



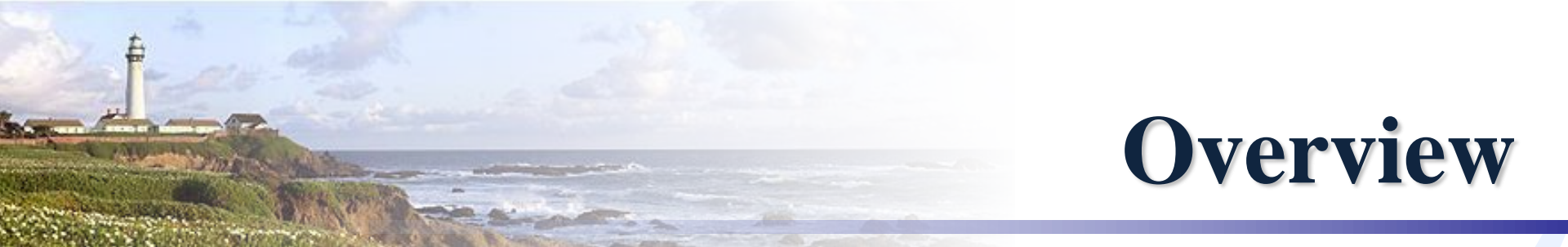
BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

AGENDA: 13

**Proposed Amendments to
Regulation 9, Rule 13:
Nitrogen Oxides, Particulate Matter
and Toxic Air Contaminants from
Portland Cement Manufacturing**

**Board of Directors Meeting
October 19, 2016**

**Robert Cave
Senior Air Quality Specialist**



Overview

- Regulatory Background and Purpose
- Technical Issues with Ammonia Standard
- Proposed Regulatory Solution
- Next Steps - Future Rule Development
- Staff Recommendation



The background of the slide features a scenic view of the Golden Gate Bridge in San Francisco, California. The bridge's iconic orange-red towers and suspension cables are visible against a clear blue sky. In the foreground, the water of the bay is calm, and a small building is situated on the left side of the frame.

Regulatory Background and Purpose

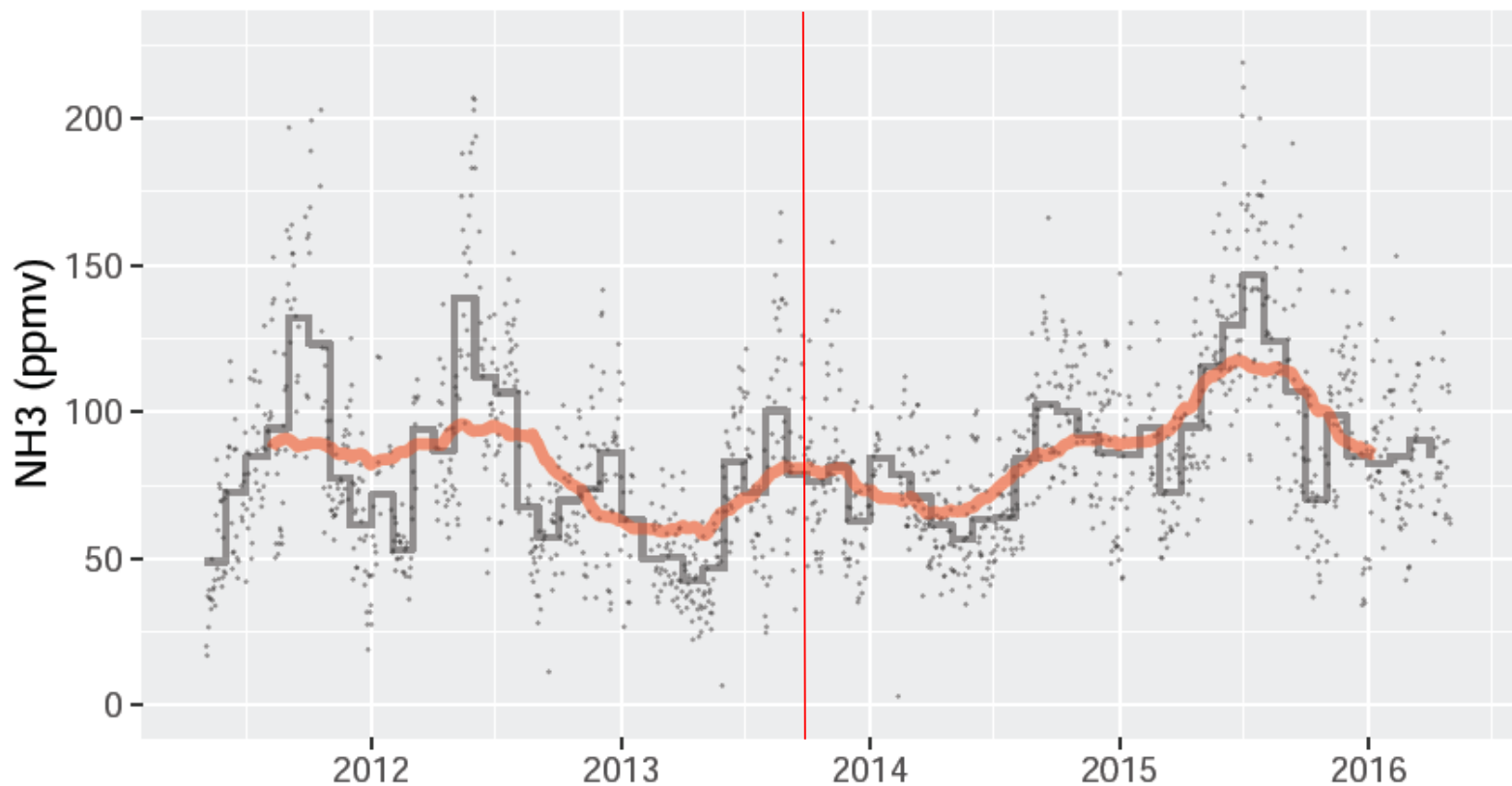
- Adopted September 12, 2012, with effective date of September 9, 2013 for emissions standards.
- Achieve NO_x emissions reductions along with efforts to meet proposed Federal toxic emissions standards.
- Strengthen enforceability of dust mitigation measures.
- Ensure health risk reduction measures are met.

Ammonia Standard – Technical Issues

- Rule sets an ammonia limit to prevent over-injection in the NO_x control system.
- Limit is unachievable due to variable ammonia content in feedstock.
- This prevents incorporation into Title V permit.
- Correcting this problem will ensure federal enforceability.



Ammonia Standard – Technical Issues (Continued)



Ammonia Standard – Solution

- Reference Exposure Level (REL)
 - Acute: 4.5 ppmv (one hour average)
 - Chronic: 0.3 ppmv (annual average)
- Odor Threshold
 - Ranges from 0.04 to 50 ppmv, most organizations point to 5 ppmv
- Set target offsite concentration well below REL and odor threshold: 0.5 ppmv hourly max
- Use air dispersion modeling to set emissions limit consistent with target offsite concentration.





Proposed Rule Amendments

- 182-Operating Day Rolling Average
- Ammonia Emission Limit: 270 ppmv
- Deletion of Baseline Ammonia Emission Level Determination and Calculation Methodology





Outreach Effort

- Public Stakeholder Meetings in Cupertino
- Stationary Source Committee Updates
- Meetings with Lehigh Facility Staff
- Proposal published in July and September
- Public Comment and Staff Response



Continuing Issues of Concern

- Toxic emissions
 - Regulation 11, Rule 18
 - Workshop in November, Public Hearing in May
- Dust emissions
 - Regulation 6, Rules
 - Workshop in January, Public Hearing in April
- Condensable PM emissions
 - Ongoing Testing and Research

The background of the slide features a scenic view of the Golden Gate Bridge in San Francisco, California, spanning across the water. The bridge's iconic orange-red towers and suspension cables are prominent against a clear blue sky. In the foreground, the water is a deep blue, and a small building is visible on the left side of the frame.

Staff Recommendations

- Board adopt the proposed amendments to Regulation 9, Rule 13.
- Staff file Notice of Exemption from CEQA.
- Staff to engage community through ongoing public outreach efforts.
- Staff continue efforts to address Toxics, Dust and Condensable PM emissions.



California Refinery Overview and SF Bay Area Crude Oil Slate

BAAQMD Board of Directors Meeting

San Francisco, CA

October 19, 2016

Gordon Schremp

Energy Assessments Division

California Energy Commission

Gordon.schremp@energy.ca.gov



Presentation Topics

- California refinery operations & crude oil sources
- Crude oil slate
 - Properties
 - Trends
 - Likelihood of significant increase of Canadian imports
- Refinery operations & surge capacity
- California fuels market
 - Imports
 - Exports



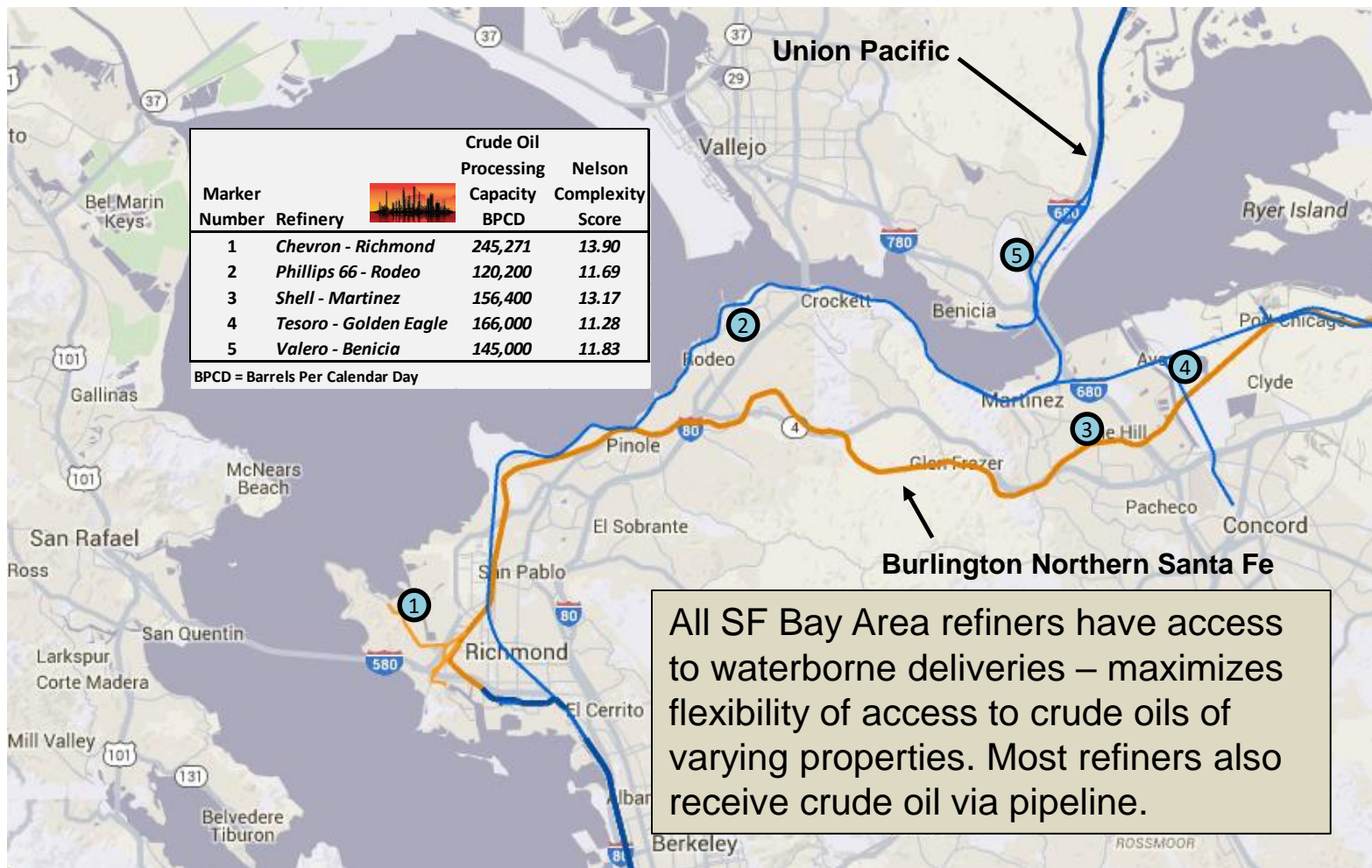
California Refineries



- Refineries are a primary hub of logistical activity
 - Raw materials imported & finished products shipped
- Crude oil receipts during 2015 received by
 - Marine vessels (foreign) – 885.8 TBD
 - Marine vessels (Alaska) – 200.5 TBD
 - California source via pipelines – 612.8 TBD
 - Rail/truck – 4.8 TBD
- Process units operate continuously at or near maximum capacity, except during periods of planned maintenance or unplanned outages



