



# California Transportation Fuel Overview & Changing Crude Oil Trends

## Prevention First 2014

Long Beach, CA

Crude by Rail/Pipeline Session

October 7, 2014

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# Transportation Fuel Infrastructure Overview

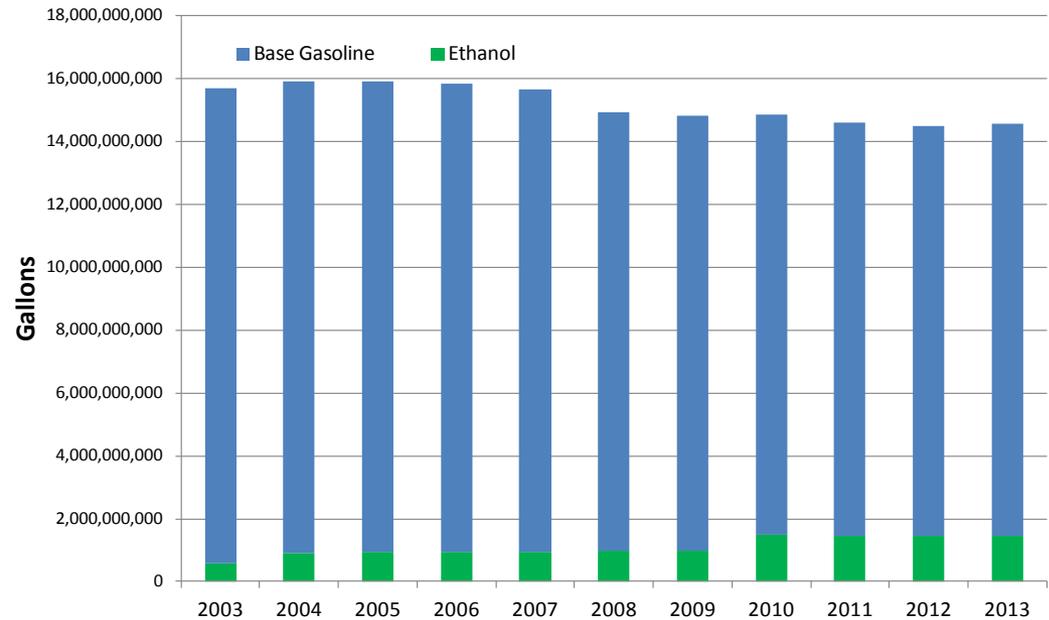




# California On-road Transportation Fuels

- 14.54 billion gallons of gasoline consumed in 2013
- Base gasoline demand down 13.4 percent between 2003 and 2013
  - Ethanol use increasing due to Renewable Fuel Standard
  - Ethanol use up to 1.46 billion gallons during 2013
  - 148 percent increase since 2003
  - Ethanol accounted for 10 percent of total gasoline gallon during 2013

California Gasoline & Ethanol Demand  
2003 - 2013

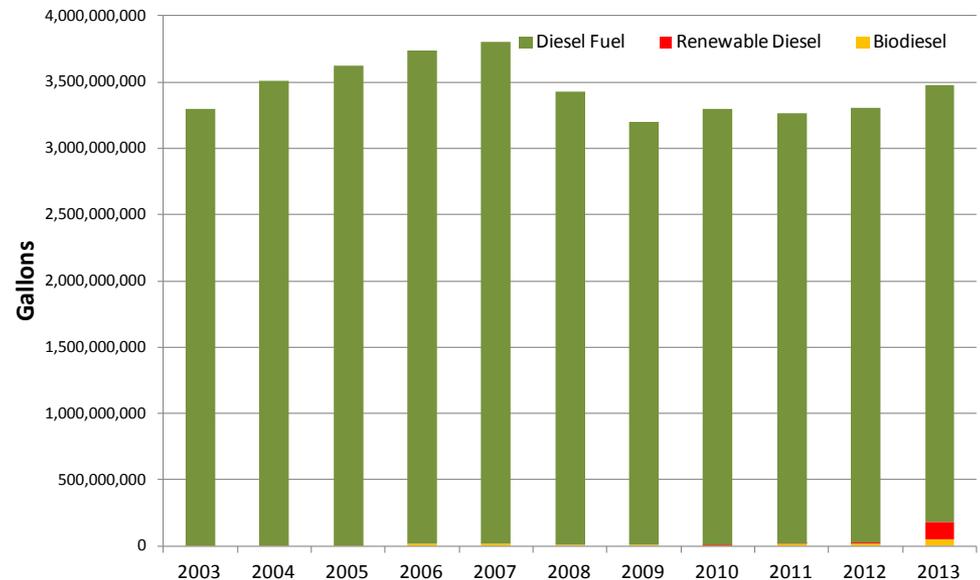




# California On-road Transportation Fuels

- 3.48 billion gallons diesel consumed during 2013
- Base diesel fuel demand unchanged between 2003 and 2013
  - Biodiesel use increasing due to Renewable Fuel Standard and the Low Carbon Fuel Standard (LCFS)
    - 49 MM gallons during 2013
  - Renewable diesel fuel use up to 136 MM gallons during 2013 due to LCFS
  - Combined renewable component accounted for 5.3 percent of total diesel gallon

California Diesel, Biodiesel & Renewable Diesel Demand 2003 - 2013



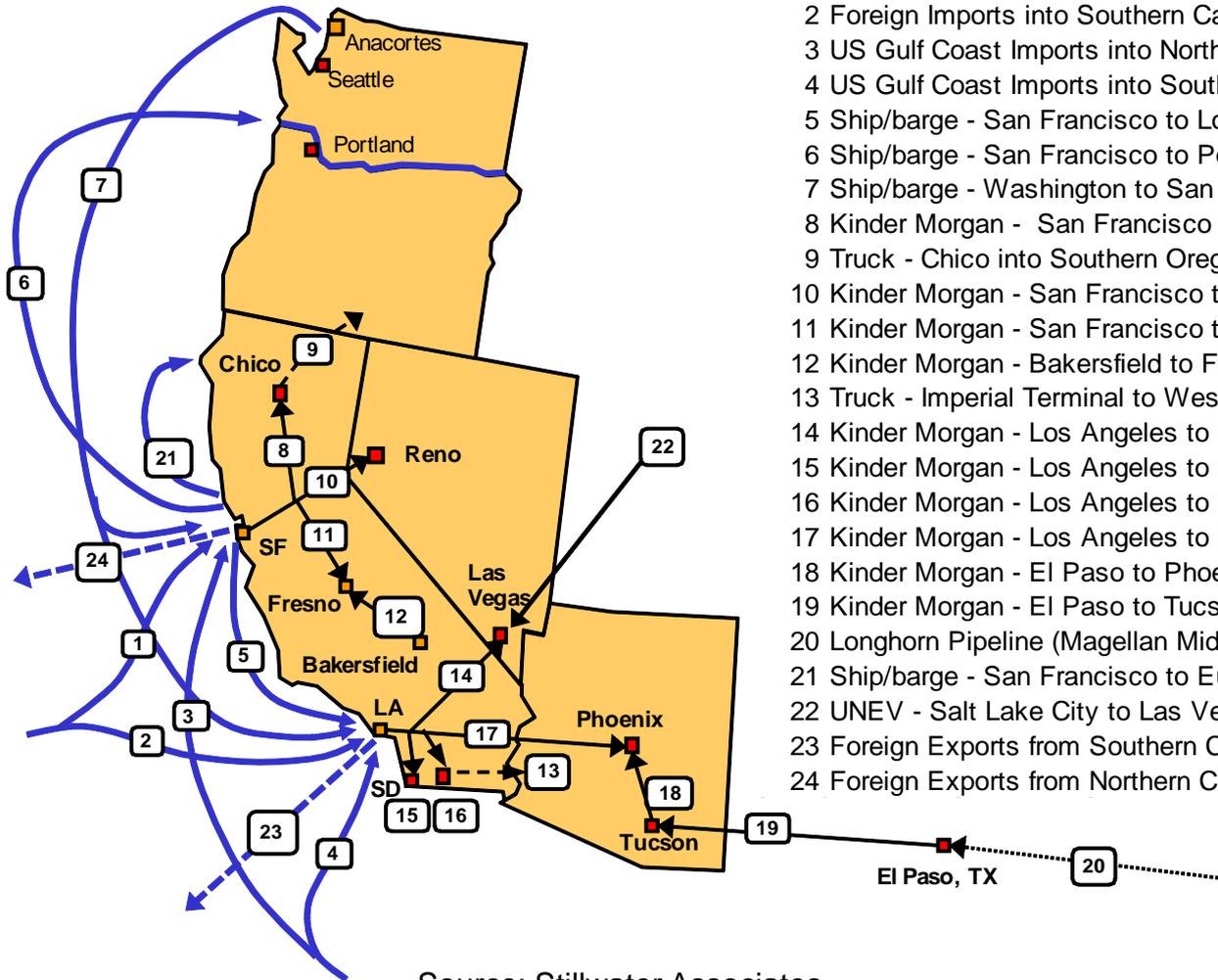


# Fuel Infrastructure – Key Elements

- The California transportation fuel “infrastructure” consists of several interconnected assets operated by a combination of refiner and third-party companies
  - Refineries
  - Pipelines
  - Marine terminals
  - 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 – Fuel Flows



- 1 Foreign Imports into Northern California
- 2 Foreign Imports into Southern California
- 3 US Gulf Coast Imports into Northern California
- 4 US Gulf Coast Imports into Southern California
- 5 Ship/barge - San Francisco to Los Angeles
- 6 Ship/barge - San Francisco to Portland
- 7 Ship/barge - Washington to San Francisco and Los Angeles
- 8 Kinder Morgan - San Francisco to Chico
- 9 Truck - Chico into Southern Oregon
- 10 Kinder Morgan - San Francisco to Reno
- 11 Kinder Morgan - San Francisco to Fresno
- 12 Kinder Morgan - Bakersfield to Fresno
- 13 Truck - Imperial Terminal to Western Arizona
- 14 Kinder Morgan - Los Angeles to Las Vegas
- 15 Kinder Morgan - Los Angeles to San Diego
- 16 Kinder Morgan - Los Angeles to Imperial
- 17 Kinder Morgan - Los Angeles to Phoenix
- 18 Kinder Morgan - El Paso to Phoenix
- 19 Kinder Morgan - El Paso to Tucson
- 20 Longhorn Pipeline (Magellan Midstream Partners, L.P.)
- 21 Ship/barge - San Francisco to Eureka
- 22 UNEV - Salt Lake City to Las Vegas
- 23 Foreign Exports from Southern California
- 24 Foreign Exports from Northern California

Source: Stillwater Associates.



