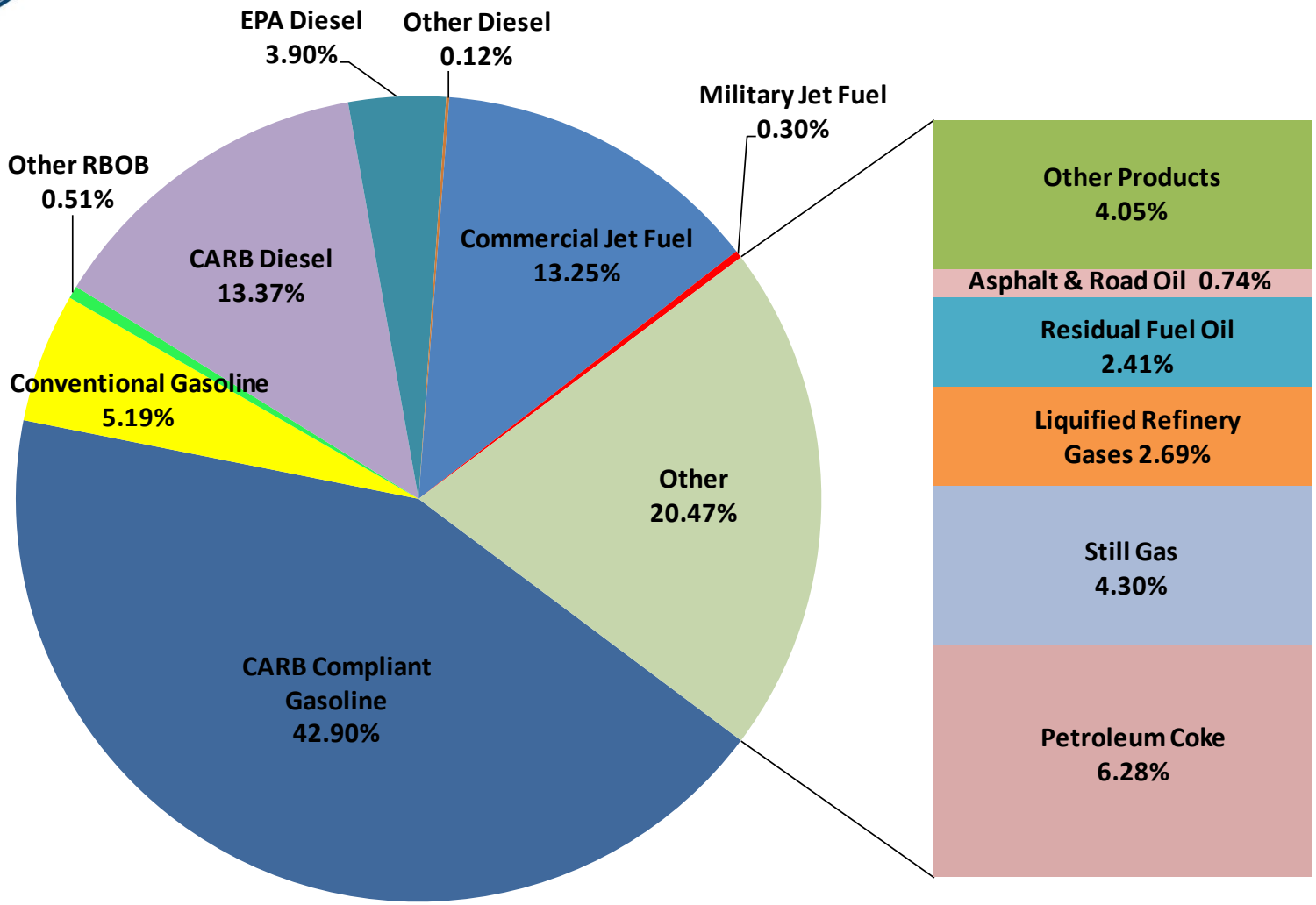
BPCD = Barrels Per Calendar Day

Sources: Oil Change International base map, Energy Information Administration refinery data and California Energy Commission analysis.