SF Bay Area Refineries

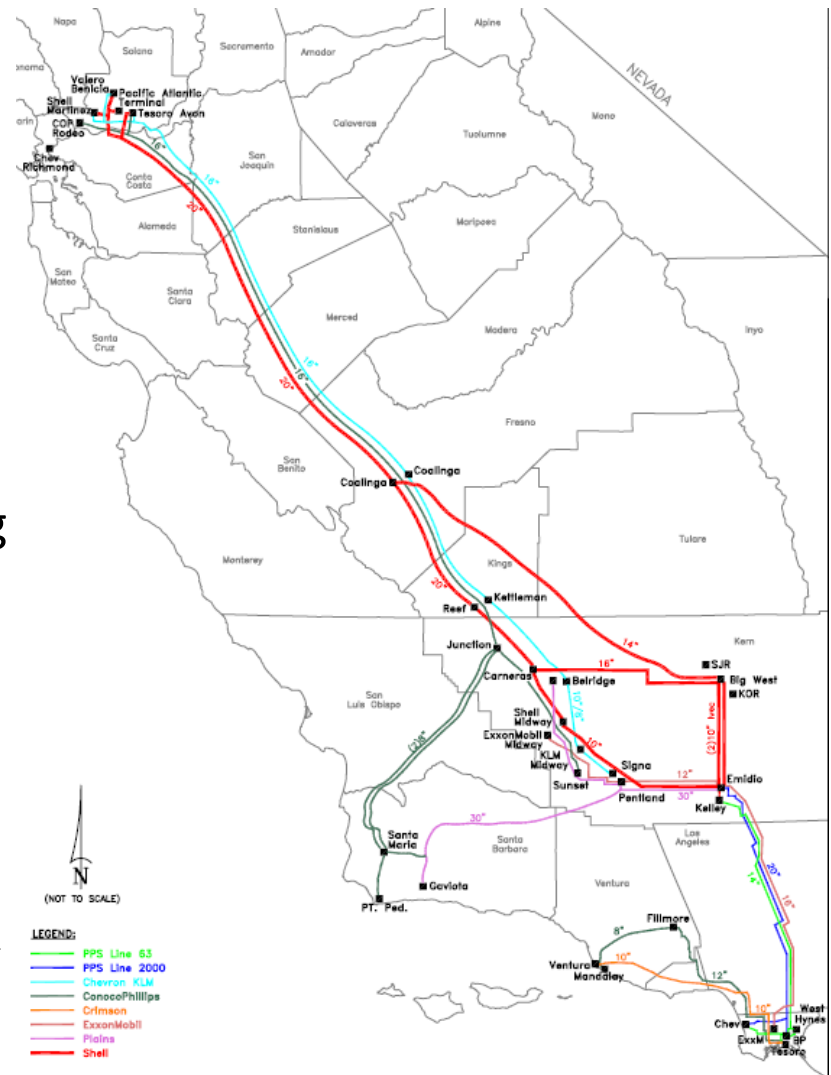


Sources: Oil Change International map, Energy Information Administration refinery data and California Energy Commission analysis.



Crude Oil Sources – SF Bay Area Refineries

- SF Bay Area refineries processed 46 percent of statewide crude oil during 2015
 - 38 percent via pipeline
- Majority (62 percent) of crude oil received via marine vessels - 2015
- Loss of marine facilities could not be made up by these pipelines originating in Kern County – not enough supply nor excess pipeline capacity
- Any crude-by-rail likely to back out marine receipts of similar quality
- Rail capability increases flexibility to enhance supply options & reduces risk of crude oil receipt curtailment

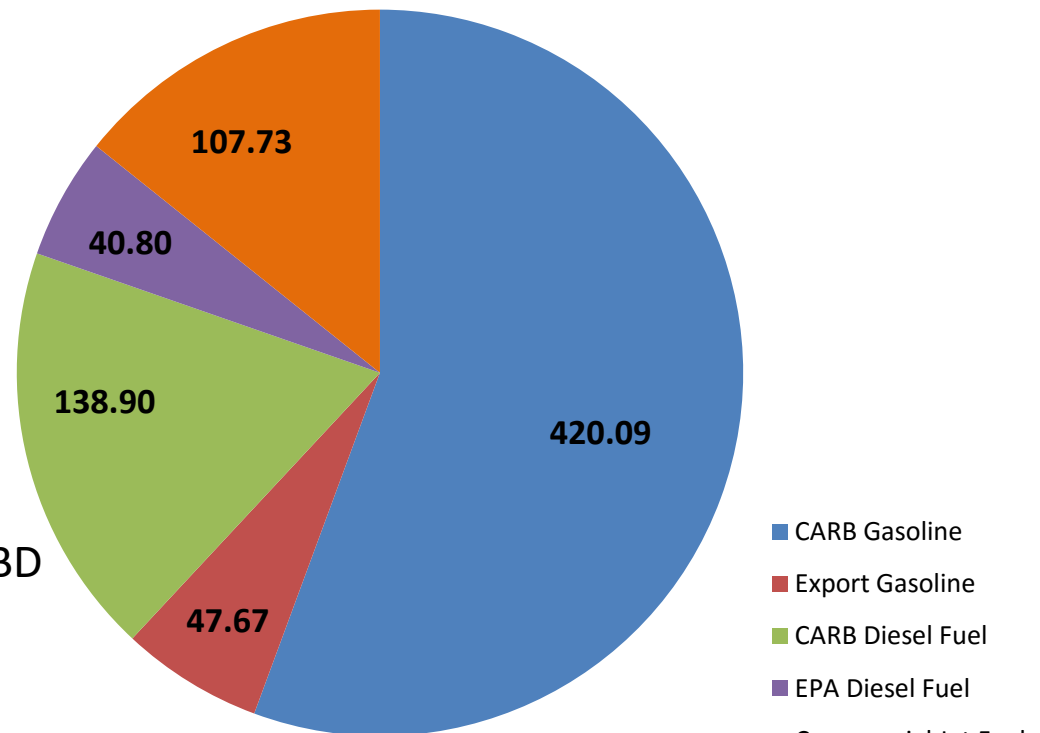




SF Bay Area Refinery Activity - 2015

- The minority of transportation fuels used in California are produced in Northern California
- California share
 - CARB Gasoline 45.0 %
 - CARB Diesel 55.8 %
 - Jet Fuel 37.5 %
 - Export Fuel 40.9 %
- Crude oil processing
 - 781.1 TBD
- Crude marine imports
 - Foreign – 407.2 TBD
 - Alaska – 80.2 TBD
- Pipeline receipts
 - San Joaquin Valley – 294.5 TBD

2015 Northern Calif. Refinery Production
Thousands of Barrels Per Day

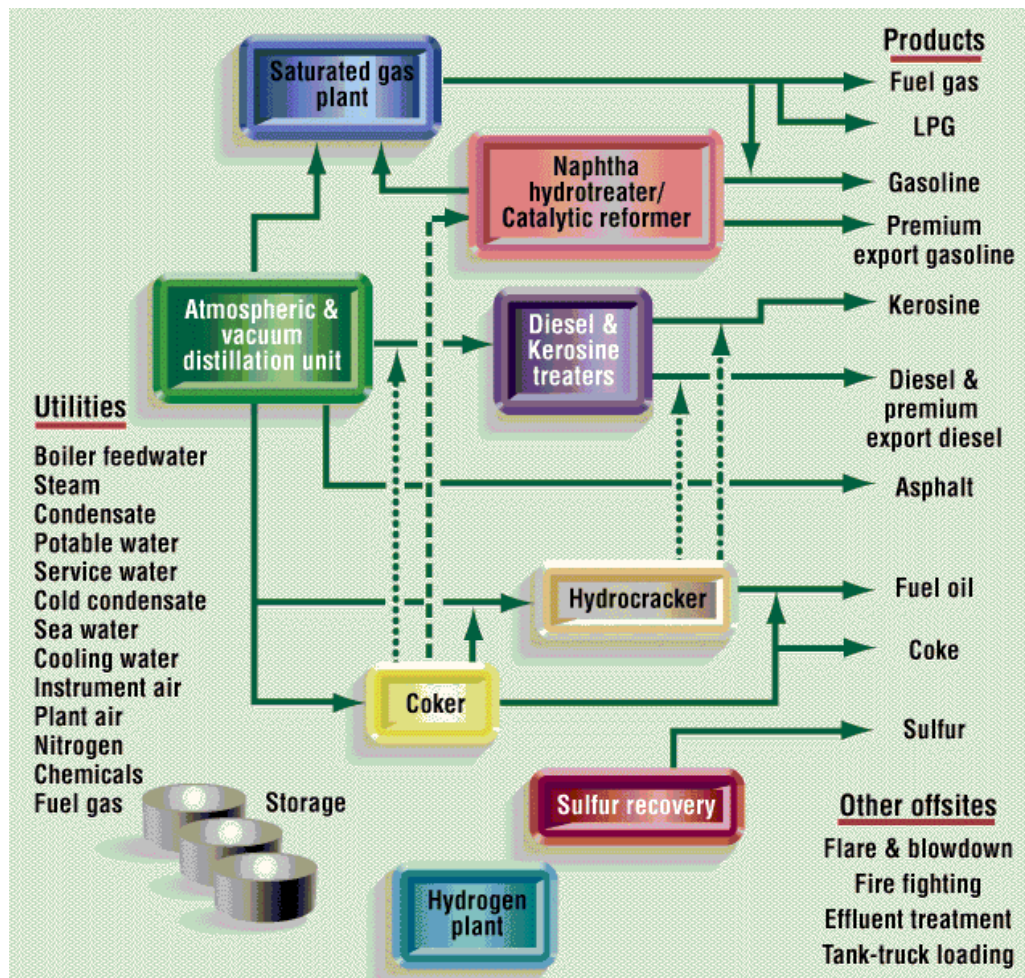


Source: California Energy Commission - Weekly Refinery Reports



Refineries – Must Maintain Balance

- Refiners must optimize operations to ensure system remains in balance:
 - Steam load
 - Sulfur plant operations
 - Refinery gases
 - Cogeneration operations & electrical loads
 - Hydrogen use
- All refinery inputs end up being consumed or converted
- Storage capacity is finite



Source: Oil & Gas Journal



Crude Oil Variability Poses Challenges

Crude oil properties
Intermediate purchases

*Refinery
equipment
capabilities*

Fuel quality standards
Changing fuel demand
Facility emission limits
Water discharge standards



Kovels.com



- California refinery operations & crude oil sources
- *Crude oil slate*
 - *Properties*
 - *Trends*
 - *Likelihood of significant increase of Canadian imports*
- Refinery operations & surge capacity
- California fuels market
 - Imports
 - Exports



Crude Oil Properties

Several key properties

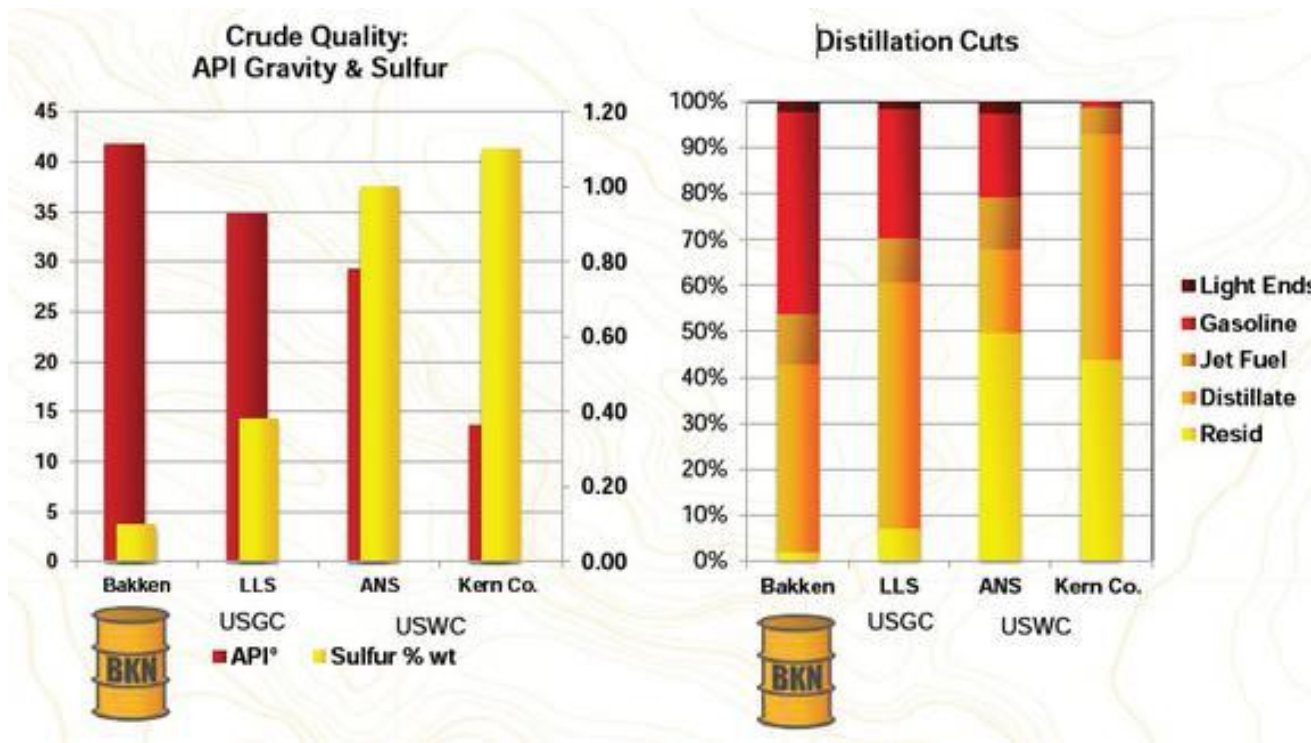
- Sulfur
 - Hydrogen needs & sulfur plant limits
- Density
 - Distillation profile
 - Storage & handling
- Metals
 - Sodium, magnesium, vanadium & nickel
 - Corrosion & catalyst deactivation
- Total Acid Number (TAN)
 - High temperature corrosion & fouling
- Nitrogen
 - Catalyst deactivation