# Key Elements - Refineries

- 3 primary refinery locations
- 13 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
- Process over 1.6 million barrels per day of crude oil





# Key Elements - Refineries



- Refineries are a primary hub of logistical activity
  - Raw materials imported & finished products shipped
- Crude oil receipts during 2013 received by
  - Marine vessels (foreign) - 866.1 TBD
  - Marine vessels (Alaska) – 201.7 TBD
  - California source via pipelines – 627.0 TBD
  - Rail/truck – 17.3 TBD
- Process units operate continuously at or near maximum capacity, except during periods of planned maintenance or unplanned outages



## Key Elements – Refineries (cont)

- 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 2013
  - Gasoline – 39.84 MM gal/day
    - 4,980 tanker deliveries/day
  - Diesel fuel – 9.53 MM gal/day
    - 1,191 tanker deliveries/day





# Key Elements – Pipelines

- Pipelines are used throughout the distribution infrastructure to interconnect key elements
- Intra-state pipelines are used to convey petroleum products within California's borders
- Interstate pipelines are used to export transportation fuels to Arizona and Nevada
  - NV – Over 90% of supply
  - AZ – Over 50% of supply
- As is the case with refineries, pipeline systems normally operate on a continuous basis
- Pipelines can only operate if transportation fuels are available to push liquid through the system



# Key Elements - Pipelines (cont)

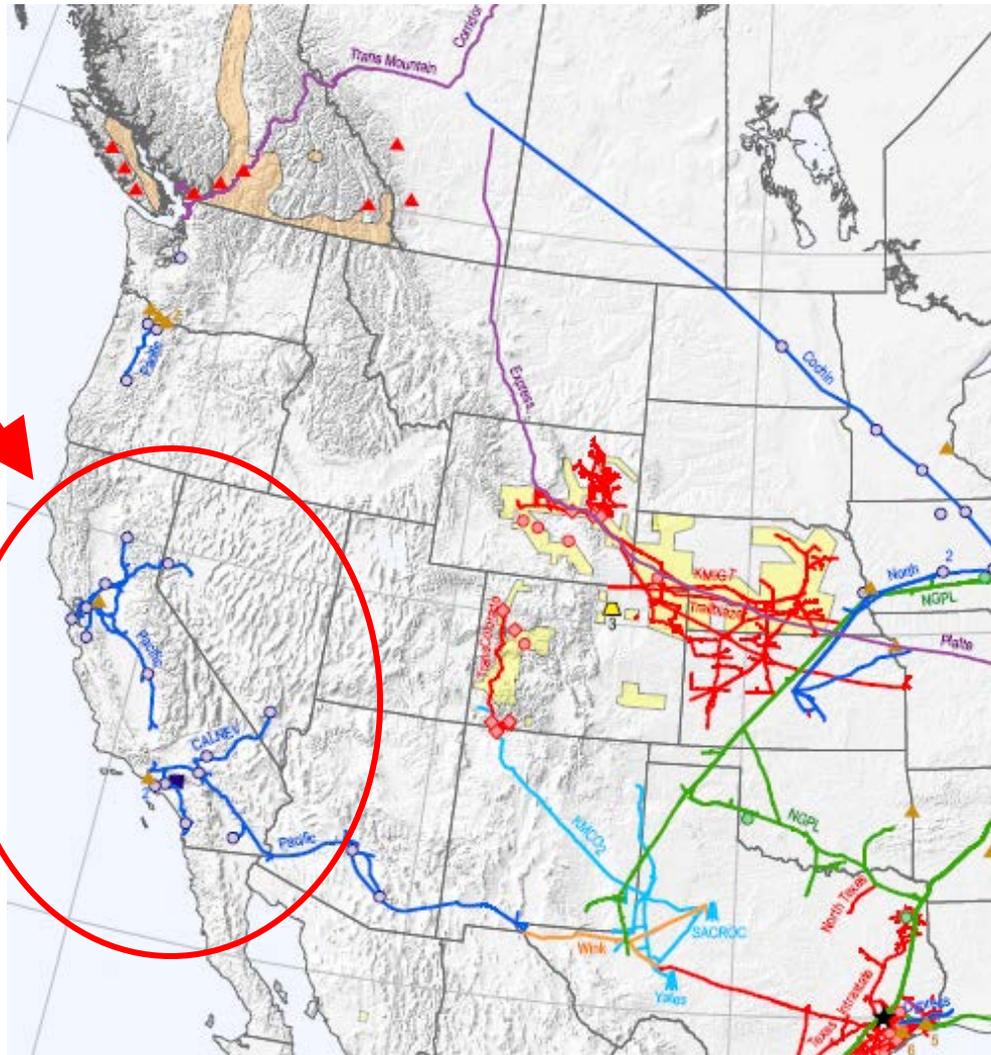
- The pipeline infrastructure in California is controlled by a combination of common carrier and private companies
- Kinder Morgan is the sole common carrier of petroleum product pipelines in the State and transports the majority of fuels through its system every day
- Other companies, such as Chevron,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





# Key Elements - Pipelines (cont)

- Kinder Morgan's Southern California system is not connected to its Northern California system.
- Fuel re-supply by pipeline from Northern California not possible
- Tanker trucks quickest, viable option to bring in additional fuel





# Key Elements – Marine Facilities

- Marine facilities are located in sheltered harbors with adequate draught to accommodate typical sizes of petroleum product tankers and crude oil vessels
- Wharves usually have adjacent storage tanks that are used to temporarily hold petroleum products prior to transfer to a subsequent location
- Most refiners operate a proprietary dock
- Third party storage provides access to majors and independents
  - Kinder Morgan
  - Pacific Atlantic
  - NuStar
  - Petro-Diamond





# Key Elements – Storage Tanks

- Storage tanks are vital to the continuous flow of petroleum products into and through California
- Tanks are located at docks, refineries, terminals and tank farms
- Tanks serve different storage purposes:
  - Unload marine vessels
  - Receive pipeline shipments
  - Feed truck-loading facilities
  - Hold inventories in advance of planned maintenance
  - Strategic storage that can be used for emergencies or periods of rapid price increases





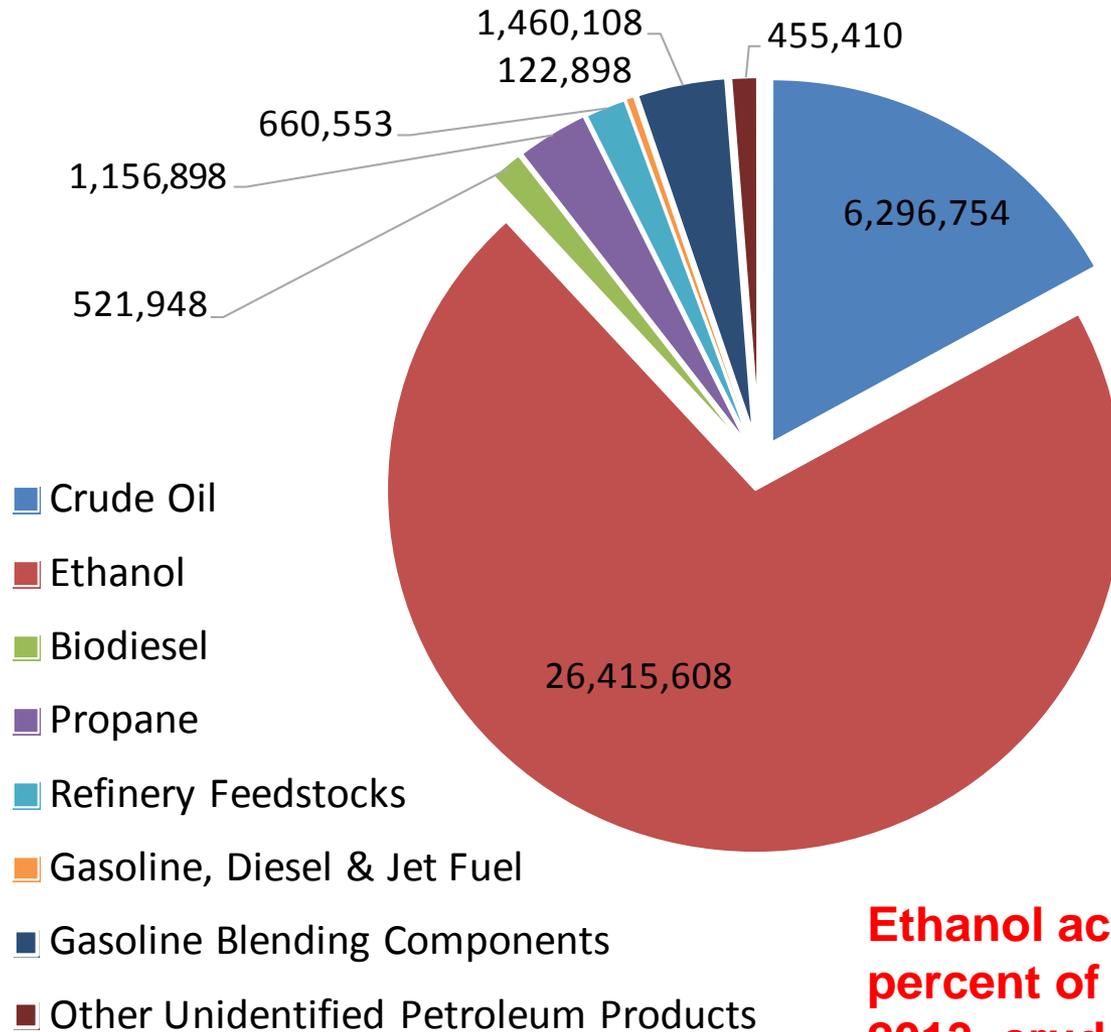
# Rail Logistics - Ethanol

- State receives ethanol via rail unit trains at two locations
  - Lomita Rail Terminal in Carson
  - West Colton Rail Terminal
- Ethanol is then trucked to gasoline distribution terminals
  - – 4.0 MM gal/day during 2013 or 500 tanker truck deliveries/day





# 2013 California Rail Imports (Barrels)



**Ethanol accounted for 71.2 percent of volume during 2013, crude oil 17.0 percent.**

Source: California Energy Commission



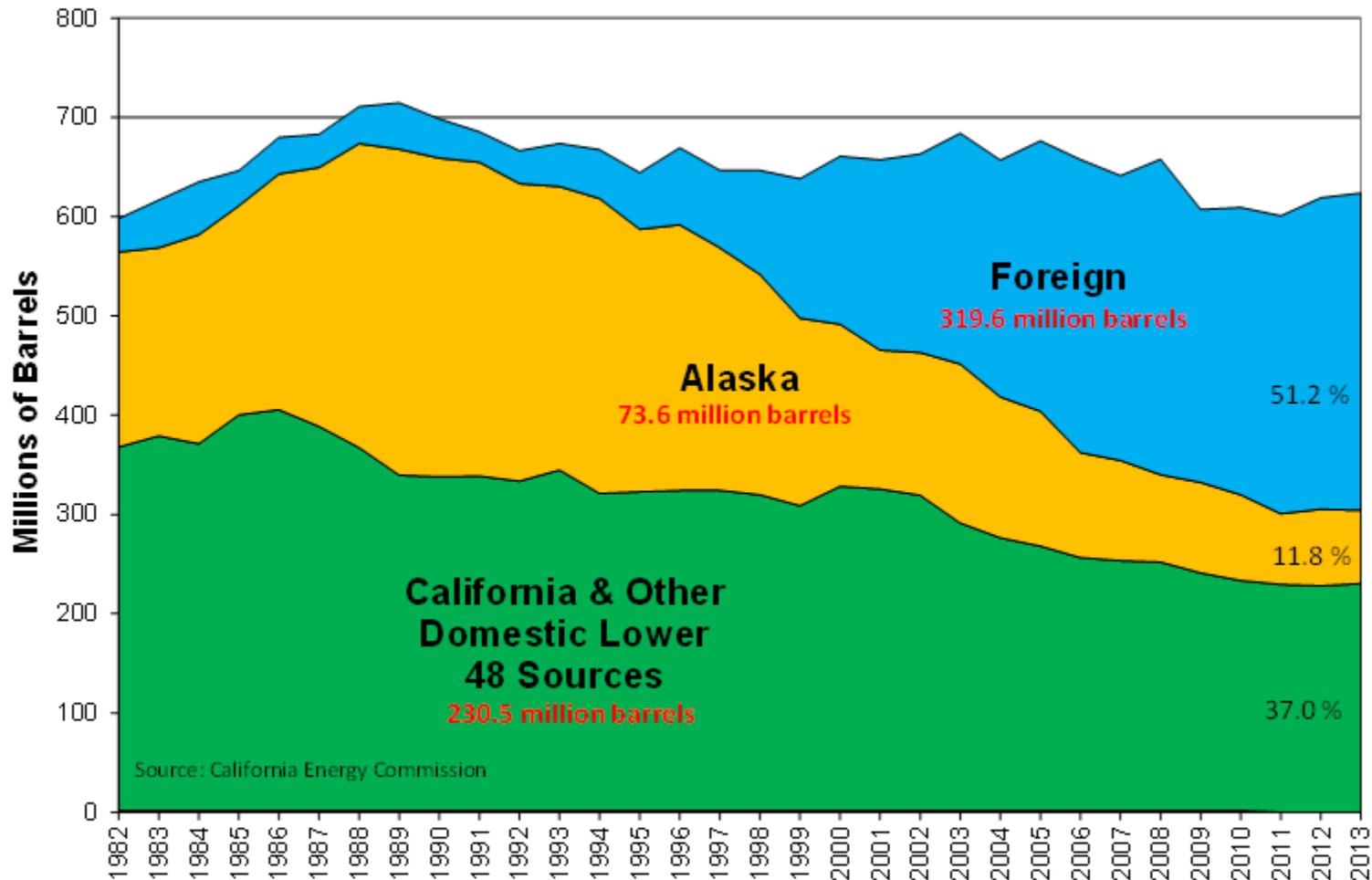
# Rail Logistics – Other Uses

- 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 due to changing trends of increasing oil production and discounted prices