Crude Oil Sources – California Refineries



California Refineries – 2016 Output



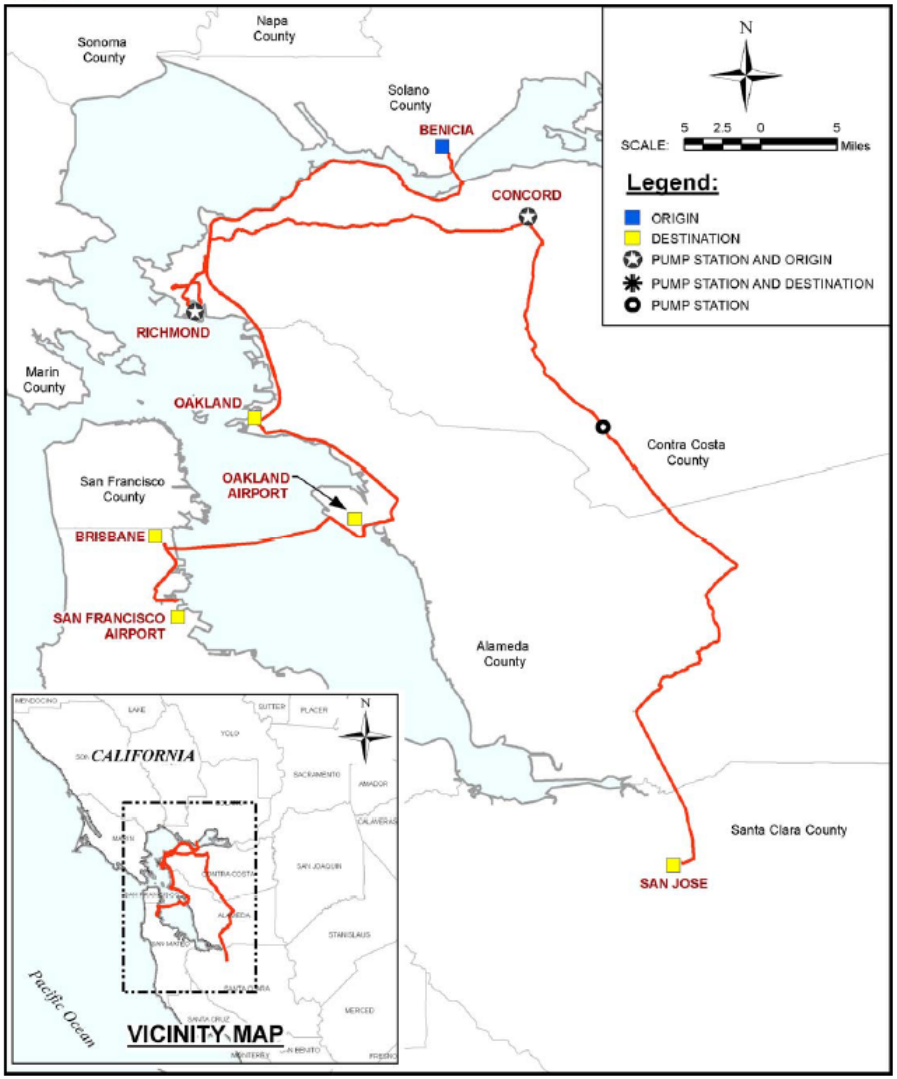
*Note: Does not include ethanol.

Source: California Energy Commission

Product Pipelines – Northern California

- The pipeline infrastructure in California is controlled by a combination of common carrier and private companies
- Kinder Morgan is the sole common carrier of petroleum product pipelines in the State and transports the majority of fuels through its system every day
- Other companies, such as Chevron, ExxonMobil, Shell, and Tesoro operate proprietary systems or segments that handle the balance of transportation fuels