Other important considerations

- Salt content
 - Corrosion
- Organic chlorides
 - Corrosion
- Reid vapor pressure (Rvp)
 - Storage tank limits
- Wax content
 - Fouling



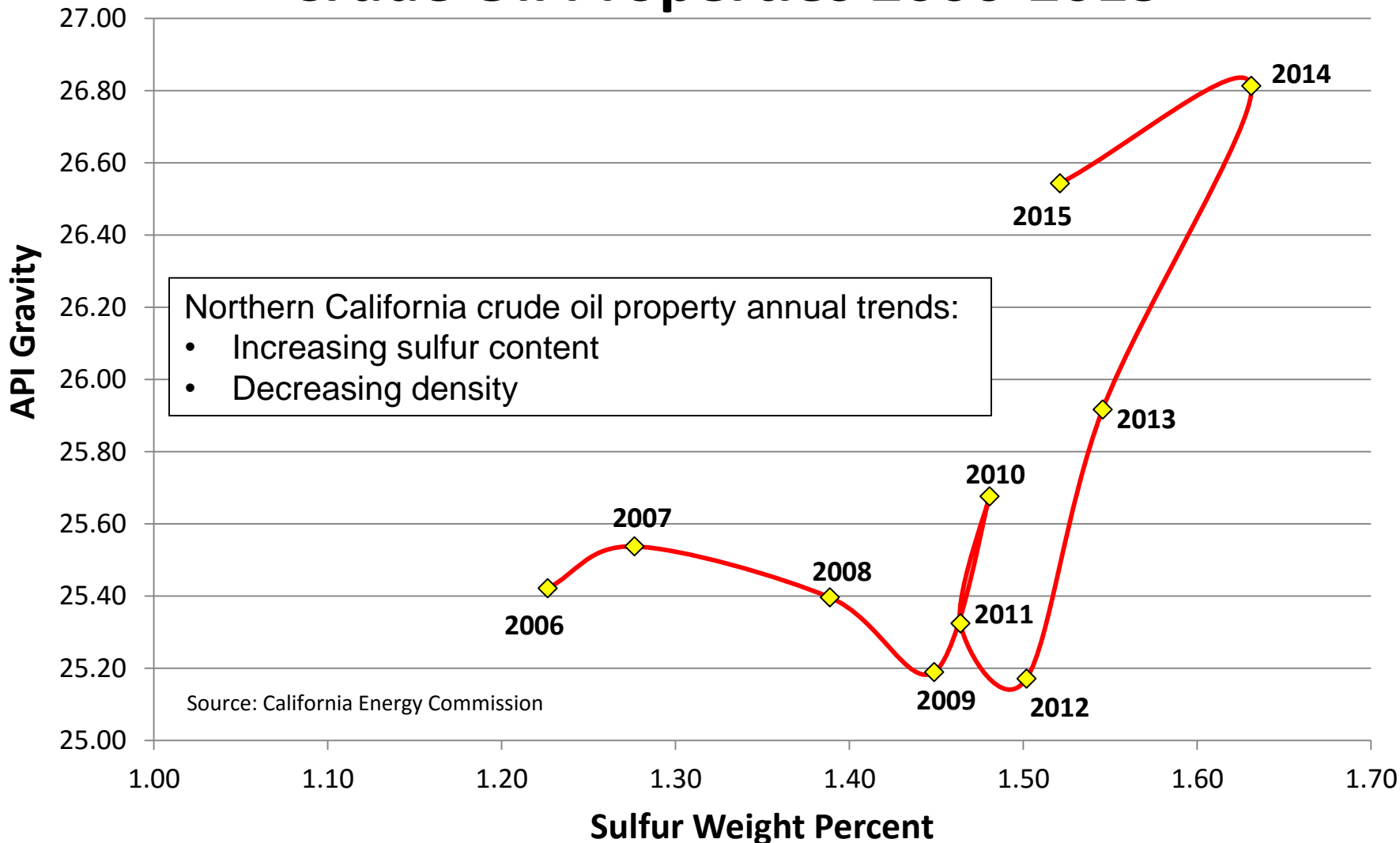
Distillation Profile - Crude Oil Yields Vary



Significant variation in yield of petroleum products, after initial distillation step, necessitates further refining to modify hydrocarbons to end up with sufficient ratios of gasoline, diesel fuel and other compounds that will meet targeted refined fuel sales volumes.



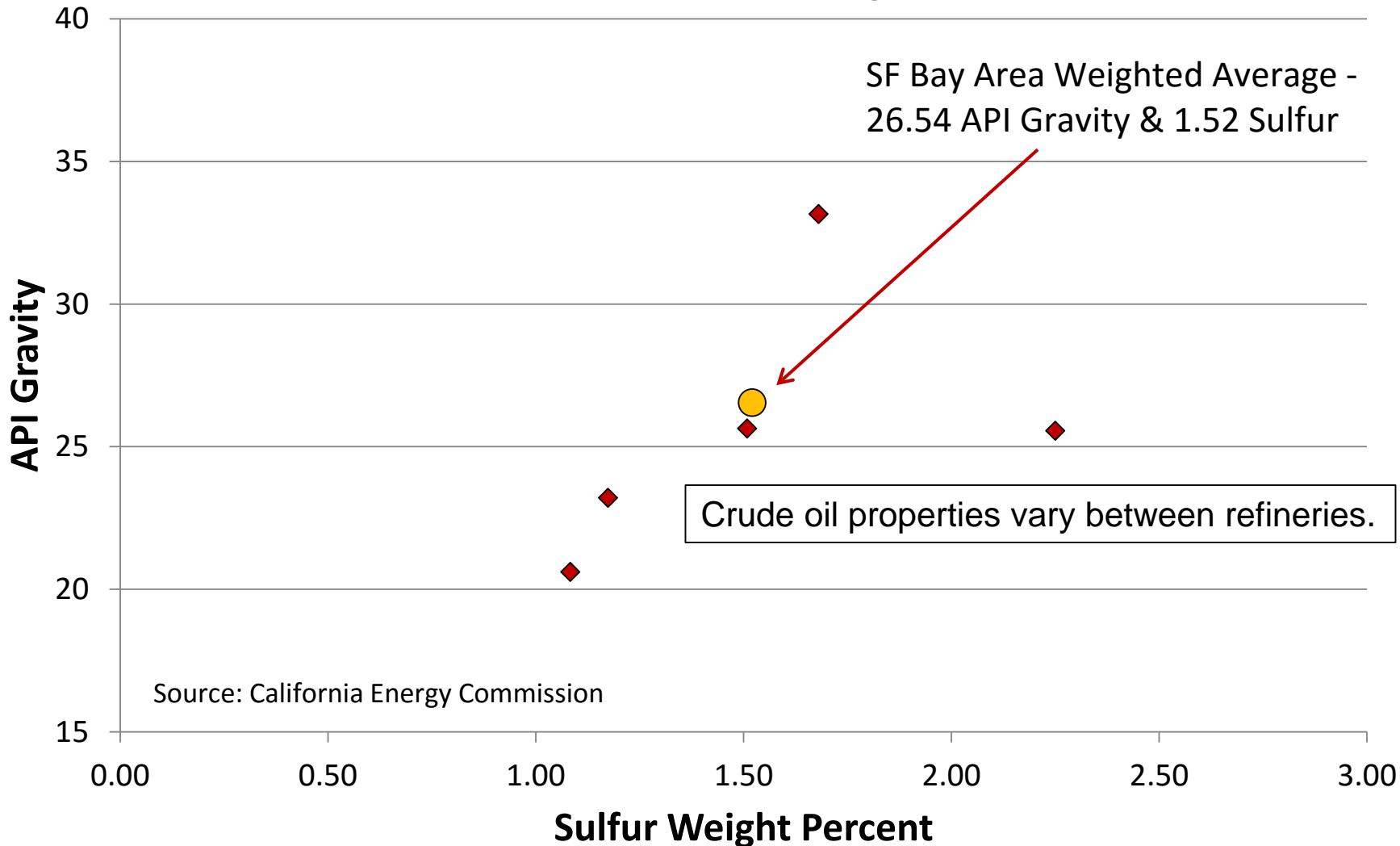
SF Bay Area Refineries Crude Oil Properties 2006-2015