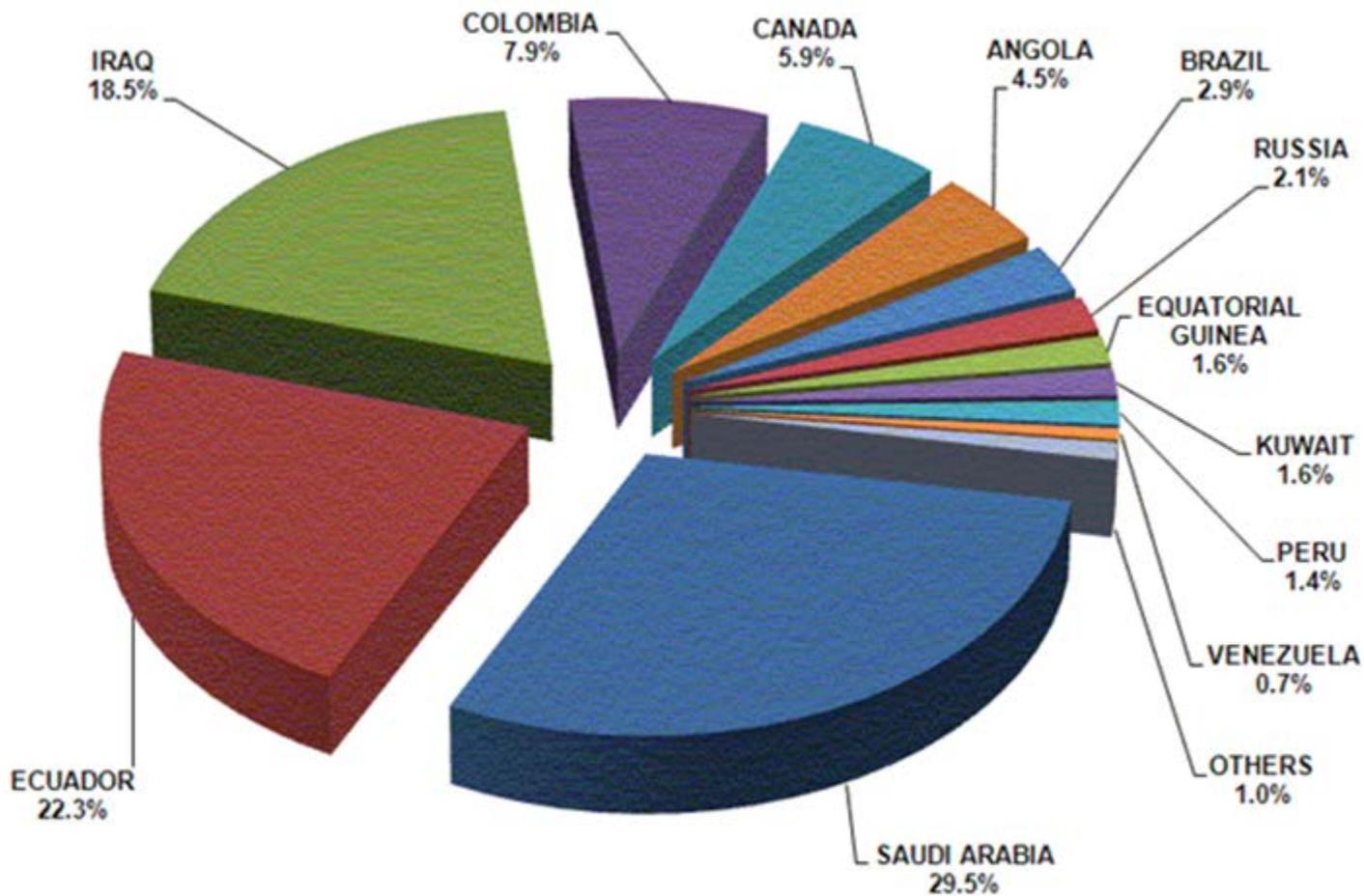
# California Refineries – Crude Oil Sources



**Declining CA & Alaska sources replaced by additional foreign imports.**



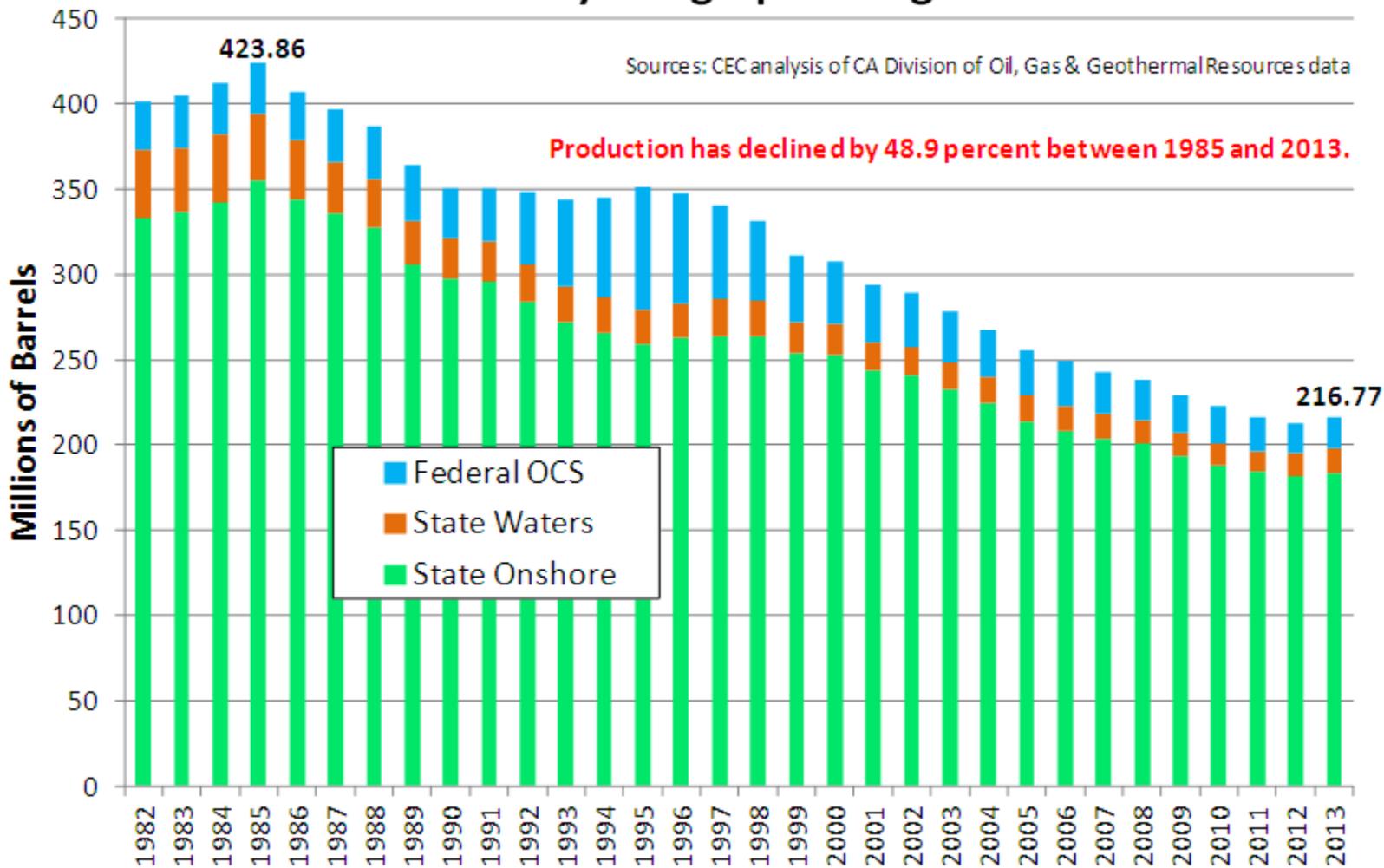
## Foreign Sources of Crude Oil Imports to California 2013



Source: Energy Information Administration (EIA), Company-Level Imports.