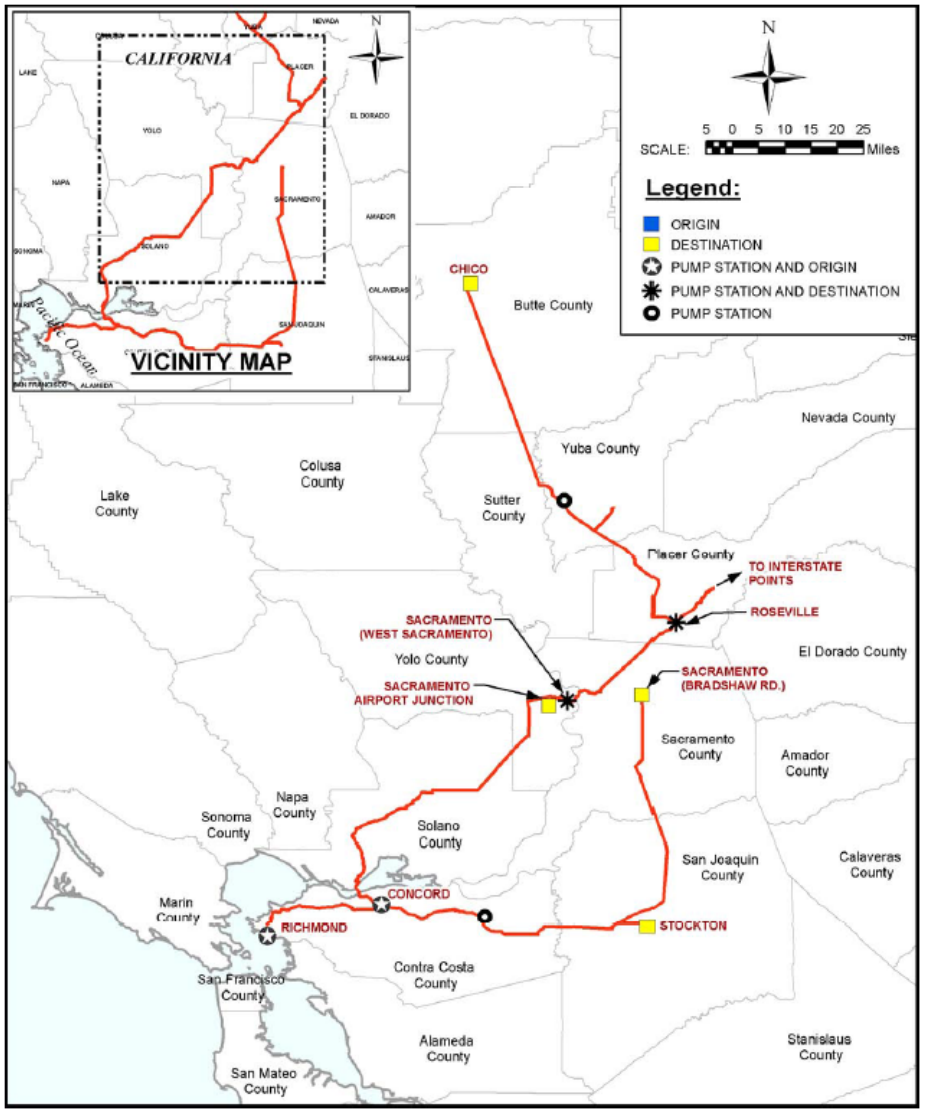
Bay Area – Kinder Morgan Lines



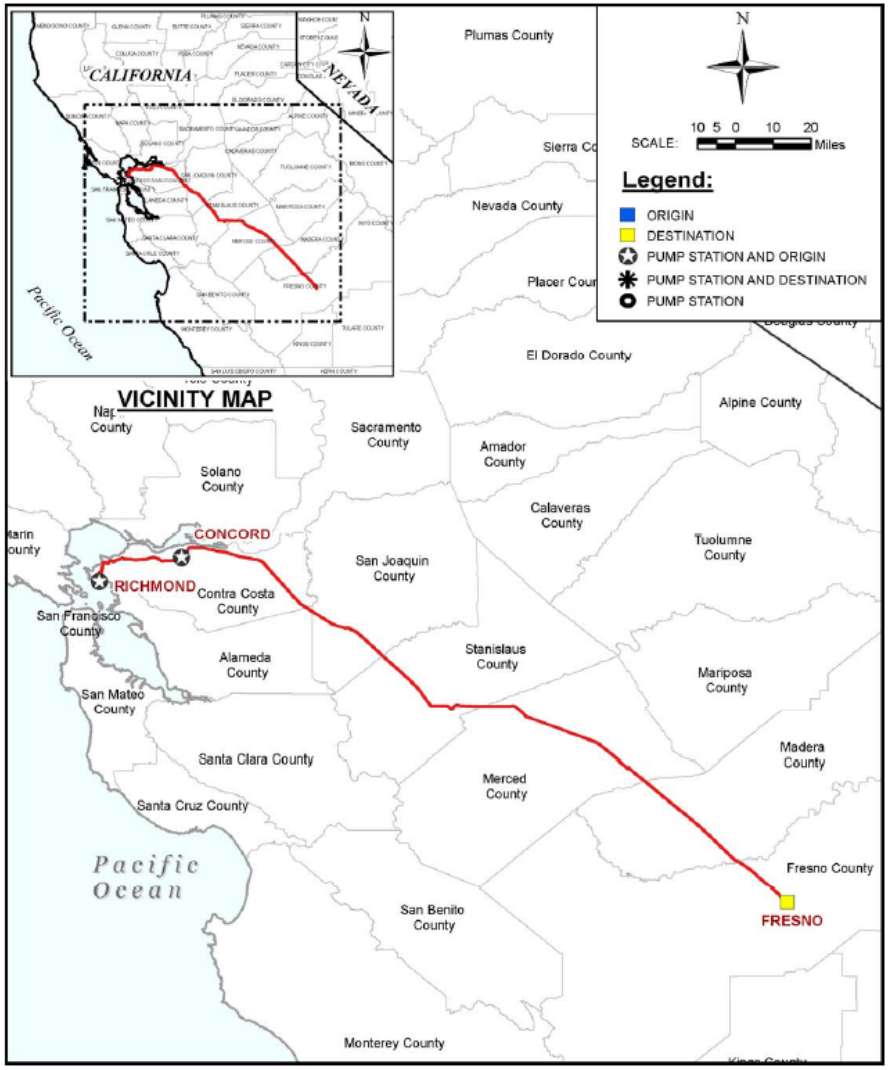
- The sole source of fuels for Bay Area airports
- Trans-bay crossing to Brisbane and SFO
- Distribution to Brisbane and San Jose terminals augments supply from truck racks linked to Bay Area refineries
- 75 to 85 percent of gasoline and diesel fuel is distributed through pipelines from refineries to distribution terminals

Bay Area – Kinder Morgan North Lines

- The Chico terminal is the northernmost extent of petroleum product pipeline system in California
- Pipeline continues to Reno (Sparks), Nevada
- Deliveries to Roseville for railroad use
- Separate pipeline delivers military jet fuel to Travis AFB (not shown on map) from Concord pump station
- Separate spur line to Beale AFB
- Sacramento Airport now receives commercial jet fuel via pipeline connection