SF Bay Area Refineries

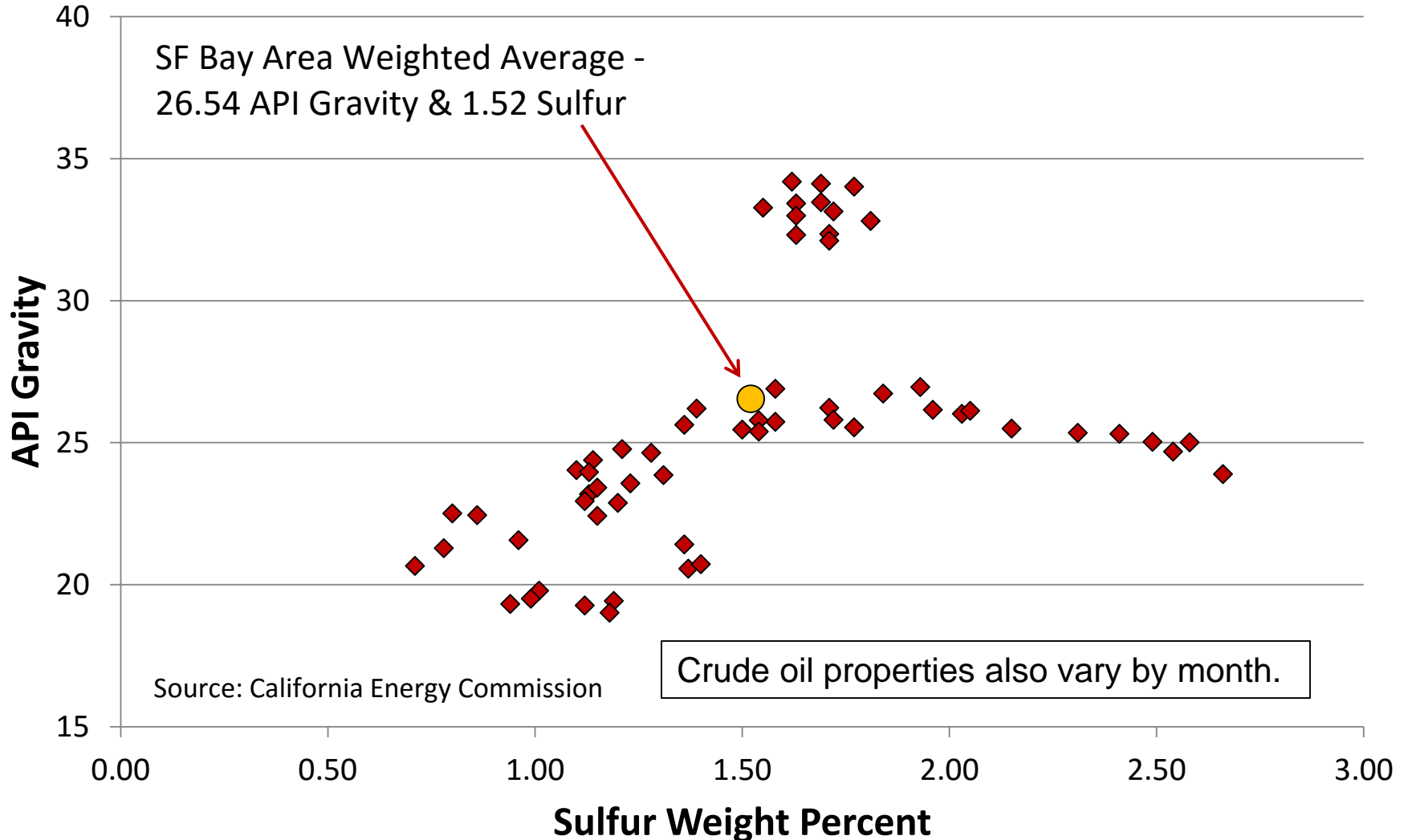
Annual Crude Oil Properties - 2015





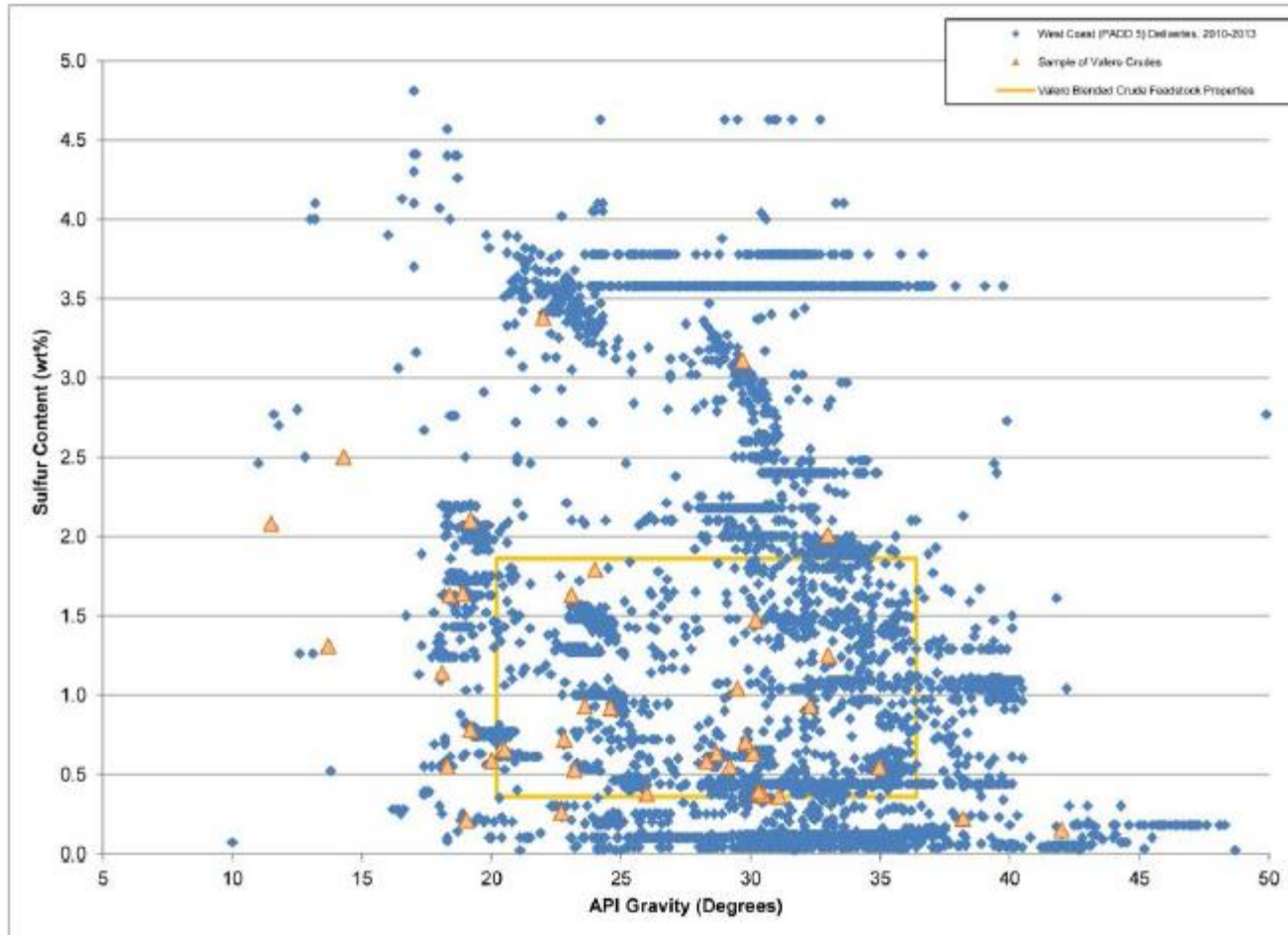
SF Bay Area Refineries

Monthly Crude Oil Properties - 2015





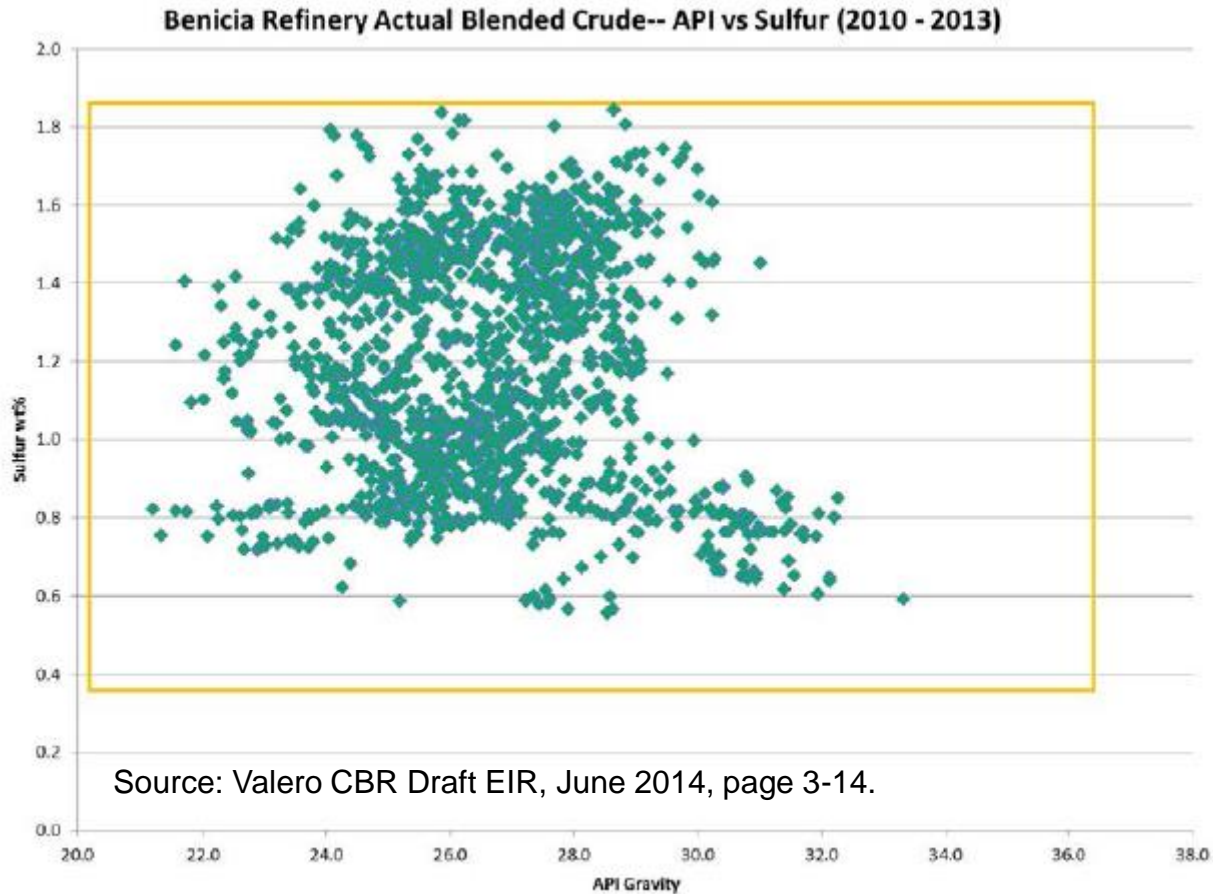
Variability of Crude Oil – West Coast



Source: Valero CBR Draft EIR, June 2014, page 3-13.



Refiners Blend Crude Oil

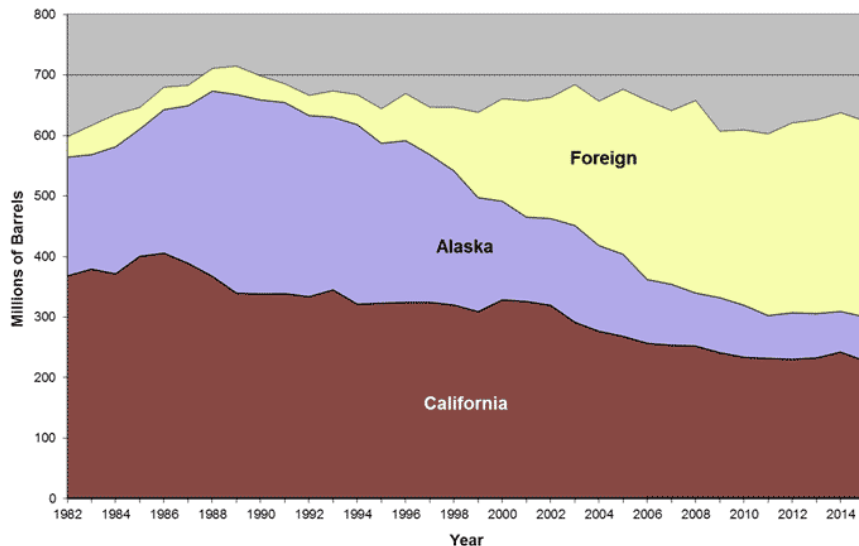


This practice enables receipt of a more diverse selection of crude oils to maximize operational and economic flexibility.



Importance of Blending

Crude Oil Supply Sources to California Refineries



- Alaska North Slope (ANS) oil production has been declining
- Source of oil for California refineries has dropped from 46 percent in 1991 to 12 percent by 2015
- Blending crude oils with different properties can produce “look-alike” mixtures that mimic the product yields of crude oils that are having to be replaced
- Flexibility of crude oil supply options increases capability to maintain stable refinery operations

ANS BLENDING

Table 1

	55% Bakken; 45% WCS	ANS	Difference
Gravity, °API	32.1	32.1	—
Sulfur, wt %	1.4	0.9	0.5
Total acid no., mg KOH	0.6	0.1	0.5
Liquid volume yields			
C ₄ -, %	3	4	-1
Naphtha, %	26	26	—
Kerosine-diesel, %	27	27	—
Gas oil, %	28	27	+1
Resid, %	16	16	—

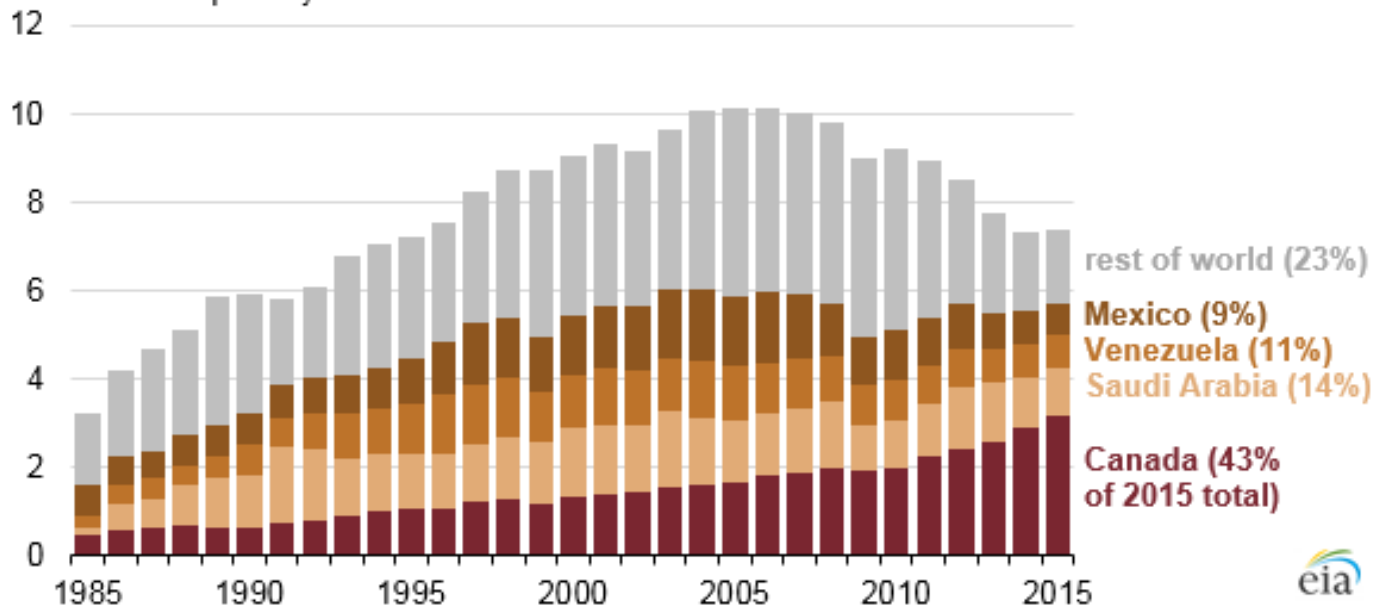
Source: Oil & Gas Journal.