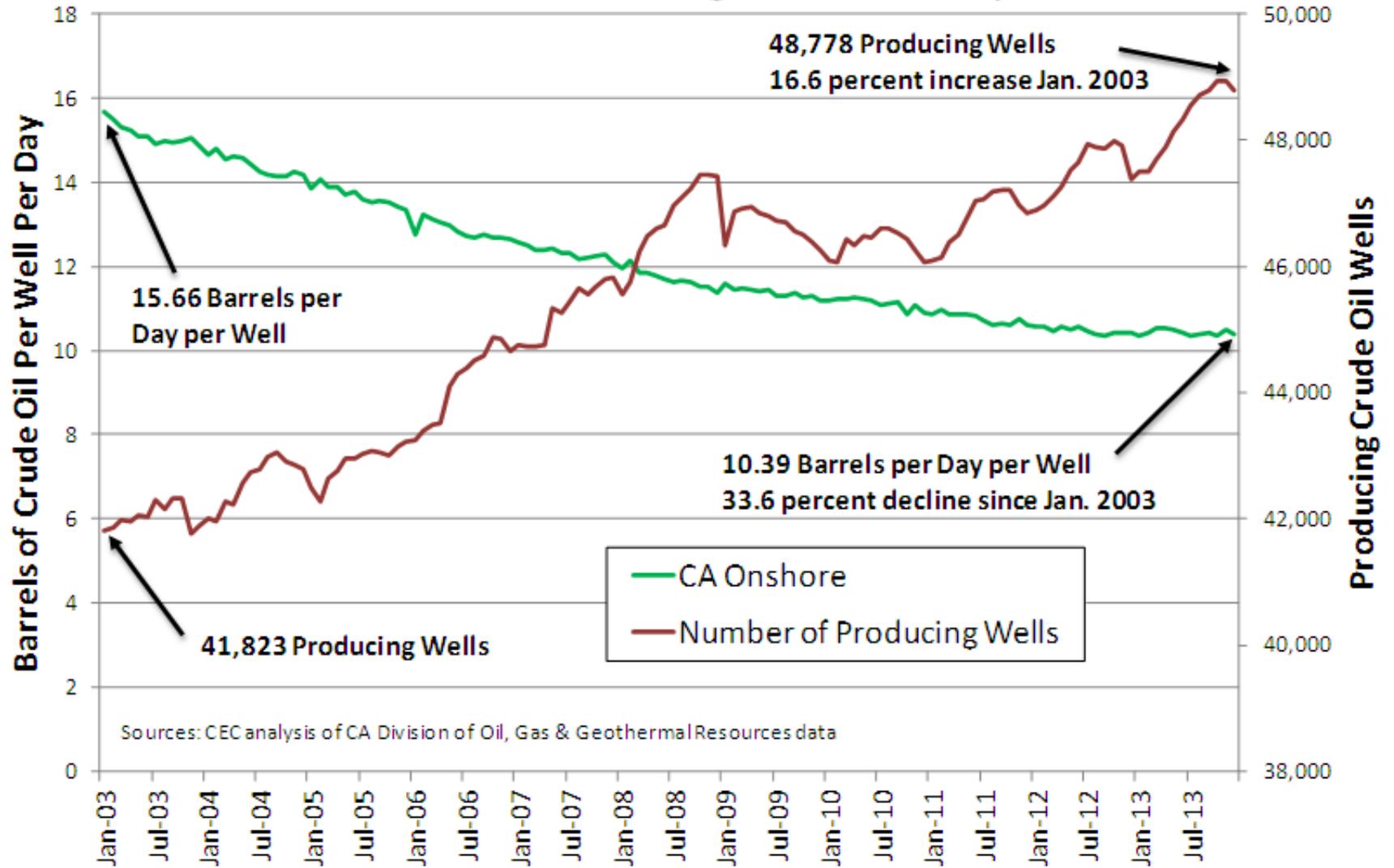


# California Crude Oil Production Source By Geographic Region





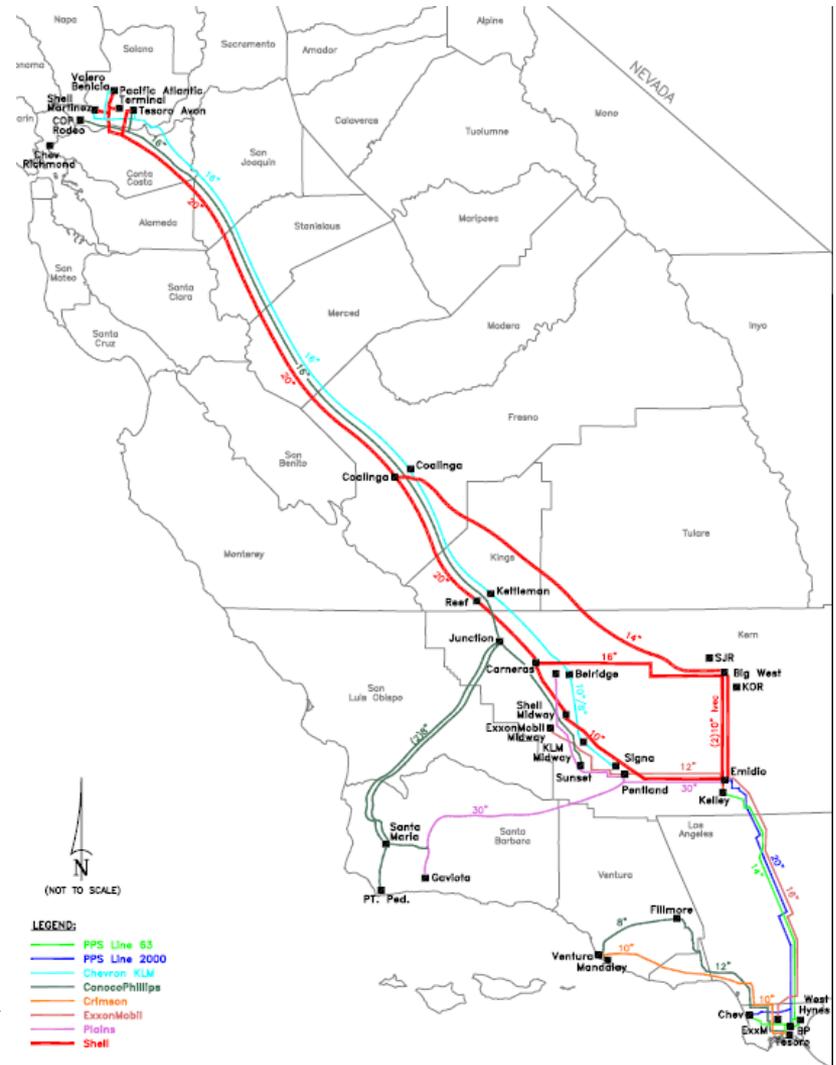
# California Crude Oil Production Onshore - Producing Wells & Output





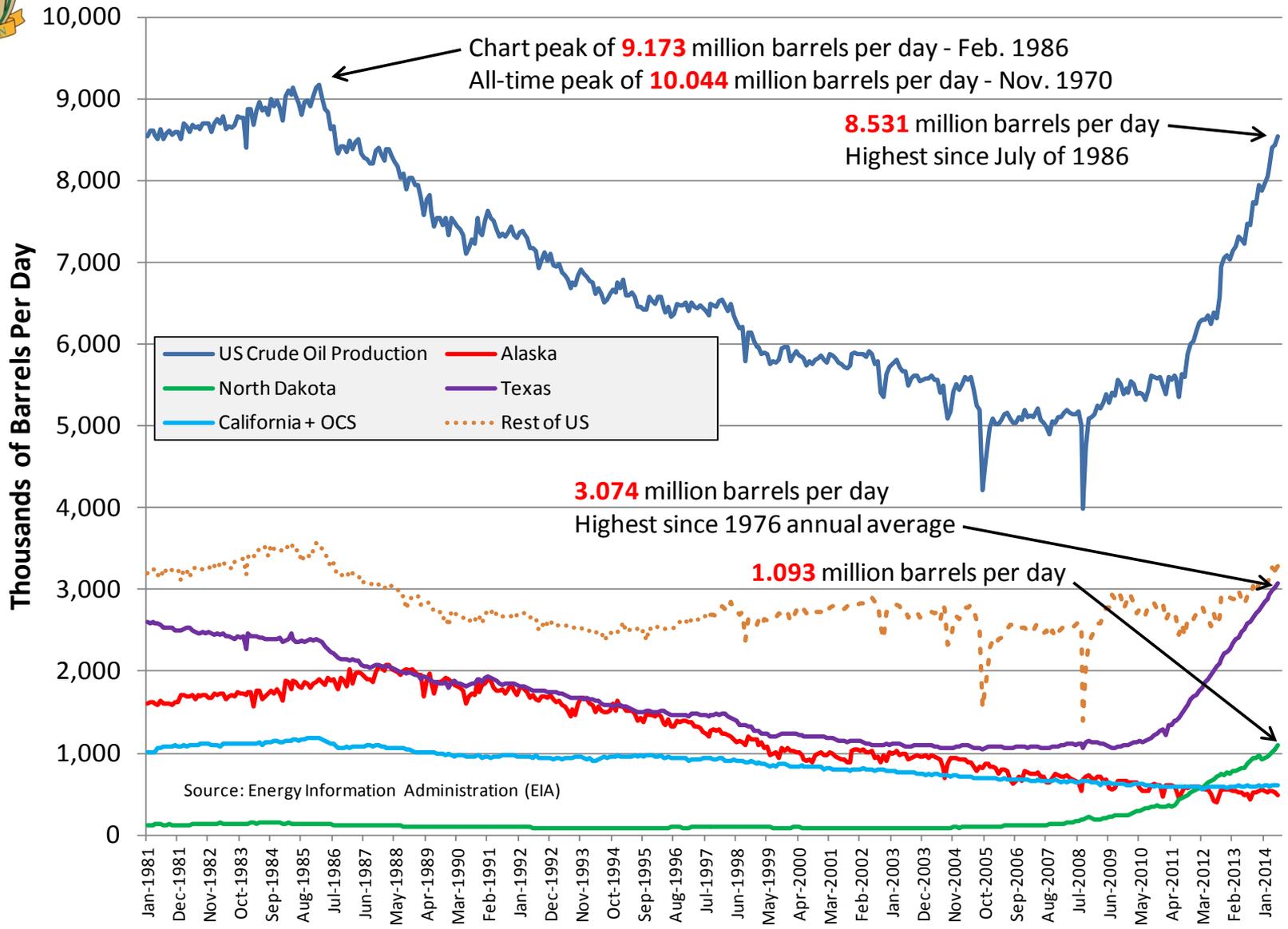
# Crude Oil Sources – Southern Calif. Refineries

- Southern California refineries processed 926.8 thousand barrels per day of crude oil during 2013
  - 488.4 TBD foreign marine imports
  - 302.4 TBD pipeline shipments
  - 122.2 TBD ANS marine imports
  - 9.5 TBD Canada rail imports
  - 4.3 TBD domestic rail imports
- Southern California refineries processed 54.2 percent of total crude oil
- Increased 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





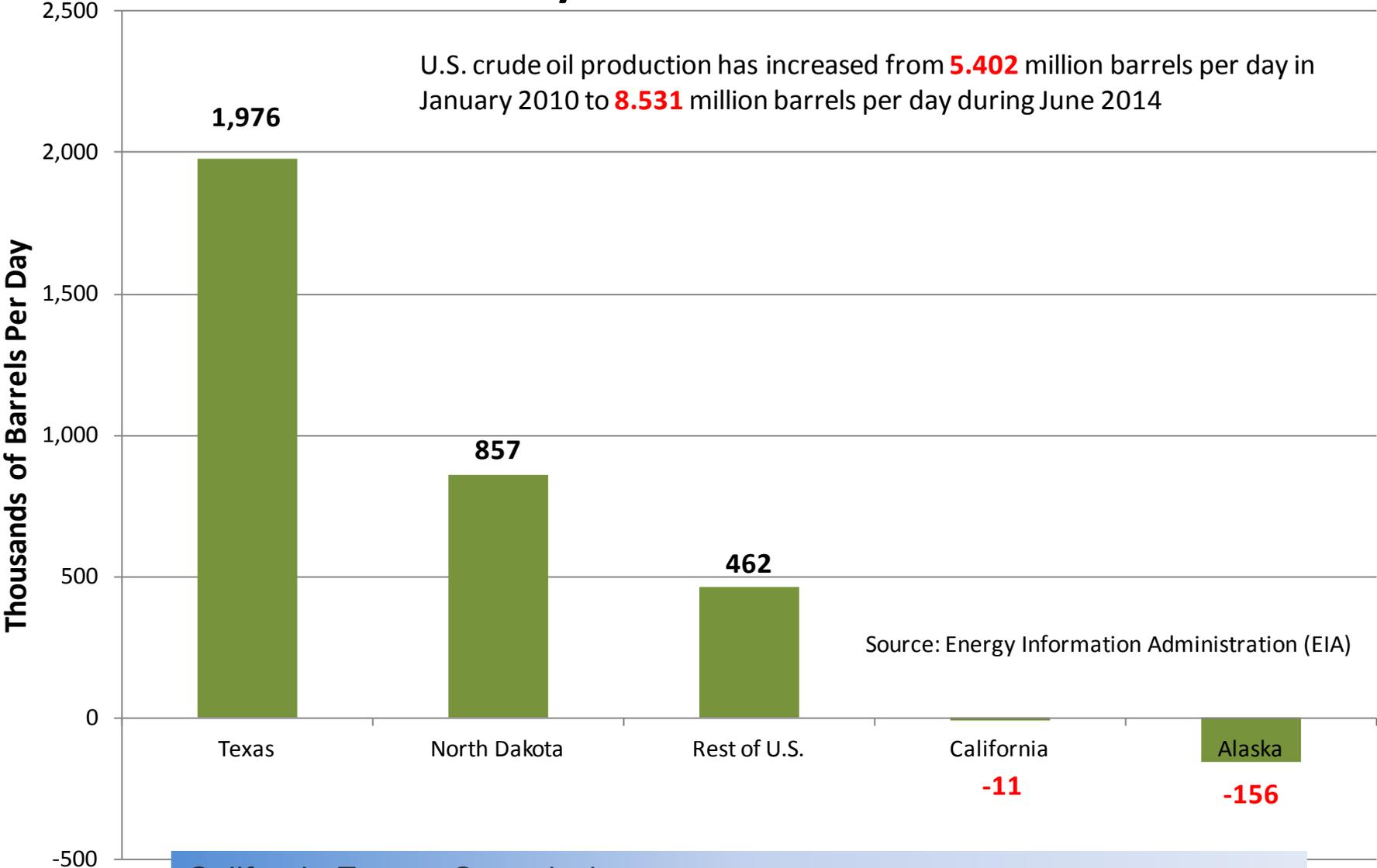
# U.S. Crude Oil Production Rebounding





# Change in Crude Oil Production January 2010 vs. June 2014

U.S. crude oil production has increased from **5.402** million barrels per day in January 2010 to **8.531** million barrels per day during June 2014



Source: Energy Information Administration (EIA)



# U.S. Crude Oil Production Rebounding

1,800,000

- Ghawar (Saudi Arabia) – Peak 5.0 MM BPD in 2005, now 4.5 MM BPD
- Samotlor (Russia) – Peak 3.0 MM BPD in 1980, now 0.84 MM BPD
- Burgan (Kuwait) – Peak 2.4 MM BPD in 1972, now 1.7 MM BPD
- Cantarell (Mexico) – Peak 2.1 MM BPD in 2003, now 0.41 MM BPD
- Rumaila (Iraq) – Peak 1.6 MM BPD in 1980, now 1.3 MM BPD
- Safaniya (Saudi Arabia) – Peak 1.5 MM BPD in 1990s, now 1.2 MM BPD
- Kirkuk (Iraq) – Peak 1.2 MM BPD in 1980, now 0.23 MM BPD
- Daqing (China) – Peak 1.1 MM BPD in 1997, now 0.75 MM BPD