Bay Area – Kinder Morgan Fresno Line



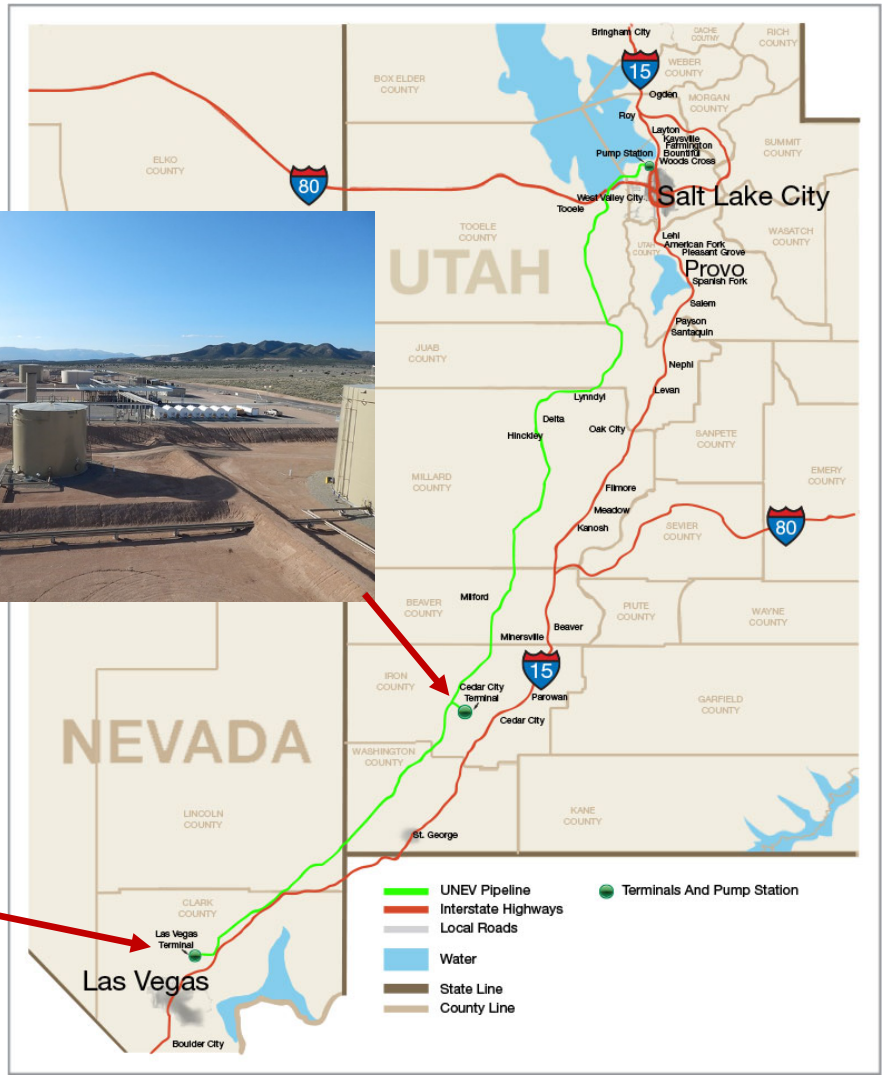
- The Fresno terminal is the southernmost extent of the petroleum product pipeline system originating from the Concord pump station
- Lemoore naval air station receives military jet fuel on a separate extension originating from the Fresno terminal (line segment not shown on this map)
- Fresno terminal can also receive fuel from pipeline segment originating from the ALON USA refinery in Bakersfield that is currently idle

Product Pipelines – Southern California

- Southwestern system includes portions to deliver transportation fuels into Southern Nevada and Arizona
  - NV – Over 85% of supply
  - AZ – Over 45% of supply
- Dependency on Southern California refineries lessened by deliveries from West Texas and Utah

UNEV System – Utah to Las Vegas

- 427-mile, 12-inch refined products pipeline – 60,000 bpd capacity
- 600,000 bbls storage capacity
- Cedar City, UT
  - 2 truck loading bays & rail receipt
- North Las Vegas, NV
  - 2 truck loading bays & truck receipt



Distribution Terminals & Tanker Trucks

- Output from the refineries is usually placed in intermediate tanks prior to blending the finished products
- The majority of gasoline, diesel and jet fuel is shipped from the refinery by pipeline to over 60 distribution terminals
- Tanker trucks then transport fuel to retail & non-retail stations
- Several truck trips during 2016
  - Gasoline – 42.33 MM gal/day
    - 5,290 tanker deliveries/day
  - Diesel fuel – 10.10 MM gal/day
    - 1,260 tanker deliveries/day

Rail Logistics – Other Uses

- Refiners use rail cars to routinely ship propane and seasonally send out and receive butane
- Rail cars are also used to deliver refinery feedstock such as gas oils and sulfuric acid for alkylation units
- More recently, California refiners have started using rail cars to import crude oil from Canada and domestic sources outside the state but this activity is less than 1 percent of supply due to poor transportation economics

Interdependencies

- Most California refineries have cogeneration capability
- But depend on other outside services to sustain operations
  - Source water for process steam
  - Wastewater discharge handling requirements
  - Natural gas to augment still gas fuel production
  - Hydrogen from merchant producers to enable operations of desulphurization processing equipment
  - Acid deliveries for operation of alkylation facilities
- Retail fuel stations provide majority of gasoline and diesel fuel to the public
- Retail stations need electricity to operate dispensers
- Even with back-up power, stations need telecommunication capability to process transactions