Canadian Crude Oil Imports – U.S.

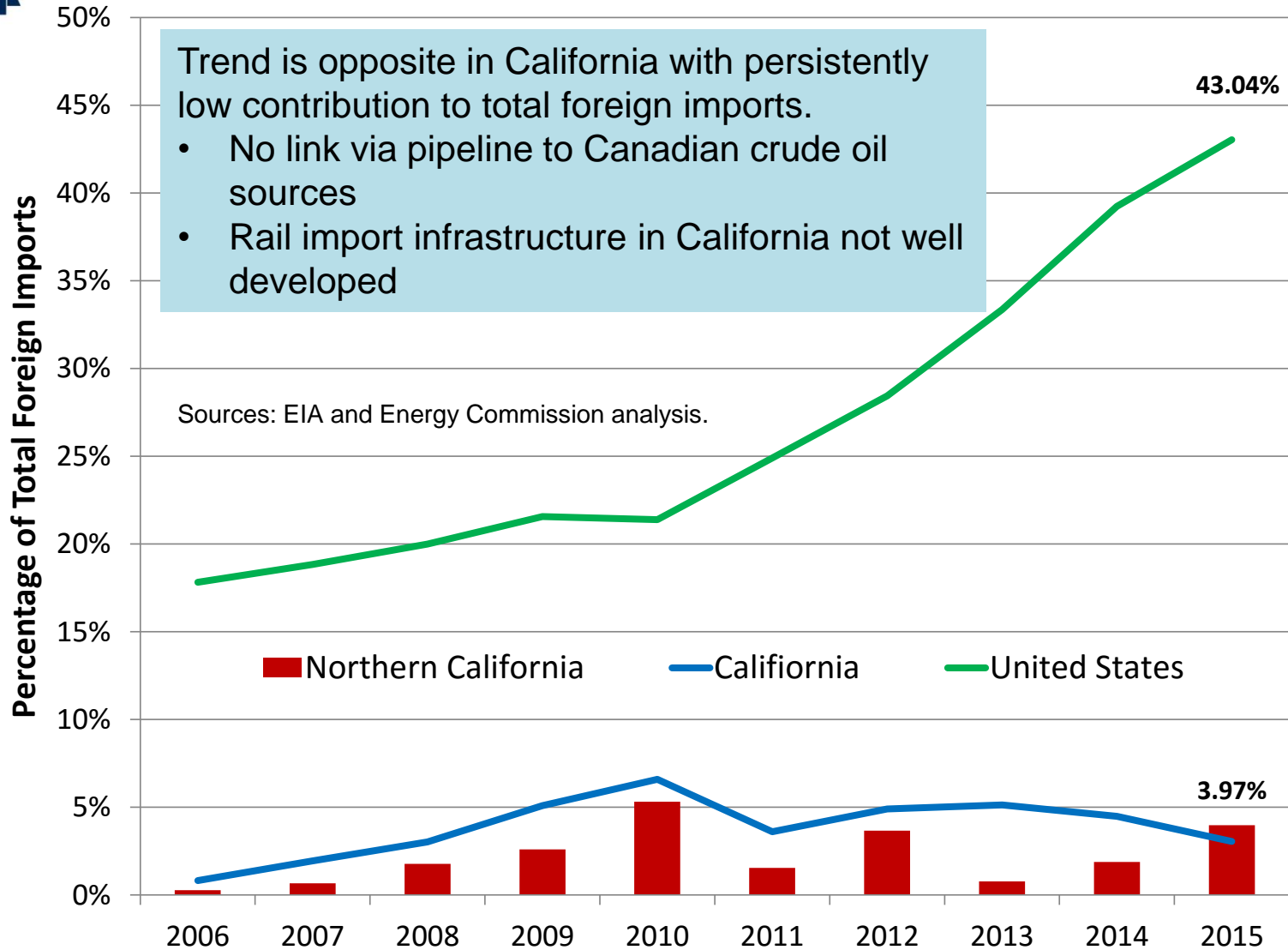
- Largest source of foreign imports for U.S. refineries
 - Contribution from Canada continues to grow
 - Proximity to refining capacity
 - Developed pipeline infrastructure

Gross imports of crude oil to the United States by country, 1985-2015
million barrels per day





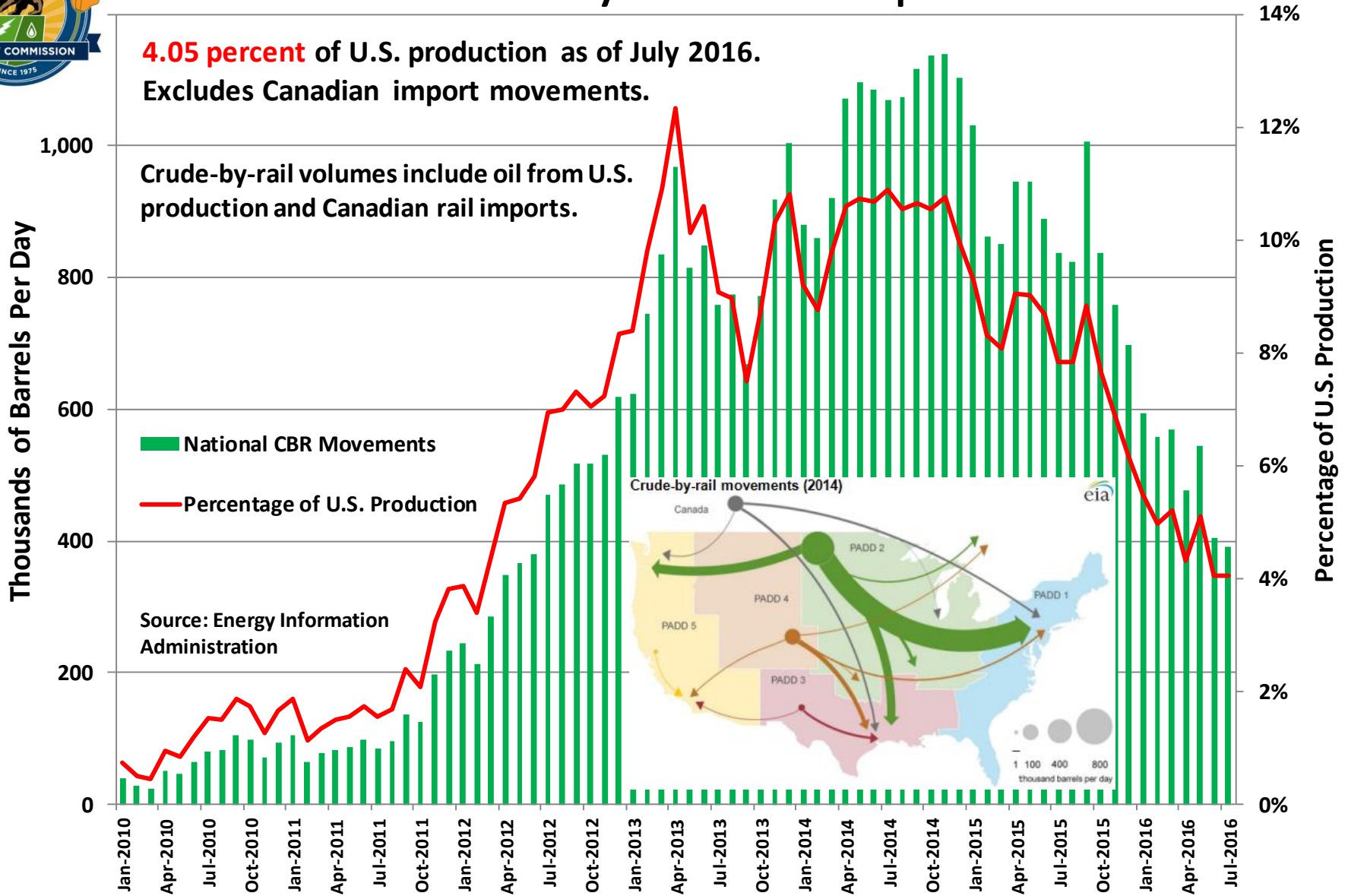
Canadian Crude Oil Imports - California





U.S. Crude-by-Rail Transportation

4.05 percent of U.S. production as of July 2016.
Excludes Canadian import movements.

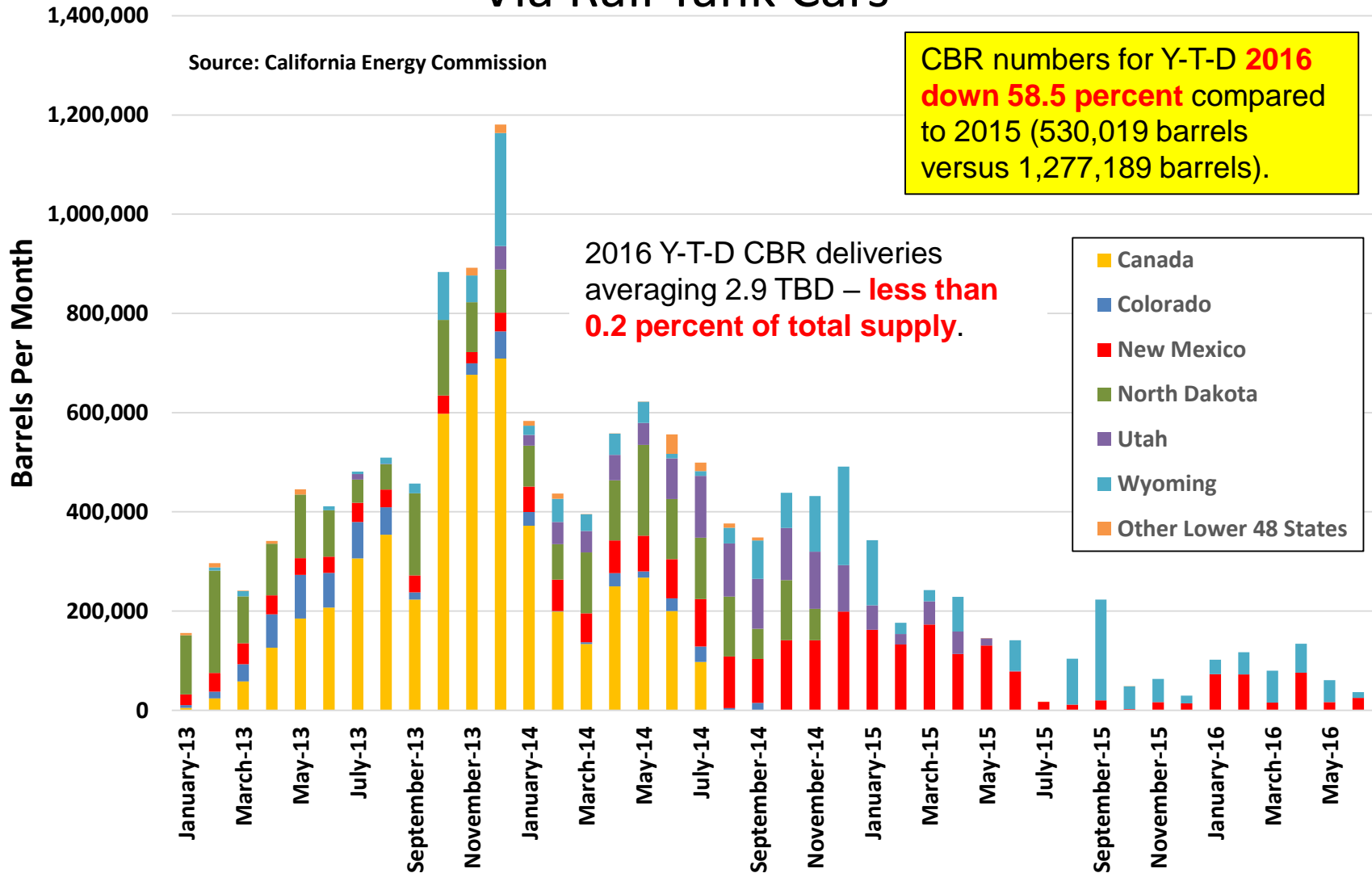




California Crude Oil Imports Via Rail Tank Cars

Source: California Energy Commission

CBR numbers for Y-T-D 2016 down 58.5 percent compared to 2015 (530,019 barrels versus 1,277,189 barrels).