1,600,000

Barrels Per Day

1,200,000

1,000,000

800,000

600,000

400,000

200,000

0

— Bakken     — Eagle Ford  
— Permian

Jan-07 Apr-07 Jul-07 Oct-07 Jan-08 Apr-08 Jul-08 Oct-08 Jan-09 Apr-09 Jul-09 Oct-09 Jan-10 Apr-10 Jul-10 Oct-10 Jan-11 Apr-11 Jul-11 Oct-11 Jan-12 Apr-12 Jul-12 Oct-12 Jan-13 Apr-13 Jul-13 Oct-13 Jan-14 Apr-14 Jul-14

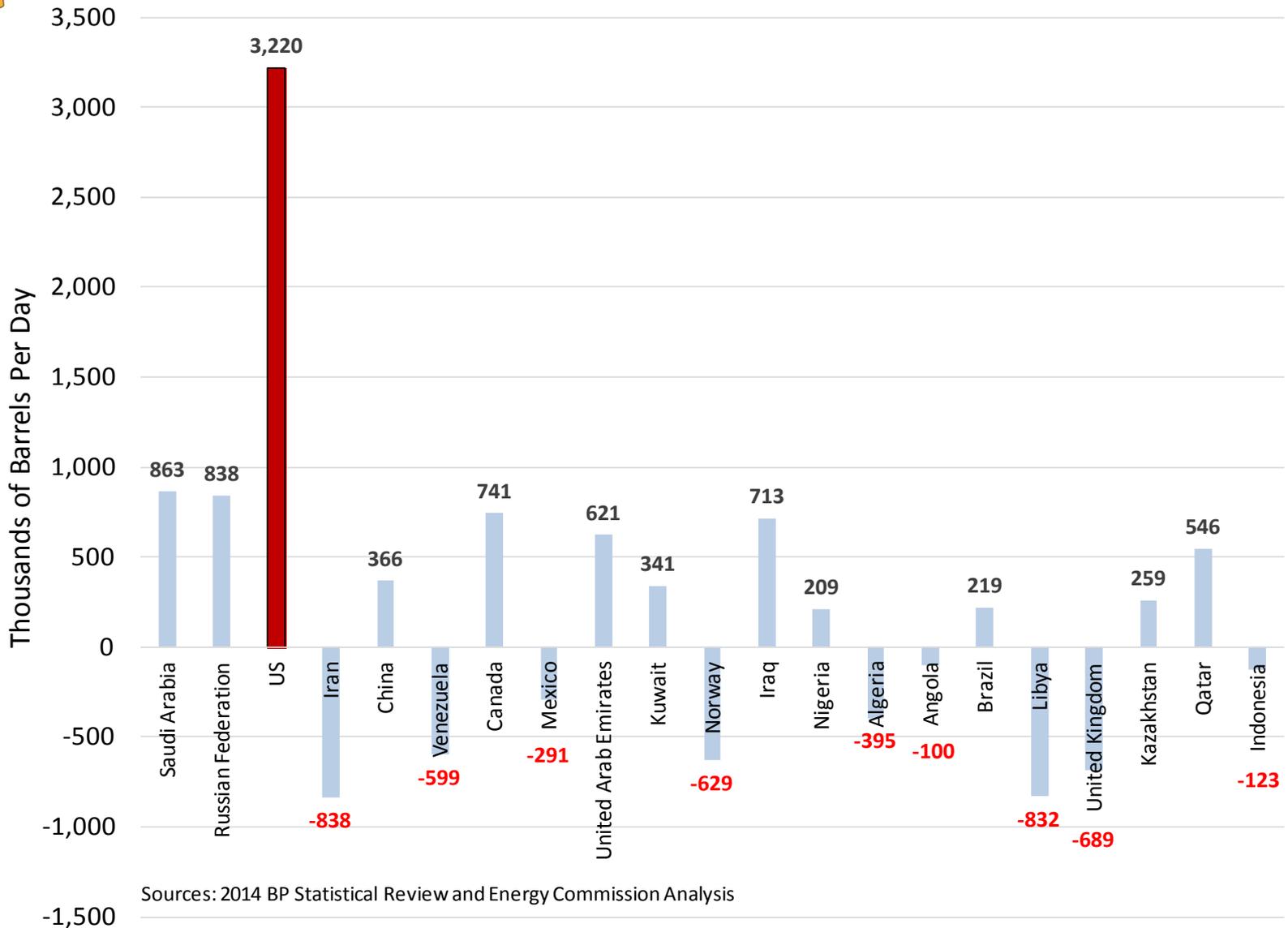
1,680,781

1,516,609

1,130,153

Source: EIA Drilling Productivity Report

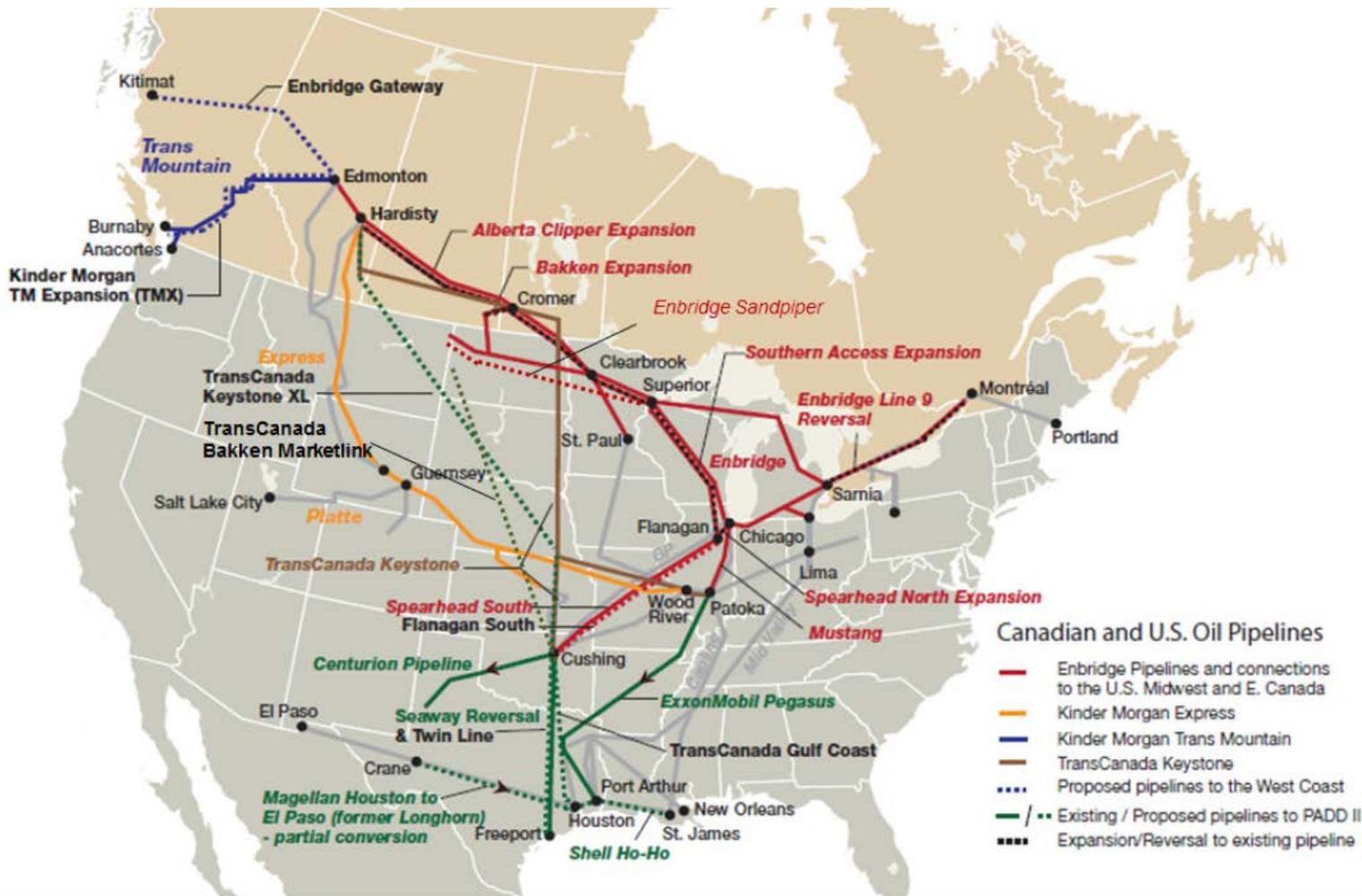
# Global Crude Oil Production 2013 vs. 2008



Sources: 2014 BP Statistical Review and Energy Commission Analysis



# Crude Oil Pipeline Projects



Source: CAPP, Raymond James Ltd.

**No crude oil pipelines into California...none planned.**



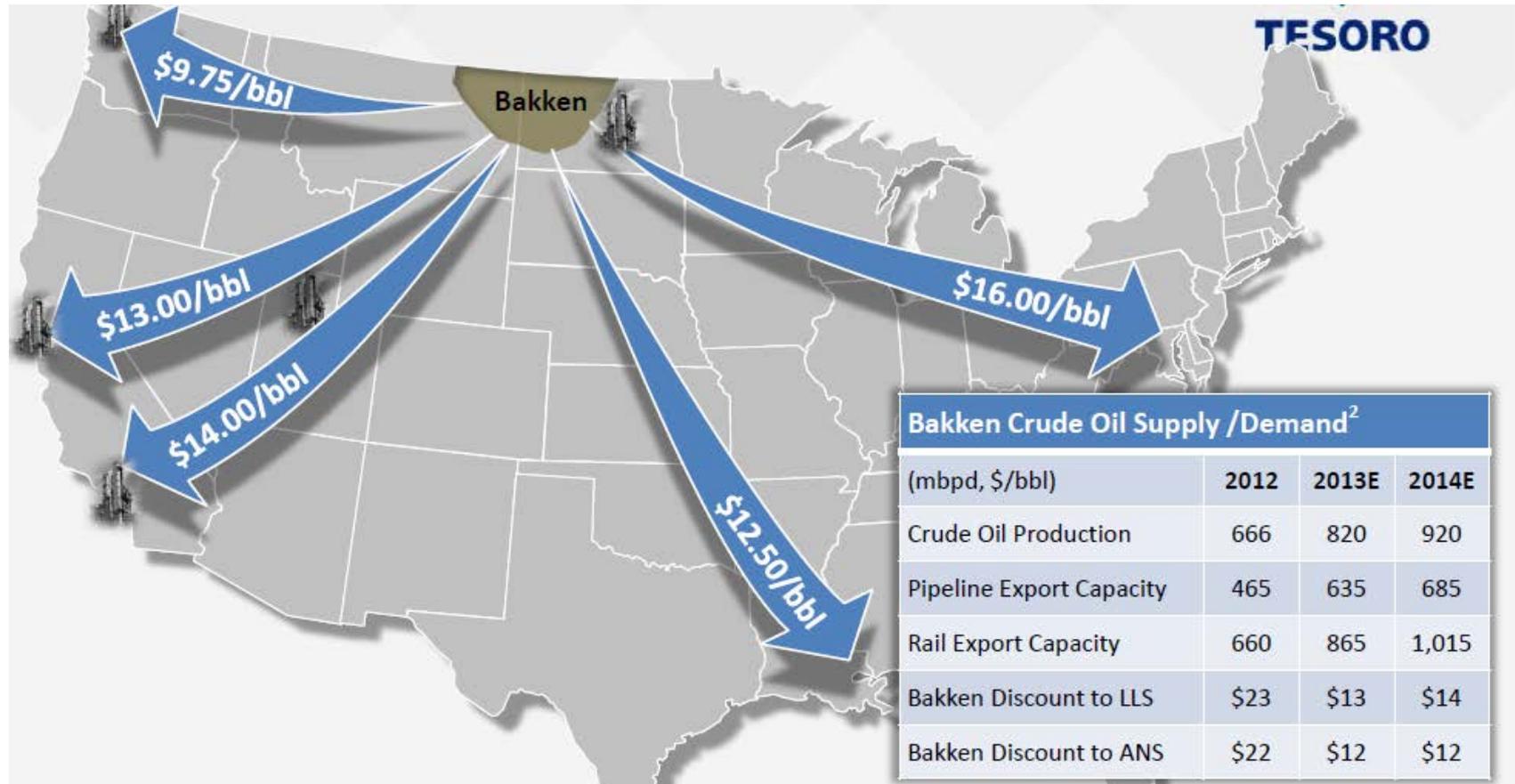
# Crude Oil – Export Restrictions

- Domestically-produced crude oil exports to foreign destinations are allowed under specific "license exceptions" identified under federal statute. Those primary exceptions include:
  - Alaska crude oil shipped on the Trans-Alaska Pipeline System (TAPS) and exported via a Jones Act vessel directly from Valdez Harbor
  - California heavy crude oil production with API gravity of 20.0 degrees or lower, limit of no more than 25,000 barrels per day
    - First export license for California heavy crude oil was granted on December 9, 1991 – no heavy crude oil exports for several years
  - Exports of domestic crude oil to Canada for processing by Canadian refineries
  - Exports in connection with refining or exchange of Strategic Petroleum Reserve crude oil
- Companies can also apply to the federal Bureau of Industry and Security (BIS) for an export license that basically requires Presidential approval