CEC Emergency Response Role: Petroleum Fuel Supplies

- The Office of Emergency Services (CalOES) is the lead State agency in an emergency
- CEC Role is outlined in the Energy Commission's Emergency Plan:
  http://www.energy.ca.gov/emergencies/plan.html
- Authority and Statutes that authorize these duties:
  - Public Resource Code Section 25216.5 (b)
  - Public Resource Code Section 25700
  - Government Code 8596
  - **Emergency Order #6**
- Emergency Order #6: Empowers the Energy Commission to hold control of and redirect petroleum stocks needed to ensure the health, safety and welfare of the public
- The Energy Commission does not own fuel supplies/resources nor does the program provide means or methods of delivery

Energy Emergency Response Phases

- Readiness – normal monitoring mode
- Verification – enables collection of information on a daily basis
  - Must announce this to media
- Pre-Emergency – consider voluntary actions
  - Fuel demand reduction
- Emergency
  - Formal declaration
  - Energy situation very drastic requiring extensive government measures
  - Emergency Order #6, formal Fuel Set-Aside Program initiated

Purpose of the Fuels Set Aside Program

From the Energy Commission Emergency Response Plan

Page 9, Paragraph 2: *The state's set-aside program is designed to* ***interfere minimally with the market****, using volumes of fuel sufficient to satisfy* ***only emergency and essential services****. All fuel delivered through the program will be purchased at the market price and, whenever possible, through the usual fuel supplier.*

Page 9, Paragraph 5: *While it is hoped that market forces will assist in balancing supply and demand, this strategy generally results in higher energy costs.*

Fuels Set Aside Program (FSAP)

- Authorizes the Energy Commission to hold "control and coordination" of petroleum and petroleum products in California
  - Formal Fuel Set-Aside Program (FSAP)
  - Emergency responders - life and property
- The Energy Commission coordinates with the California Office of Emergency Services (OES) [ESF #7] to ensure critical fuel supplies get to where they are needed most during a declared emergency.
- Non-emergency FSAP activities handled by the CEC at their Sacramento headquarters
- Liquid transportation fuels, not electricity or natural gas
  - Gasoline & diesel fuel
  - Civilian and military jet fuel
  - Propane

FSAP – Formal & Informal

Role of the Energy Commission: Mediate communication between entities (responders) with *fuel needs* and entities with *fuel stock* (refineries & distributors)

- FSAP has two versions – Emergency (formal) and Non-emergency (informal)
- Emergency-related transportation fuels requests
  - CEC personnel stationed at OES
  - Filling mission tasks for transportation fuels through OES Web EOC system
- Non-emergency-related transportation fuels requests
  - CEC personnel stationed at the Energy Commission
  - Fuel requests for other reasons
    - Economic harm
    - Community hardship
    - Essential infrastructure
- Priority given to emergency-related requests if supplies are constrained

Fuel Request Submission Process

EMERGENCY SERVICES

- First responders requesting emergency fuel use standard resource request procedures set by their local or state agency through established emergency operating center (EOC) protocols
- The Energy Commission will coordinate with the Office of Emergency Services (CalOES) for these requests

Civilian Requests

- Civilian entities may submit requests based upon the program guidelines defined on the Energy Commission website
  - Petroleum Fuels Set-Aside Program
  - Resources - FSAP Applicant Handbook

Catastrophic Earthquake

- Unprecedented event - not experienced in our lifetimes

- Business-as-usual will not suffice
- Large portion of fuel supply will be lost or unavailable
- Demand outside the impacted region will experience varying degrees of panic-buying

Transportation Fuel Adequacy

- There will not be sufficient transportation fuel supplies to meet demand following a catastrophic earthquake
- Steps will need to be undertaken to *increase* fuel supply

Brooklyn gas lines during aftermath of Superstorm Sandy – Photo Credit: thehotzoneusa.com

Transportation Fuel Adequacy

- Options available to ***increase supply*** but require cooperation and pro-active actions to pave the way
  - Waiver of fuel specifications
    - California has its own gasoline & diesel fuel regulations – require waiver by the California Air Resources Board – gasoline and diesel fuel
    - U.S. EPA would also have to waive federal Reformulated Gasoline regulations
  - Waiver of non-taxable diesel fuel regulations
    - Allow dyed diesel to be used
  - Consider waiver of Jones Act to increase delivery capability of waterborne transportation fuels
  - Waiver of driver-hours restrictions for delivery tanker trucks will be automatic after declaration of emergency
  - To the extent feasible, all of these regulatory capabilities should be worked out in advance – including Nevada and Arizona

Transportation Fuel Demand

- Demand needs to be controlled/curtailed
  - Odd-even rationing is an effective tool – statewide implementation
  - Would require pre-planning and should be deployed shortly after the incident
  - Security would likely be required in urban areas
  - Most California retail stations are self-serve and would need oversight to ensure compliance
  - Traffic control
  - Adequate manpower
  - New rule-making?
  - New legislation?