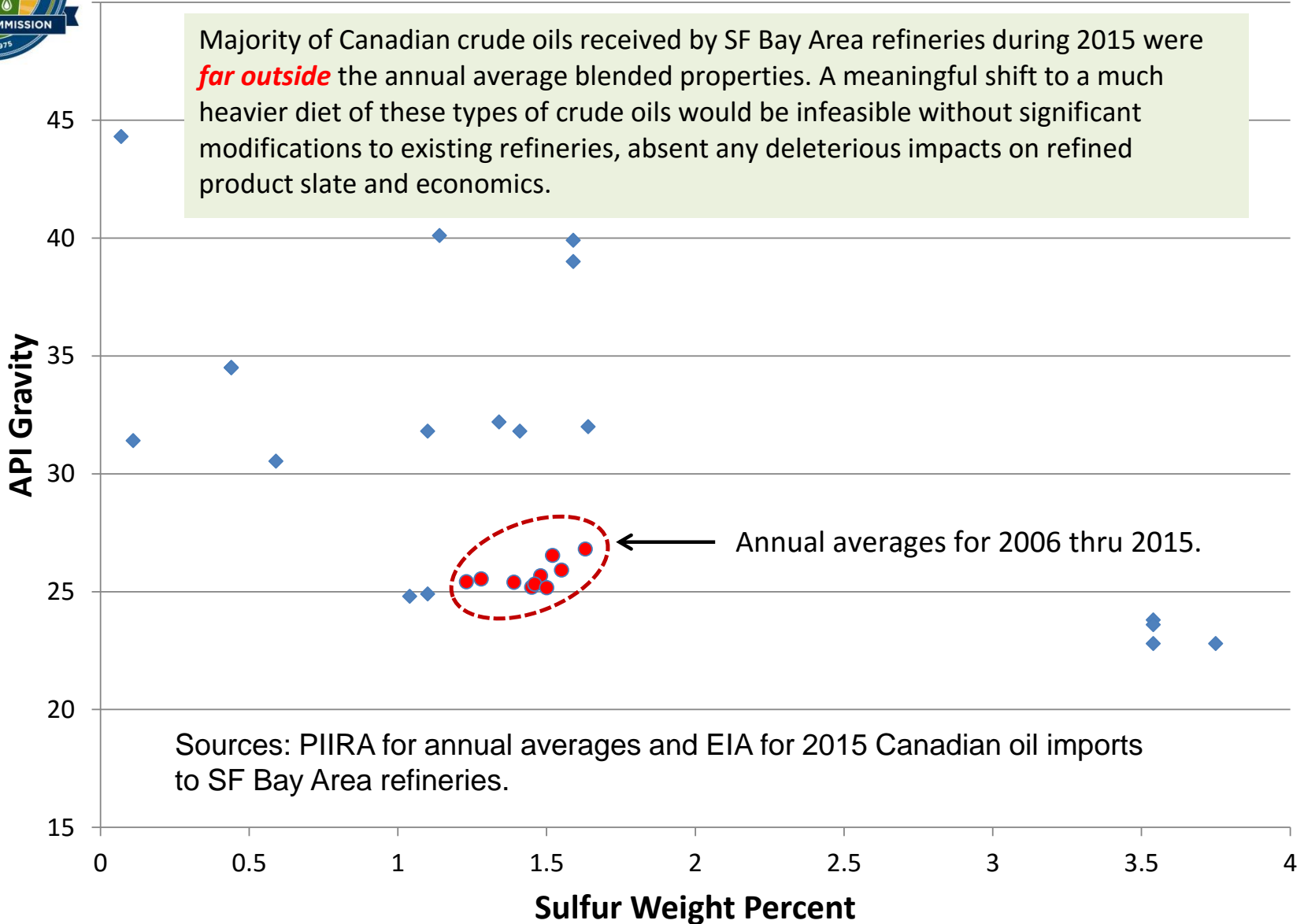
Likelihood of Increasing Canadian Imports

- California crude-by-rail (CBR) infrastructure project permits
 - Valero-Benicia CBR facility – up to 70,000 barrels per day capacity
 - Permit **denied** September 20, 2016
 - Phillips 66-Santa Maria – up to 37,000 barrels per day capacity
 - Permit **denied** October 5, 2016
- Clatskanie rail import facility on Columbia River
 - No longer receiving crude oil as of 4th Q 2015
 - In process of converting to ethanol-by-rail receipt business
- Tesoro-Savage Project – Vancouver, WA
 - Still has not received permit to construct
 - Adjudicative hearing held by the Energy Facility Site Evaluation Council
 - Final EIS expected to be issued later this year
 - Facility would be able to receive up to 360,000 barrels per day
 - ***No preference to any crude oil types***



2015 Canada Crude Imports vs. Annual

Majority of Canadian crude oils received by SF Bay Area refineries during 2015 were *far outside* the annual average blended properties. A meaningful shift to a much heavier diet of these types of crude oils would be infeasible without significant modifications to existing refineries, absent any deleterious impacts on refined product slate and economics.



Sources: PIIRA for annual averages and EIA for 2015 Canadian oil imports to SF Bay Area refineries.



- California refinery operations & crude oil sources
- Crude oil slate
 - Properties
 - Trends
 - Likelihood of significant increase of Canadian imports
- *Refinery operations & surge capacity*
- California fuels market
 - Imports
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Exxon Mobil Refinery Explosion – Feb. 18th



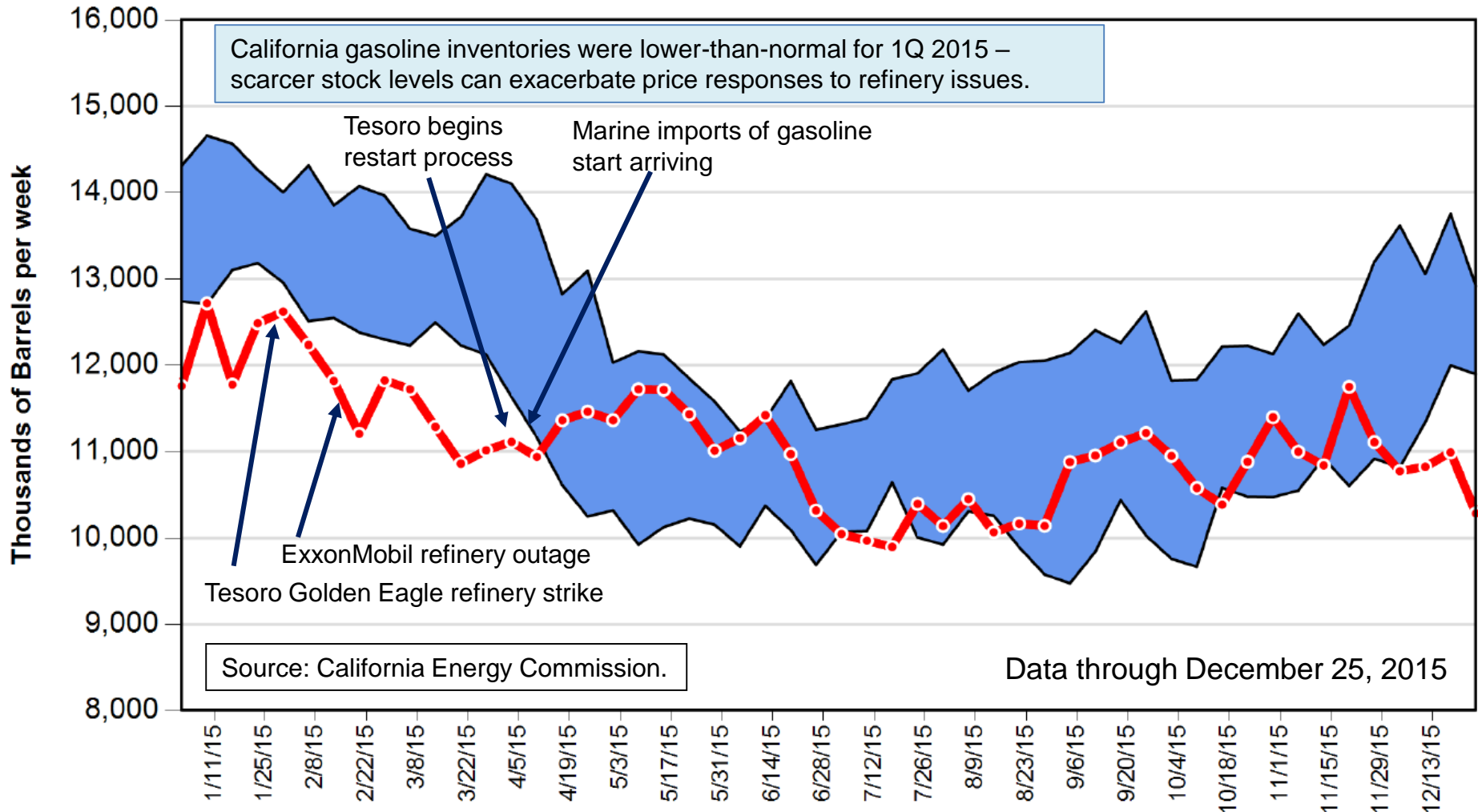
Source: Bob Riha, Reuters.

- Explosion occurs at Exxon Mobil refinery in the morning
- Involves electrostatic precipitator (ESP), pollution control device
- Refinery gasoline units unable to operate following ESP outage
 - **8.3 percent of state refining capacity**
- According to company, supplies nearly 10 percent of gasoline to the state
- Trade publication reports refinery could resume operation of gasoline units, at reduced rates, using older ESP unit after being refurbished – possibly late July
- Never happened...



California Gasoline Inventory Levels

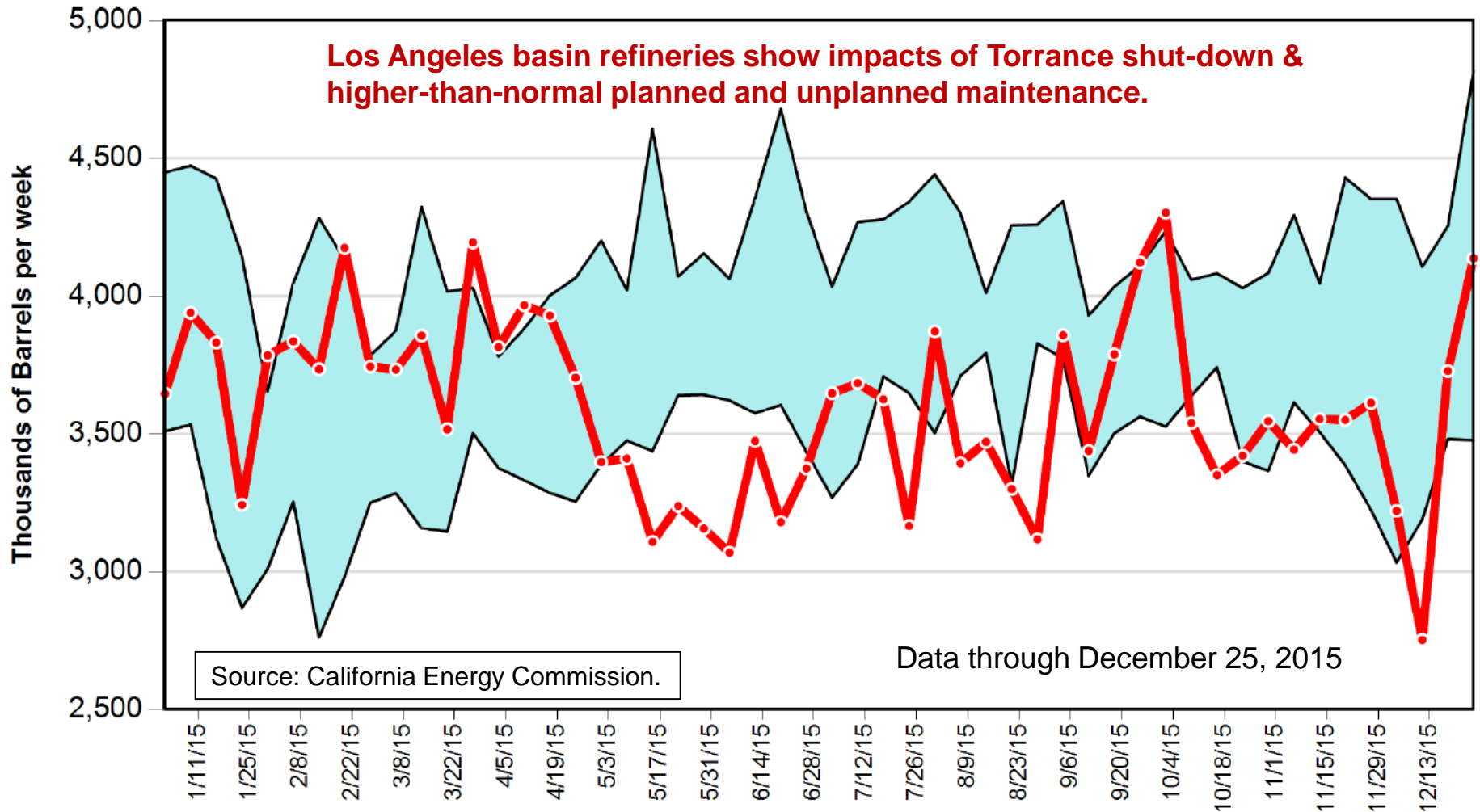
California CARB Gas and Blendstocks Inventories (with 5-Year High-Low Band)