**Recent export licenses for “processed” condensate approved.**



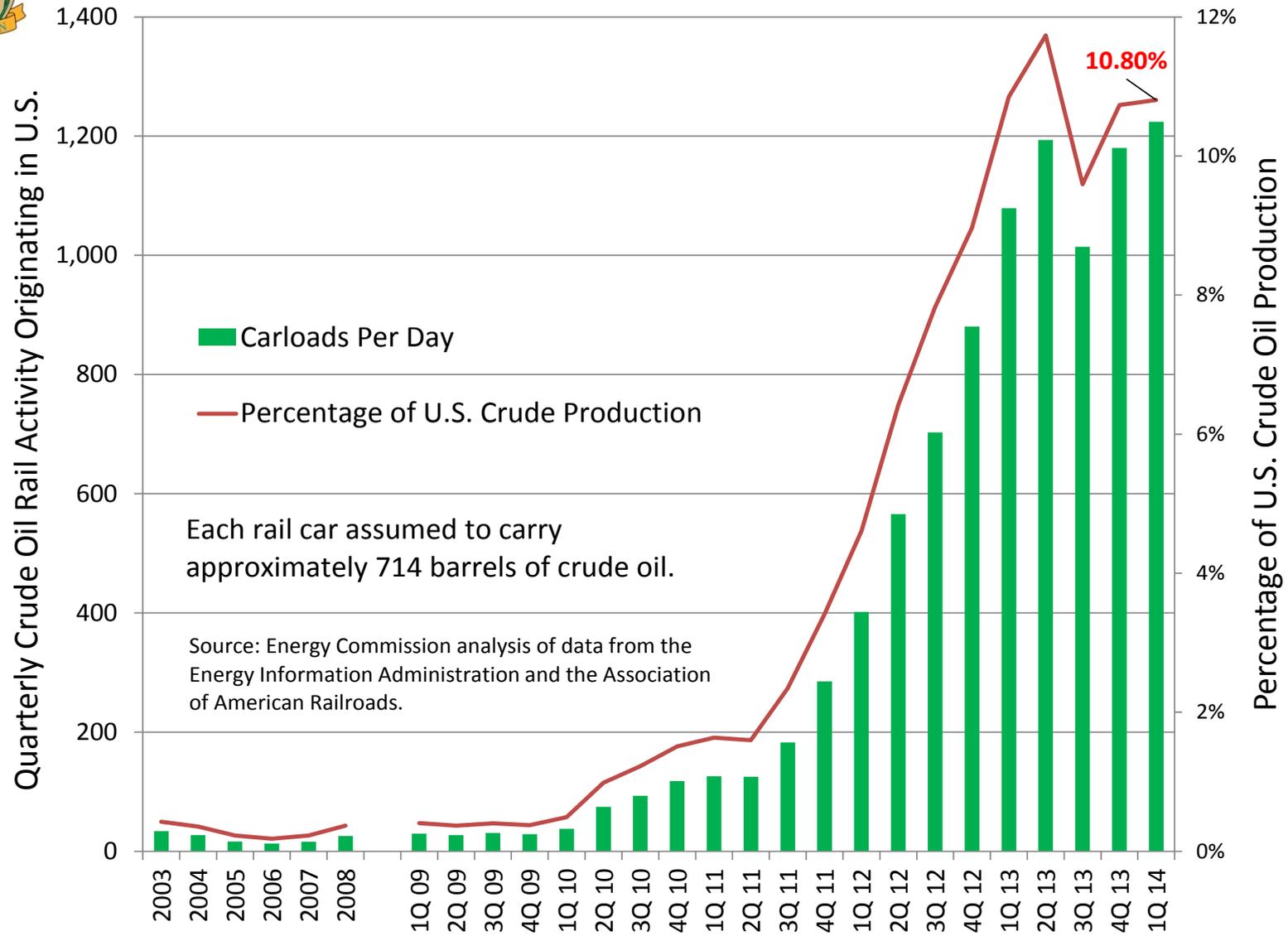
# Crude Oil Discounts Enable Rail Shipment



Source: Barclays CEO Energy-Power Conference, Tesoro, September 2013



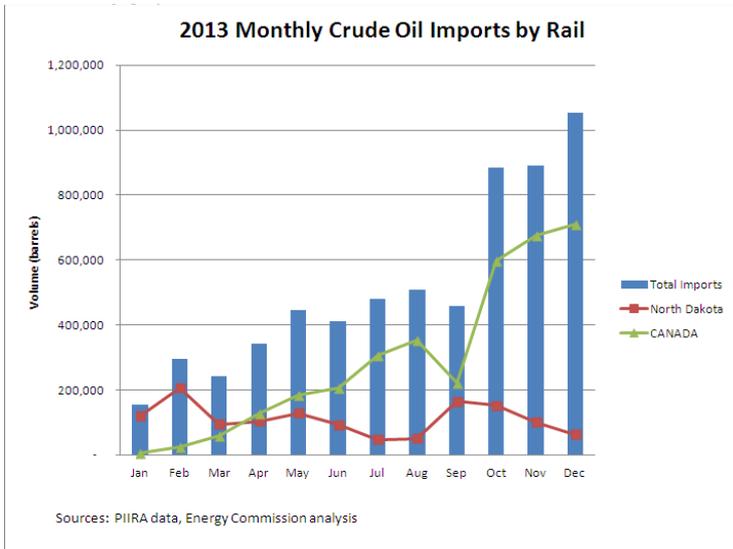
# U.S. Crude-by-Rail Movements





# California Crude-by-Rail Imports

- 2012 CBR imports – 1.1 MM Bbls
- 2013 CBR imports – 6.3 MM Bbls
  - Average of 17,251 barrels/day
  - Approximately 9,600 rail tank cars
  - Average of 660 barrels/rail tank



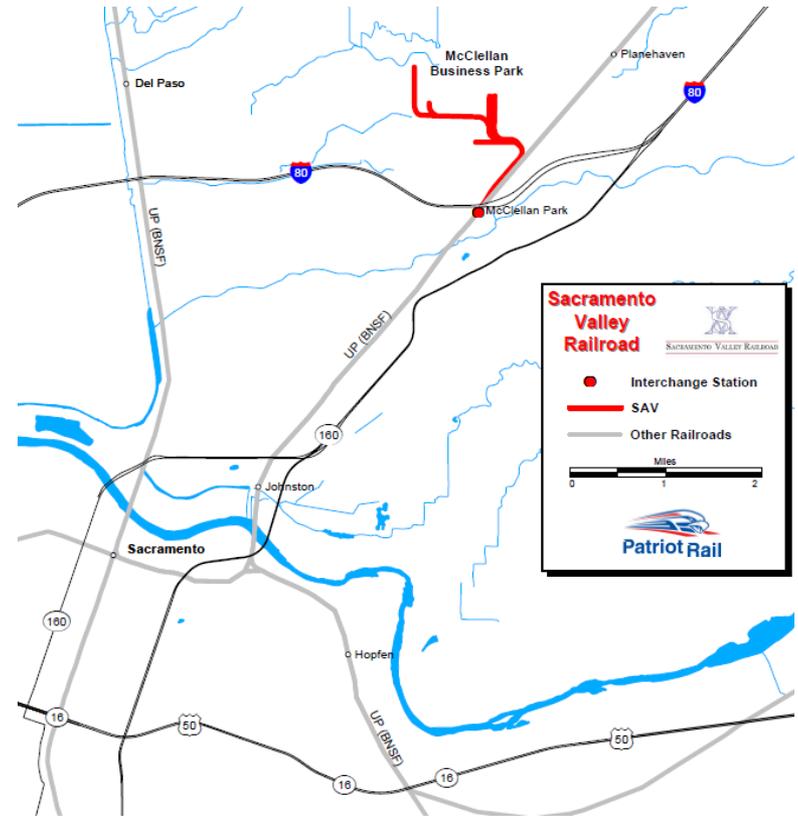
2013 Crude-By-Rail Imports		
California Energy Commission Country or State of Origin for Railcars	2013 Total Barrels	2013 Percentage
<b>California Totals</b>		
Canada	3,472,050	55.14%
Colorado	500,707	7.95%
New Mexico	411,725	6.54%
North Dakota	1,348,681	21.42%
Utah	59,004	0.94%
Wyoming	441,398	7.01%
Other States	63,207	1.00%
Subtotals	6,296,772	100.00%
<b>Northern California</b>		
Canada		
Colorado	157,836	12.53%
New Mexico		
North Dakota	1,075,861	85.41%
Utah		
Wyoming		
Other States	25,952	2.06%
Subtotals	1,259,649	100.00%
<b>Bakersfield &amp; Southern California</b>		
Canada	3,472,050	68.93%
Colorado	342,870	6.81%
New Mexico	411,725	8.17%
North Dakota	272,820	5.42%
Utah	59,004	1.17%
Wyoming	441,398	8.76%
Other States	37,255	0.74%
Subtotals	5,037,122	100.00%

*Other States* include Illinois, Nebraska, Oklahoma, Texas and Washington.



# Northern California – CBR Activity

- Two locations currently receiving CBR deliveries
  - Kinder Morgan – Richmond Rail Facility
  - SAV Patriot – McClellan
- Combined deliveries during 2013 amounted to 1.26 million barrels or 3,451 barrels per day
  - Two facilities are permitted to receive a maximum of 21,354 barrels per day of crude oil via rail tank car
  - Crude oil transferred to trucks
- Kinder Morgan facility can receive crude oil unit trains



Source: Patriot Rail



# Southern California – CBR Activity

- Four locations currently receiving CBR deliveries
  - Bakersfield, Carson, Long Beach and Vernon
- Combined deliveries during 2013 amounted to 5.04 million barrels or 13,800 barrels per day
  - Maximum permit off-loading capability being determined
- Manifest rail cars of crude oil being delivered but no full unit trains to these locations

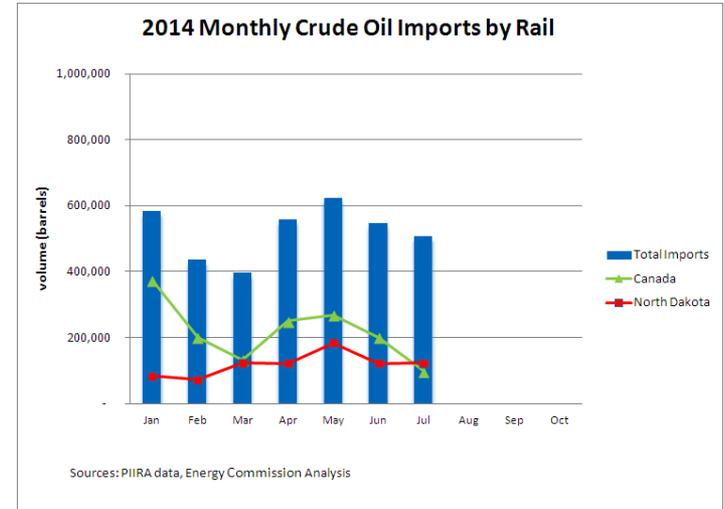


Source: Google Map image of Kern facility.