Plate inspection in odd-even line – Photo Credit: Norman Lono, NY Daily News

Transportation Fuel Demand

- Loss of production from Northern or Southern California refineries and/or ability to ship refined products from their facilities will significantly curtail or halt petroleum product pipeline deliveries to areas outside the impacted region
- Media and consumers will quickly arrive at this conclusion
- Inaction could result in supply shortages – all motorists "topping off" their tanks equates to about three days-worth of gasoline production/demand – would drain the distribution system
- This scenario will not be isolated to California
  - Nevada pipeline deliveries will be curtailed, UNEV pipeline will not be able to completely make up the shortfall
  - Arizona supplies will also be reduced with additional supplies from the East Line lagging by several days and likely insufficient to replace all of the volume reduced on the West Line
  - These two states will also need to take similar steps to curtail demand

Transportation Fuels Working Group

- A Fuels Working Group has been created to improve preparedness for response to a catastrophic event
  - OES, Cal NG, CUES, DGS & CEC core members
  - Participation from FEMA and Cal EPA
- Purpose
  - Identify specific goals and work solutions
- Areas of focus
  - Quantify fuel demand & geographic scope for emergency needs
  - Alternative sources of fuel for National Guard activities
  - Strategies for maximizing fuel delivery from outside California
    - Rail & aviation resupply
  - Fuel supply inside impacted zones
    - Trapped first responders still need fuel

How Much Fuel Is needed?

- Understanding the scale and types of transportation fuels that will be needed in the aftermath of a catastrophic event are critical to preparedness
- CUEA has been conducting confidential assessments of member utilities to better understand what fuel types & burn rates
- Quantifying daily emergency fuel needs enables the CEC to justify the volumes of transportation fuel stocks to “hold” for use by emergency response efforts
- Point source demand (back-up generators) that can be geocoded allows for better refinement of fuel needs and geographic scope of resupply logistics

Alternative Sources of Re-supply

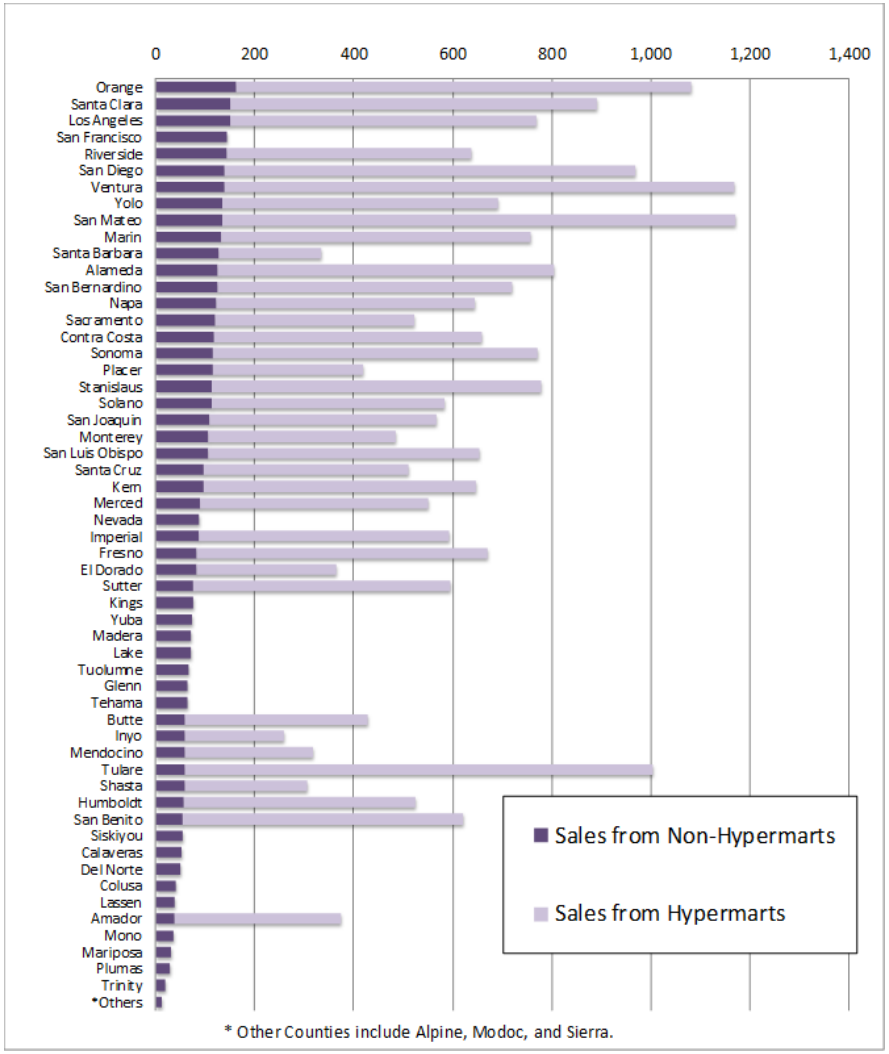
- Besides waiving specifications, what other options might be pursued to increase resupply to California?
- Identification of potential liquid fuel supply redundancy (LFSR) locations and partners outside the impacted zone
  - Intent of LFSR concept to pre-arrange emergency fuel supply for California National Guard mission tasks immediately following catastrophic event
  - Working with the California National Guard, OES, DGS, and refiners
  - Would be triggered if the National Guard were to exhaust their primary source of fuel from the Defense Logistics Agency (DLA) ***or*** if mission tasks change to include delivery of transportation fuels not already held at DLA facilities