Gasoline Production - South

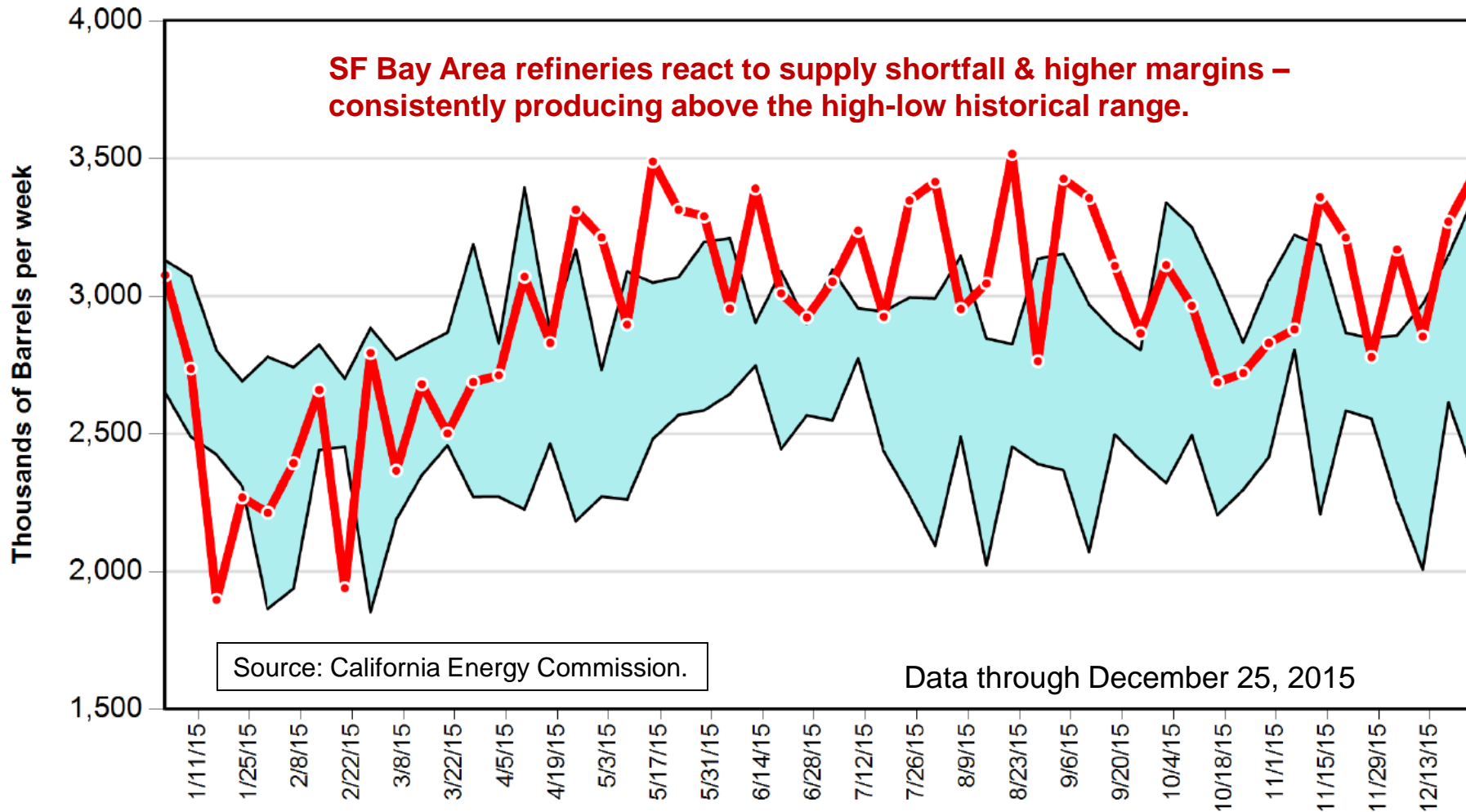
Southern California CARB Gasoline Production (with 5-Year High-Low Band)





Gasoline Production - North

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





Refinery Capacity

- California refineries do not operate at 100 percent of design capacity for all process units due to:
 - Planned maintenance
 - Unplanned refinery outages
 - Pipeline interruptions
 - Marine terminal issues
 - Market conditions
 - Demand levels
 - Refinery margins
- Ability to increase output of refined petroleum products in response to rapid changes in demand is an important flexibility capability
- A reduction of this “surge” capability would artificially constrain supply for the California transportation fuels market



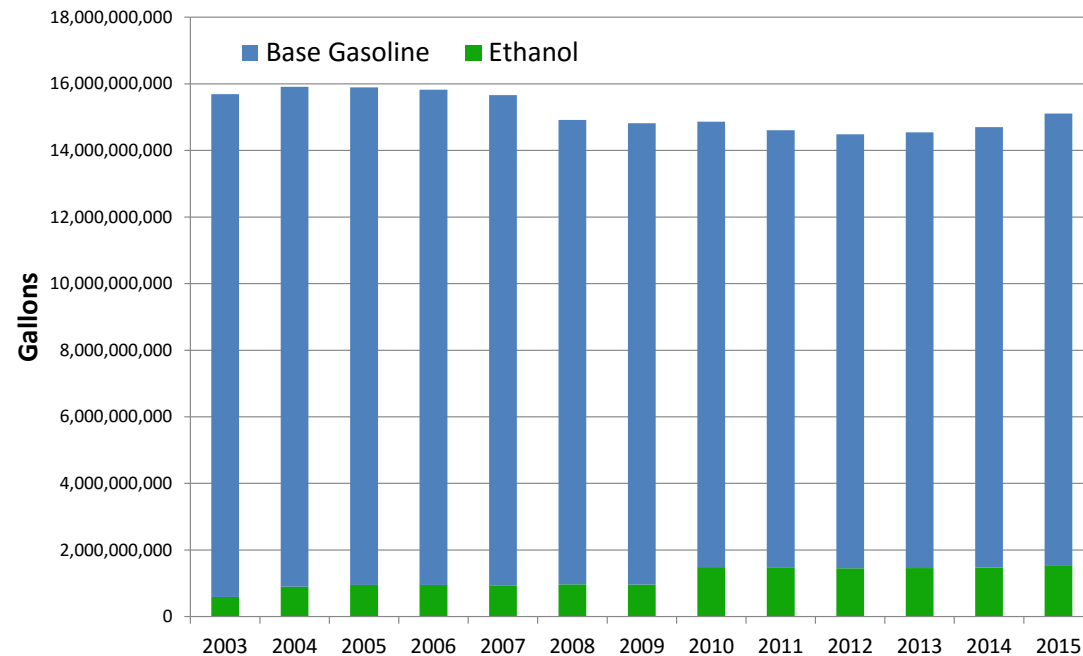
- California refinery operations & crude oil sources
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 - *Imports*
 - *Exports*



California On-road Transportation Fuels

- 15.11 billion gallons of gasoline consumed in 2015
- Base gasoline demand up 3.9 percent between 2013 and 2015
 - Ethanol use increasing due to Renewable Fuel Standard
 - Ethanol use up to 1.52 billion gallons during 2015
 - 158 percent increase since 2003
 - Ethanol accounted for 10 percent of total gasoline gallon during 2015

**California Gasoline & Ethanol Demand
2003 - 2015**

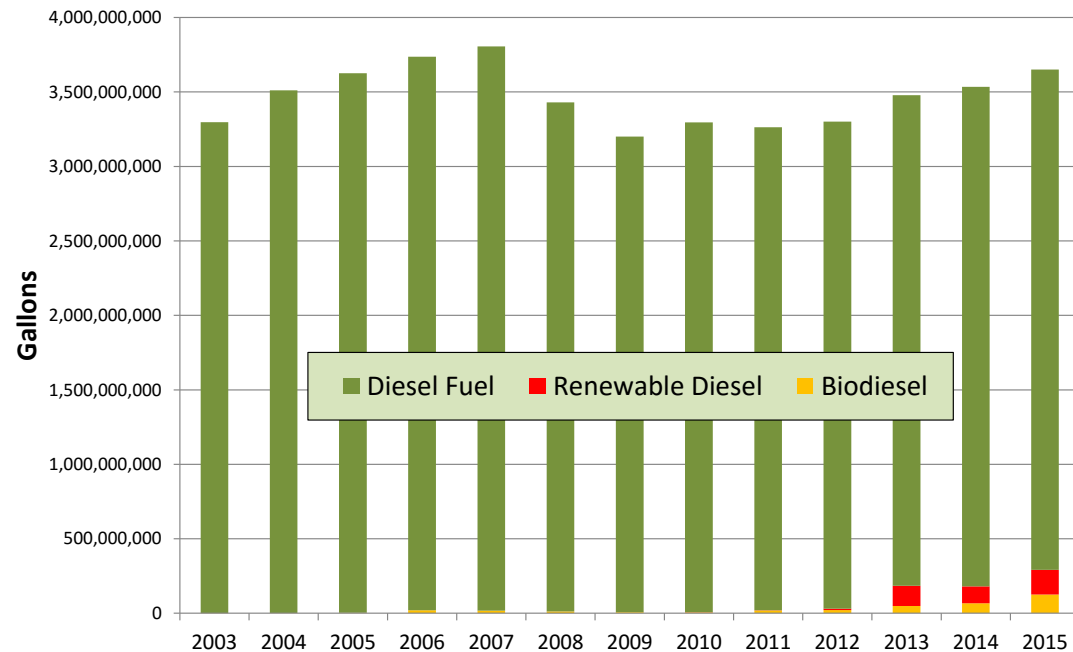




California On-road Transportation Fuels

- 3.65 billion gallons diesel consumed during 2015
- Base diesel fuel demand up 2.0 percent between 2013 and 2015
 - Biodiesel use increasing due to Renewable Fuel Standard and the Low Carbon Fuel Standard (LCFS)
 - 126 MM gallons during 2015
 - Renewable diesel fuel use up to 165 MM gallons during 2015 due to LCFS
 - Combined renewable component accounted for 8.0 percent of total diesel gallon

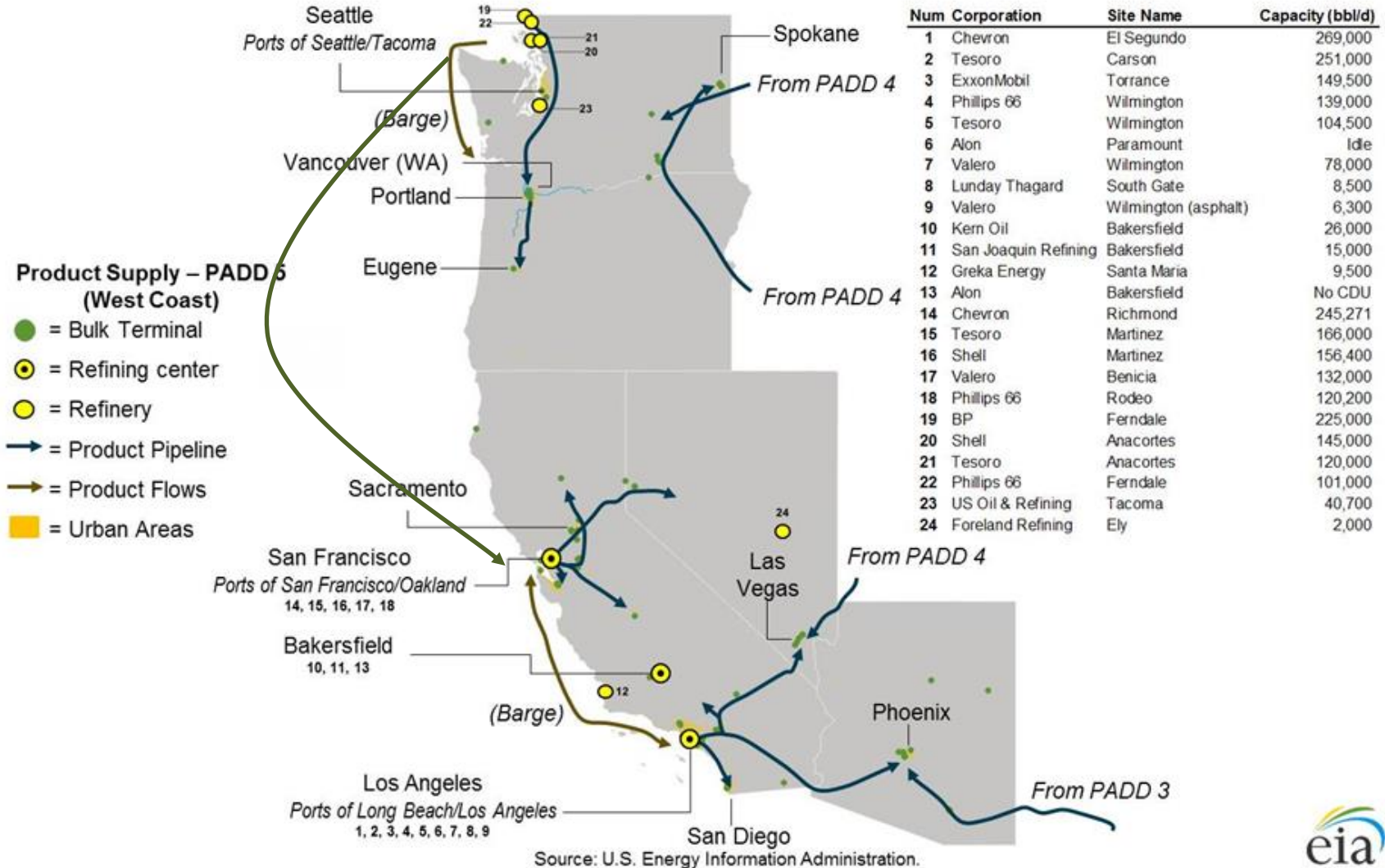
California Diesel, Biodiesel & Renewable Diesel Demand 2003 - 2015





Western States More Isolated than Rest of U.S.