# California CBR Imports Expected to Grow

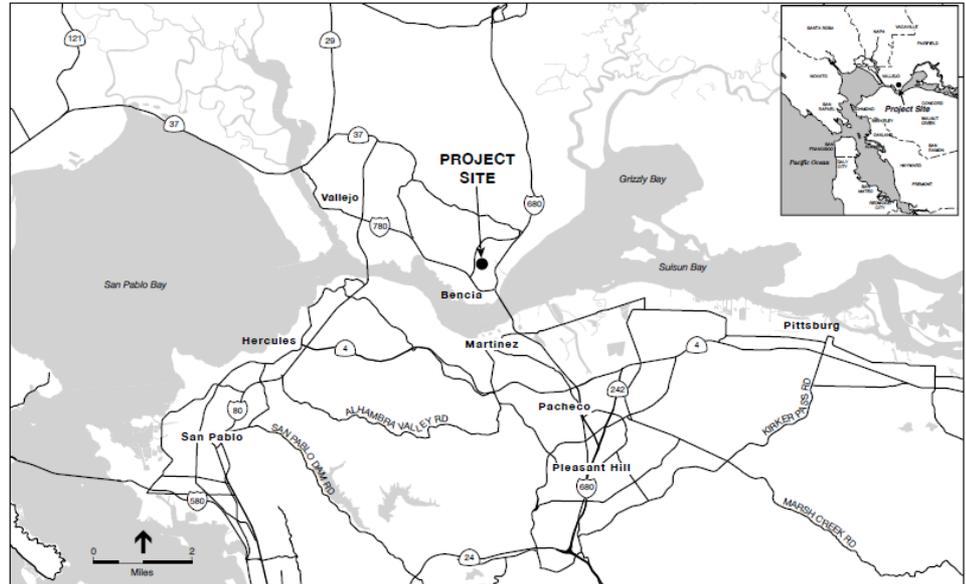
- 2014 CBR imports, first 7 months
  - 3.649 MM barrels
  - Average of 17,214 barrels/day
  - 54 percent higher than same period in 2013
- Four CBR projects seeking permits
  - 2 Northern California
  - 1 Bakersfield area - **approved**
  - 1 San Luis Obispo County
- One CBR project under construction
  - Plains All American - Bakersfield
- Could grow up to 22 percent by 2016, assuming:
  - Permits issued, customers signed up, financing approved, constructed & operated at capacity – 376,000 BPD





# Crude-by-Rail Projects – Northern California

- Valero – Benicia Crude Oil By Rail Project – **Permit Review**
  - Benicia refinery
  - Up to 70,000 BPD
  - Construction will take 6 months
  - Could be operational by 2015
  - Draft EIR released June 17, 2014
  - Comments closed Sept. 15
  - Lead agency – City of Benicia
  - [http://www.ci.benicia.ca.us/index.asp?Type=B\\_BASIC&SEC={FD E9A332-542E-44C1-BBD0-A94C288675FD}](http://www.ci.benicia.ca.us/index.asp?Type=B_BASIC&SEC={FD E9A332-542E-44C1-BBD0-A94C288675FD})



SOURCE: ESA

Benicia Valero CBR, 202115.01  
Figure 3-1  
Project Location

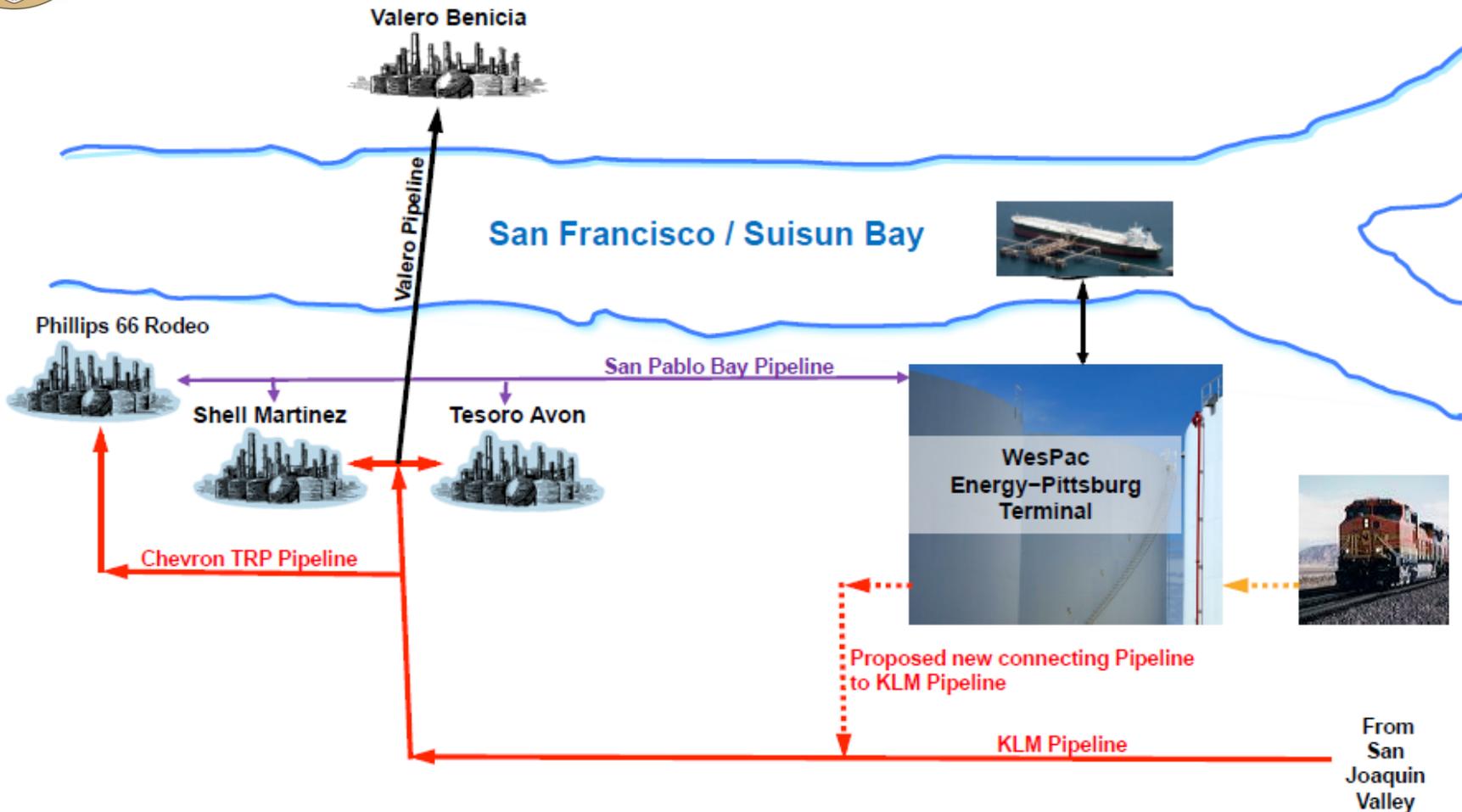


# Crude-by-Rail Projects – Northern California

## WesPac Energy Project – Pittsburg – **Permit Review**

- Rail receipt average capability of 50,000 barrels per day (BPD)
- Includes marine terminal for receipt and loading – average of 192,000 BPD
- Combined average receipt capability of 242,000 BPD
- Connection to KLM pipeline – access to Valero, Shell, Tesoro & Phillips 66 refineries
- Connection to idle San Pablo Bay Pipeline – access to Shell, Tesoro & Phillips 66 refineries
- Construction of the first phase for the rail facility and associated storage tanks could be completed within 12 to 15 months of receiving all permits
- Could be operational by 2016
- A recirculated draft environmental impact report (RDEIR) will be developed and a new comment period set for those applicable sections
- There is currently no scheduled release date for the RDEIR
- Lead agency – City of Pittsburg
- <http://www.ci.pittsburg.ca.us/index.aspx?page=700>

# WesPac Project – Refinery Connections



 WesPac Energy-Pittsburg LLC



# Crude-by-Rail Projects – Bakersfield

## Alon Crude Flexibility Project - **Approved**

- Alon – Bakersfield Refinery
- 2 unit trains per day
- 150,000 BPD offloading capacity
- Will be able to receive heavy crude oil
- Oil tankage connected to main crude oil trunk lines – transfer to other refineries
- Kern County Board of Supervisors approved permits for the project on September 9, 2014
- Construction will take 9 months, could be complete by 2015

## Plains All American – Bakersfield Crude Terminal – **Under Construction**

- Up to 65,000 BPD
- Connection to additional crude oil line via new six-mile pipeline
- Draft EIR will be developed for that pipeline later this year
- PAA – “operational by October 2014”



Source: KernGoldenEmpire.com



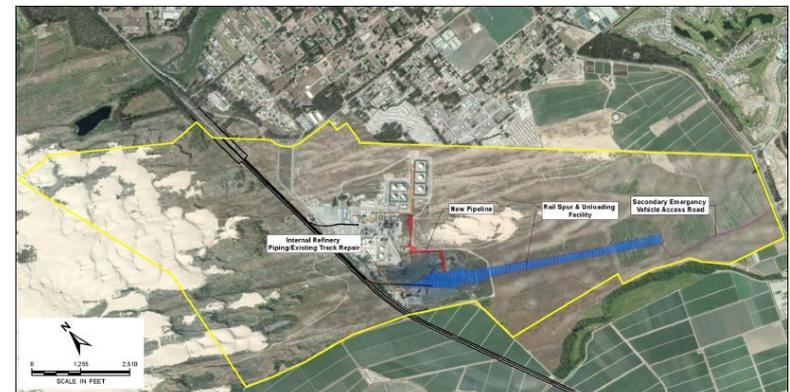
# Crude-by-Rail Projects – San Luis Obispo

## Phillips 66 – Santa Maria Refinery – **Permit Review**

- Up to 41,000 BPD
- Revised Draft EIR to be re-circulated during October of 2014
- Construction 9 to 12 months to complete
- Lead agency – County of San Luis Obispo Planning Commission
- Planning Commission hearing could occur during January 2015
- <http://www.slocounty.ca.gov/planning/environmental/EnvironmentalNotices/railproject.htm>

## Valero – Wilmington Refinery – **Cancelled**

- Up to 60,000 BPD
- Withdrew permit application



Source: Phillips 66 Draft EIR – November 2013



# Crude-by-Rail Projects – Not Included

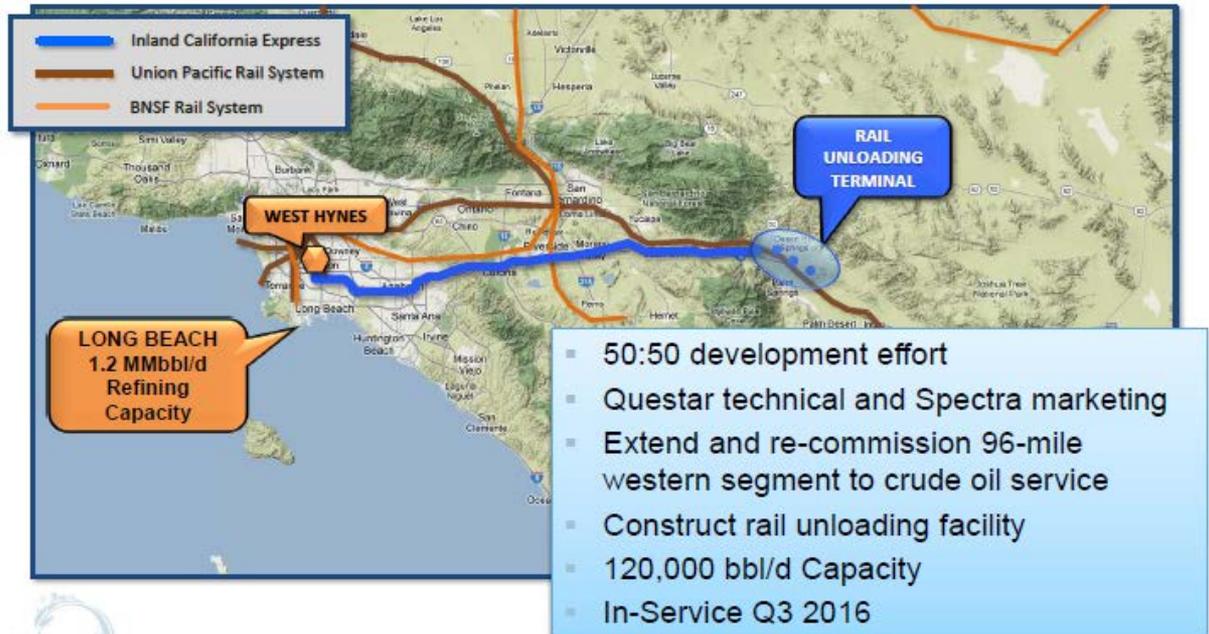
## Two Projects not included in CBR projection by Energy Commission