Strategies for Maximizing Fuel Delivery

- FEMA efforts to create “hub-and-spoke” importation and re-distribution of transportation fuels
  - Utilize marine assets – tankers and barges
  - Questions concerning availability and timing of response
- Potential re-tasking of existing rail receipt terminals
  - Can rail terminals be repurposed to receive rail cars of gasoline and diesel fuel rather than ethanol and crude oil?
  - Which locations may be feasible candidates and what effort/equipment modifications would be required?
- Identification of potential rail sites that could be proactively developed for use during a catastrophic event
  - Would target rail transloading potential
- Aviation fuel resupply
  - Airports re-supply will be difficult through normal pipeline means
  - Fixed wing delivery from outside state likely optimal

Hypermarket Stores Inside Impact Area

- Hypermarket retail stores sell ***5.3*** times more gasoline than non-hypermarts
- Ideal locations for points-of-distribution activity
  - Large footprint
  - More fueling islands
  - Food & provisions



Urban Gas Stations – Average Sales

Should consider focusing efforts on stations with greatest throughput, storage tank capacity and dispensers - hypermarts

Analysis of A15 Retail Survey Data From CY 2015

California Bay Area County	Non Hypermarts Retail Sites	Average Gasoline Throughput Gallons/Month	Hypermart Retail Sites	Average Gasoline Throughput Gallons/Month
Alameda	222	126,061	8	804,629
Contra Costa	179	118,890	6	658,161
Marin	47	131,715	1	757,435
Napa	29	122,255	1	644,748
San Francisco	63	143,922		
San Mateo	125	133,649	3	1,170,999
Santa Clara	271	151,959	8	890,772
Subtotals	936	134,569	27	830,643
LA Basin				
Los Angeles	1,356	151,098	35	769,073
Orange	462	162,536	15	1,080,881
Riverside	383	143,833	22	636,461
San Bernardino	407	124,929	14	718,372
San Diego	562	138,533	16	968,118
Ventura	137	138,430	2	1,168,740
Subtotals	3,307	145,974	104	817,476

Potential Activities – Retail Backup Power

- Gas stations inside damaged zone will likely be without power
- Could identify stations that could be used to distribute fuel using backup generators – permanent or portable
  - New York has PON for $12 million that will be used for permanent back-up generators at key service stations
  - Some state laws require pre-wiring to accept portable generators for key service stations
  - CEC will be including additional questions on their annual retail survey form (A15) related to back-up power capability

Questions?

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