West Coast petroleum product supply map





California Fuels Market - Isolated

- California's fuels market is *nearly self-sufficient*, so imports 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



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)

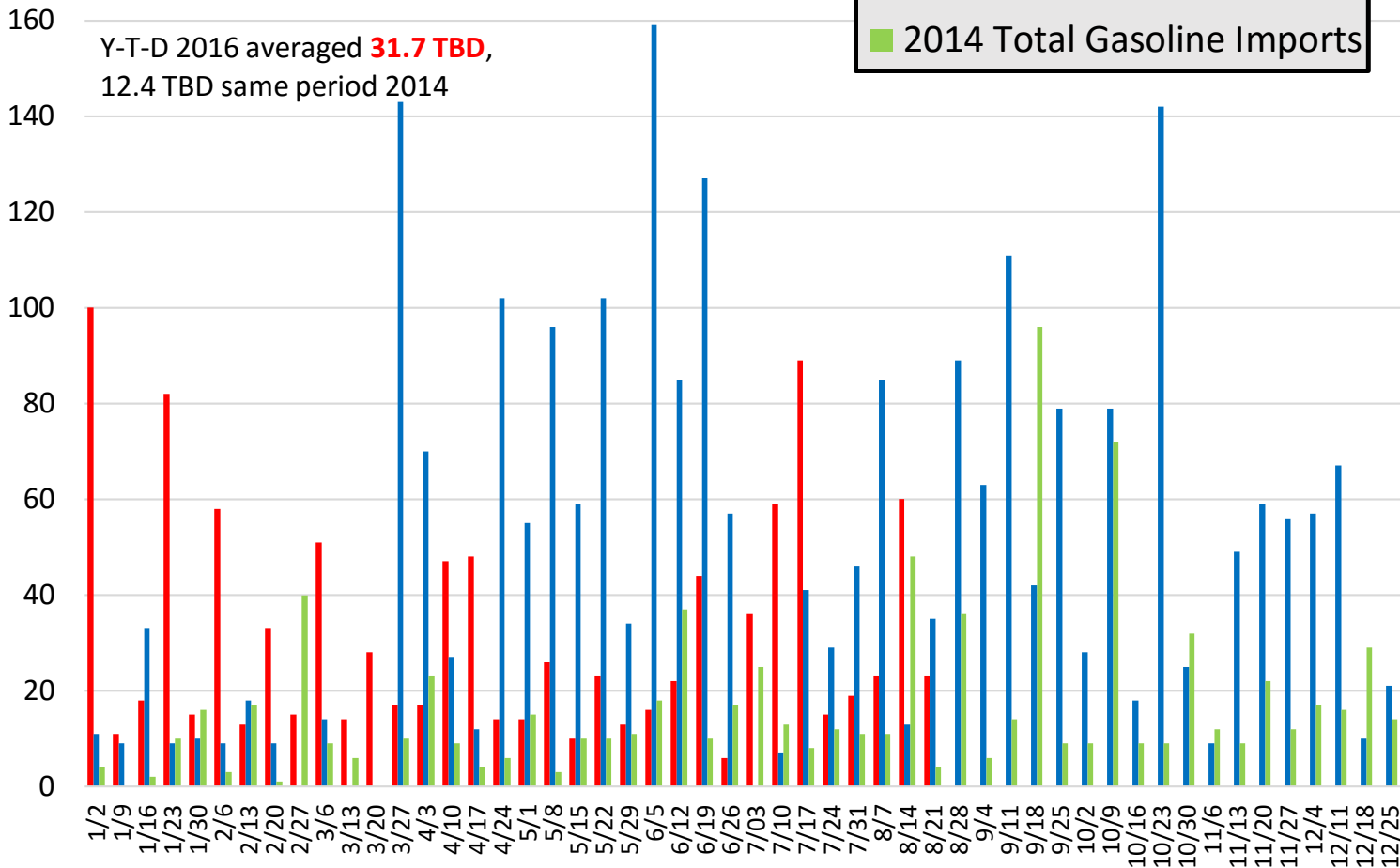
18.3 TBD same period during 2014

Highest quantity since 2007

Y-T-D 2016 averaged **31.7 TBD**,

12.4 TBD same period 2014

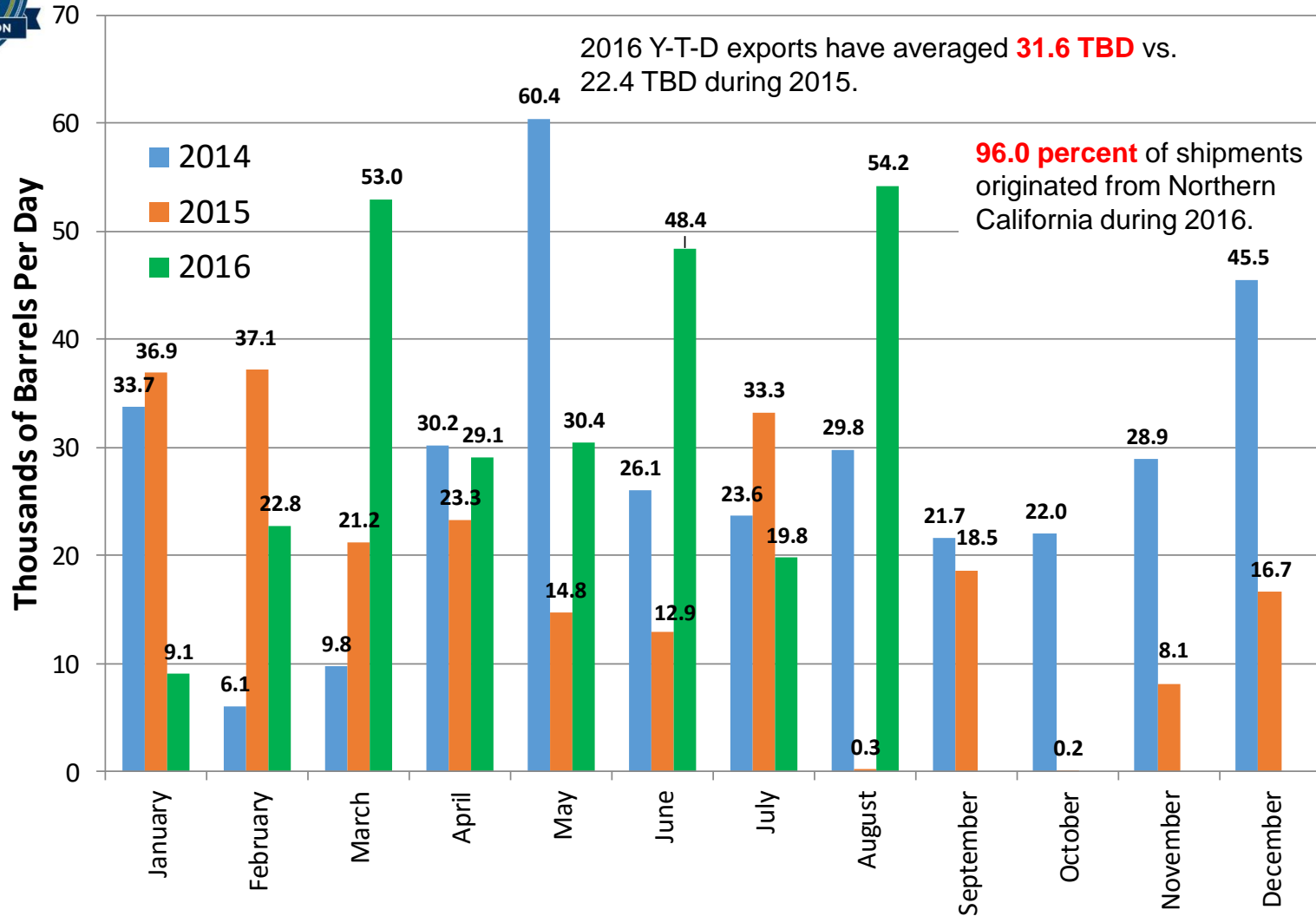
Thousands of Barrels Per Day



86 percent of West Coast imports arrived in California during 2015



California Foreign Gasoline Exports



Source: California Energy Commission analysis of the International Trade Commission's Interactive Tariff and Trade DataWeb.

Exports accounted for only 1.8 percent of total gasoline output during 2015



Additional Q & A



San Francisco skyline – Source: Hdimagelib.com

AGENDA: 15



**BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT**

**Status Update on Draft
Rule 12-16: Refinery Caps &
Rule 11-18: Toxic Risk Reductions**

**Eric Stevenson, Director
Meteorology, Measurement, and Rules**

**Board of Directors Meeting
October 19, 2016**



Overview

- Rule Development History
- Overview of Draft Rule 12-16
- Overview of Draft Rule 11-18
- Schedule / Next Steps

A scenic view of the Golden Gate Bridge in San Francisco, with the Sausalito town visible on the left side of the water.

Rule Development History

Refinery Rulemaking

- On track towards 20% emissions reductions
- Four emission reduction rules adopted
- Regulation 12, Rule 15 adopted (tracks crude slate changes and emissions)

June/July 2016: Board Direction

- Develop two rules:
 - Refinery Numerical Caps
 - Staff Proposal
- Develop one EIR
- Board Hearing: May 2017



Draft Rule 12-16

Limits GHGs & Criteria Pollutants Emissions

- Affects:
 - Five refineries
 - Three related facilities
- GHGs, PM₁₀ & PM_{2.5}, SO₂, NO_x
- Limits set at 7% above a five-year high
- No changes to the limit for permitted projects or production increases

Draft Rule 11-18

Reduce Public's Exposure to Localized Health Risks

- 100s of facilities potentially affected
 - Refineries, gas stations, hospitals, foundries, data centers, landfills, POTWs, crematoria, chemical plants, schools and universities, military facilities, power plants, etc.
- Risk Action Level reduced from 100 per million (100/M) to 10 per million (10/M)
- Incorporate New OEHHA Guidelines and health values
- Ensure public transparency
- Ensure continuous improvement



Draft Rule 11-18

Reduce health risks from high risk facilities

- Health Risk Assessments (HRAs) conducted by Air District staff using latest OEHHA guidelines
- Facilities above 10 per million (10/M) must:
 - Develop a Risk Reduction Plan for Air District approval
- Risk Reduction Measures Include:
 - Installation of Best Available Retrofit Control Technologies for Toxics (TBARCT)
 - Modification of operating hours and activity levels
 - Modification of emissions point parameters



Scheduled Next Steps

- **Continue to engage stakeholders and update Board**
- **Mid-October:**
 - Draft Rule Language (published)
 - CEQA Notice of Preparation / Initial Study (published)
 - Initial Staff Report to be released within the next week
- **Mid-November – Workshops**
- **May – Public Hearings**
 - Final Rule Language and Staff Report
 - Socioeconomic Analysis
 - CEQA Environmental Impact Report

Summary of Ozone Seasons

Year	National 8-Hour	State 1-Hour	State 8-Hour
2013*	3	3	3
2014*	5	3	10
2015*	5	4	11
2016	15	5	15

Spare the Air Alerts: 6/2, 6/3, 6/4, 6/21, 6/28, 7/13, 7/14, 7/15, 7/25, 7/26, 7/27, 7/28, 7/29, 8/11, 8/12, 8/13, 8/18, 8/19, 9/7, 9/17, 9/18, 9/19, 9/25, 9/26, 9/27, 10/8, 10/9

Days > 0.070 ppm 8-hour NAAQS: 6/2, 6/3, 6/4, 6/30, 7/14, 7/15, 7/25, 7/26, 7/27, 8/12, 8/13, 8/17, 9/26, 10/8, 10/9

*Based on NAAQS of 0.075 ppm that was in place during those years