### Targa – Port of Stockton – **Planned**

- Up to 65,000 BPD
- Receive rail, load barges

### Questar Project - **Planned**

- East of Desert Hot Springs
- Nearly 2 unit trains per day
- 120,000 BPD offloading capacity
- Connection to Los Angeles basin crude oil pipeline network
- Company is still performing an engineering analysis



Source: Questar Pipeline customer meeting, March 2014



# Rail Routes Into and Within California

## CBR Routing Information - California

- Energy Commission does not track routes of CBR deliveries – only source states/provinces, destinations within California, and volumes
- Counties transited by trains carrying more than 1 MM gallons of Bakken crude oil are reported by Class 1 railroads to OES
- Crude oil from Canada, North Dakota and Wyoming will likely traverse the state from north to south
- Crude oil from Colorado, New Mexico and Texas will likely traverse the state from east to west





# CBR Projects – Pacific Northwest

## (4) Tesoro – Anacortes Refinery – **Operational**

- Up to 50,000 BPD
- Operational September 2012

## (1) BP – Cherry Point Refinery – **Operational**

- Up to 60,000 BPD
- Operational December 2013

## (5) Global Partners – Clatskanie, OR – **Operational**

- Originally up to 28,600 BPD
- 8/19/14 - permit revised to 120,000 BPD

## (2) Phillips 66 – Ferndale Refinery – **Operational**

- Up to 20,000 BPD, mixed freight cars
- Permits received for expansion to 40,000 BPD in 2014 – ready by late 2014

## (10) U.S. Oil and Refining – Tacoma Refinery – **Operational**

- Up to 6,900 BPD
- Seeking permits to expand capacity to 48,000 BPD

**CBR off-loading capacity up to 260,900 BPD, could reach 300,000 BPD by end of 2014**



Source: Skagit Valley Herald



# CBR Projects – Pacific Northwest

## (3) Shell – Anacortes Refinery Project – **Permit Review**

- Rail receipts of unit trains
- Capacity up to 50,000 BPD
- Seeking a Mitigated Determination of Nonsignificance permit
- Lead agency – Skagit County Planning & Development Services
- Possible initial start-up during early 2016
- <http://www.skagitcounty.net/Departments/PlanningAndPermit/shellpermit.htm>





# Northwest Washington CBR Facilities

## Railroad Owners

- BDTL - Ballard Terminal Railroad
- BNSF - BNSF Railway Company
- CBRC - Columbia Basin Railroad
- City of Tacoma
- City of Yakima
- City of Yelm
- Clark County
- CSCD - Cascade & Columbia River Railroad
- GRNW - Great Northwest Railroad
- KFR - Kettle Falls International Railway
- LWRR - Lake Whatcom Railway
- NWRR - Northwest Railway Museum
- Patriot Rail
- Port of Benton
- Port of Chehalis
- Port of Columbia
- Port of Seattle
- POVA - Pend Oreille Valley Railroad
- PSAP - Puget Sound & Pacific Railroad
- Sound Transit
- Spokane County
- Tacoma Rail
- UP - Union Pacific Railroad
- US Army
- US Dept of Energy
- US Navy
- WSDOT - Washington State Dept of Transportation
- Yakima County



Source: WSDOT State Rail & Marine Office map and Energy Commission





# CBR Projects – Pacific Northwest

## **(6) Imperium Renewables, Port of Grays Harbor – Permit Review**

- Up to 75,000 BPD
- Washington Department of Ecology and City of Hoquiam are co-lead agencies
- Initial start-up date uncertain

## **(7) NusStar, Port of Vancouver – Permit Review**

- Up to 41,000 BPD
- Initial start-up date uncertain

## **(8) Targa Sound, Tacoma Terminal – Permit Review**

- Up to 41,000 BPD
- Initial start-up date uncertain

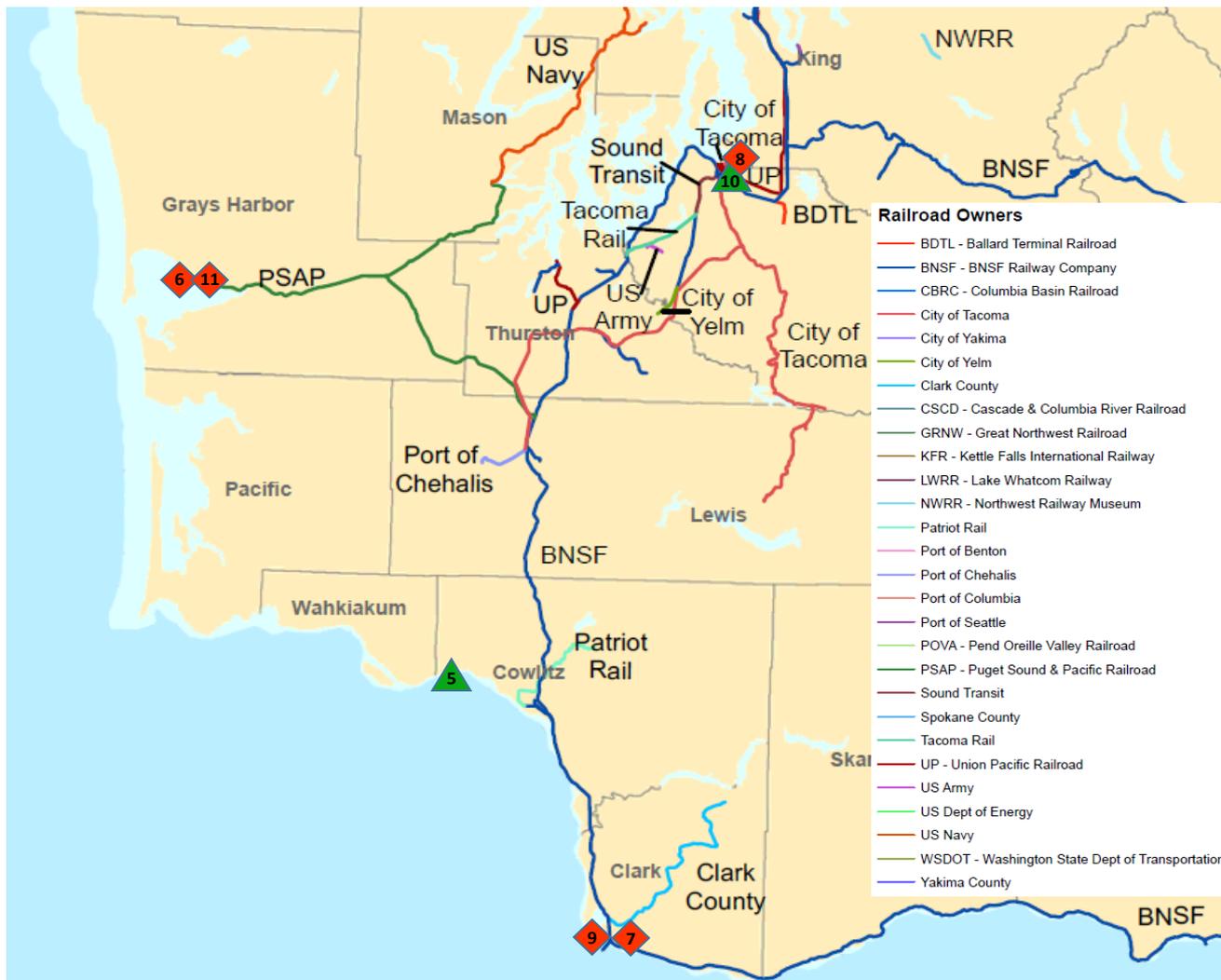
## **(11) Westway Terminals, Port of Grays Harbor – Permit Review**

- Up to 26,000 BPD first phase & up to 48,900 BPD second phase
- Washington Department of Ecology and City of Hoquiam are co-lead agencies
- Initial start-up date uncertain

**Additional CBR off-loading capacity up to 182,000 BPD, uncertain time-line**



# SW Washington & NW Oregon CBR Facilities



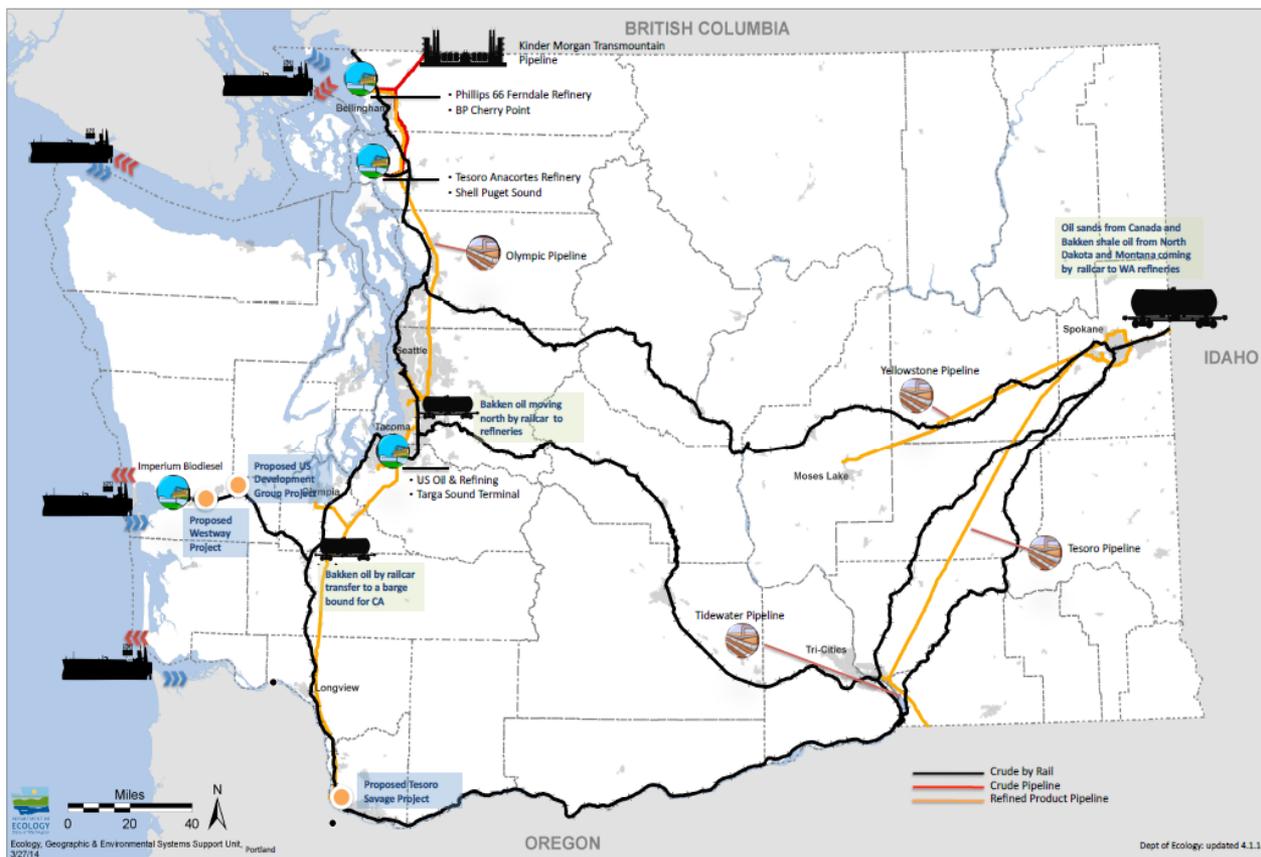
Source: WSDOT State Rail & Marine Office map and Energy Commission



# Rail Routes Into and Within Washington

## CBR Routing Information – Washington

- Crude oil from Canada, North Dakota and Wyoming will likely enter through Idaho before heading north to Puget Sound refineries



Source: Washington Department of Ecology.



# Questions?



Queensway Bay and Queen Mary, Long Beach, California 12-3-04