



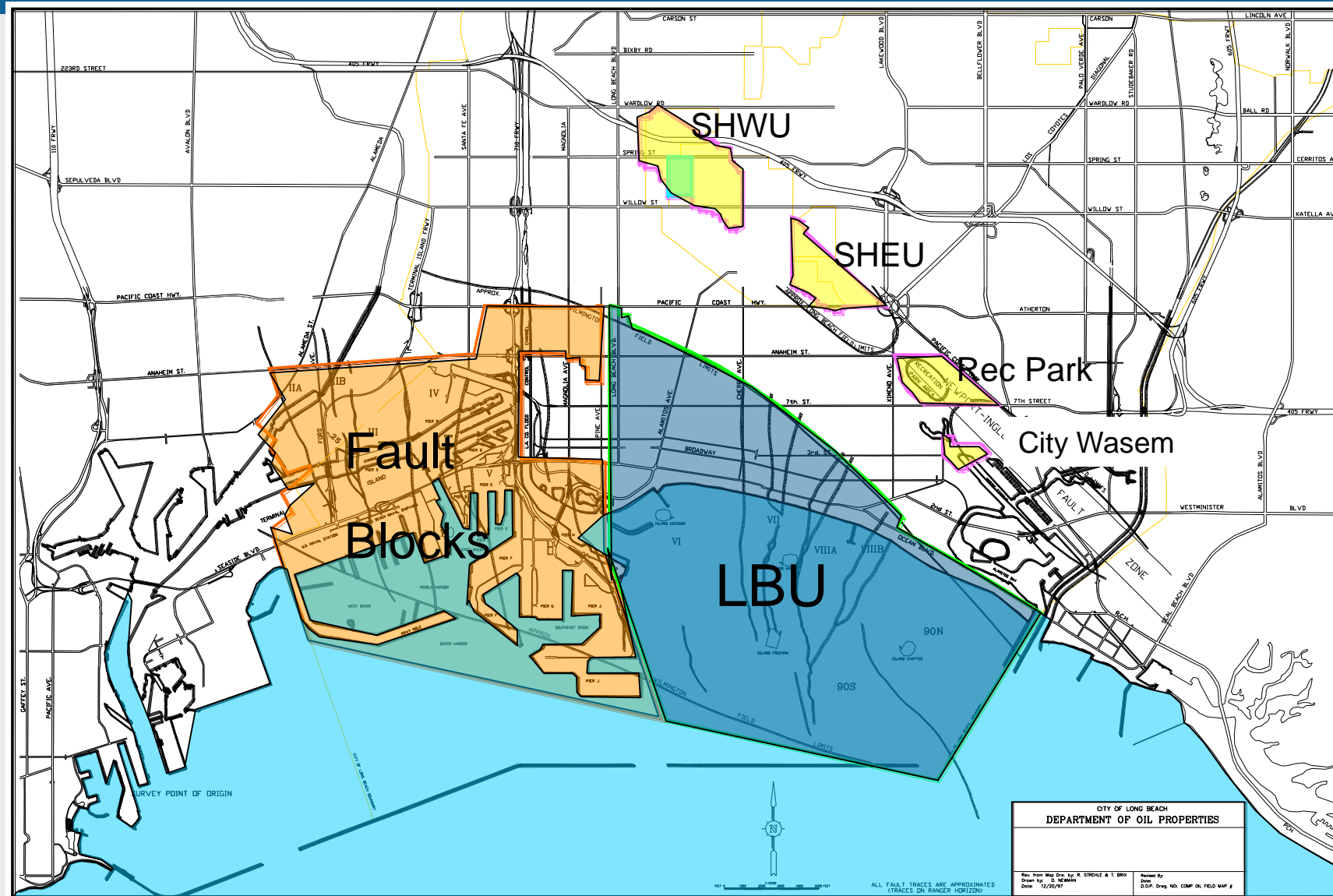
Wilmington Oil Field Operations Outlook

Energy Resources Department

Oil Operations Bureau

- Unit Operator of oil and gas assets located within the Wilmington Oil Field.
- Trustee for the State of California's oil assets in the Long Beach Tidelands.
- Review other oil operations where the City has a financial interest.
- Oversee oil production of approximately 11 million barrels of oil per year and management of about 2,000 active production and injection wells.
- Subsidence management and post production planning.
- Ensure the environment is protected and no adverse conditions are caused by oil operations.

Oil Operating Areas



History

- 1911 – Long Beach Tidelands conveyed to the City of Long Beach
- 1936 – Wilmington Oil Field discovered
- 1950's – Rate of Subsidence 2.4 feet/year
- 1956 – Chapter 29 established the subsidence fund
- 1958 – Subsidence control act provided the City tools to combat elevation loss
- 1960's – Unitization of West Wilmington to control subsidence
- 1962 – City election to lift drilling ban
- 1964 – Chapter 138 and the establishment of the LBU
- 1991 – LBU OWPA
- 1994 – Port of Long Beach purchases UPRC
- 2001 – Oxy buys THUMS
- 2012 – West Wilmington OWPA

Subsidence Management

- 1950's rate of subsidence was 2.4 feet/year.
- Maximum Subsidence was 29 feet.
- Re-pressurization from waterflood stabilized surface elevations.
- Current Conditions
 - 26 separate injection/voidage ratios by zone and fault block.
 - Temporary well shut-ins as needed to meet prescribed injection/voidage ratios.
 - Collect pressure survey data.
 - Elevation surveys using mobile GPS technology; adjust I/V ratios based on elevation and pressure survey results.

Post Production Subsidence Management

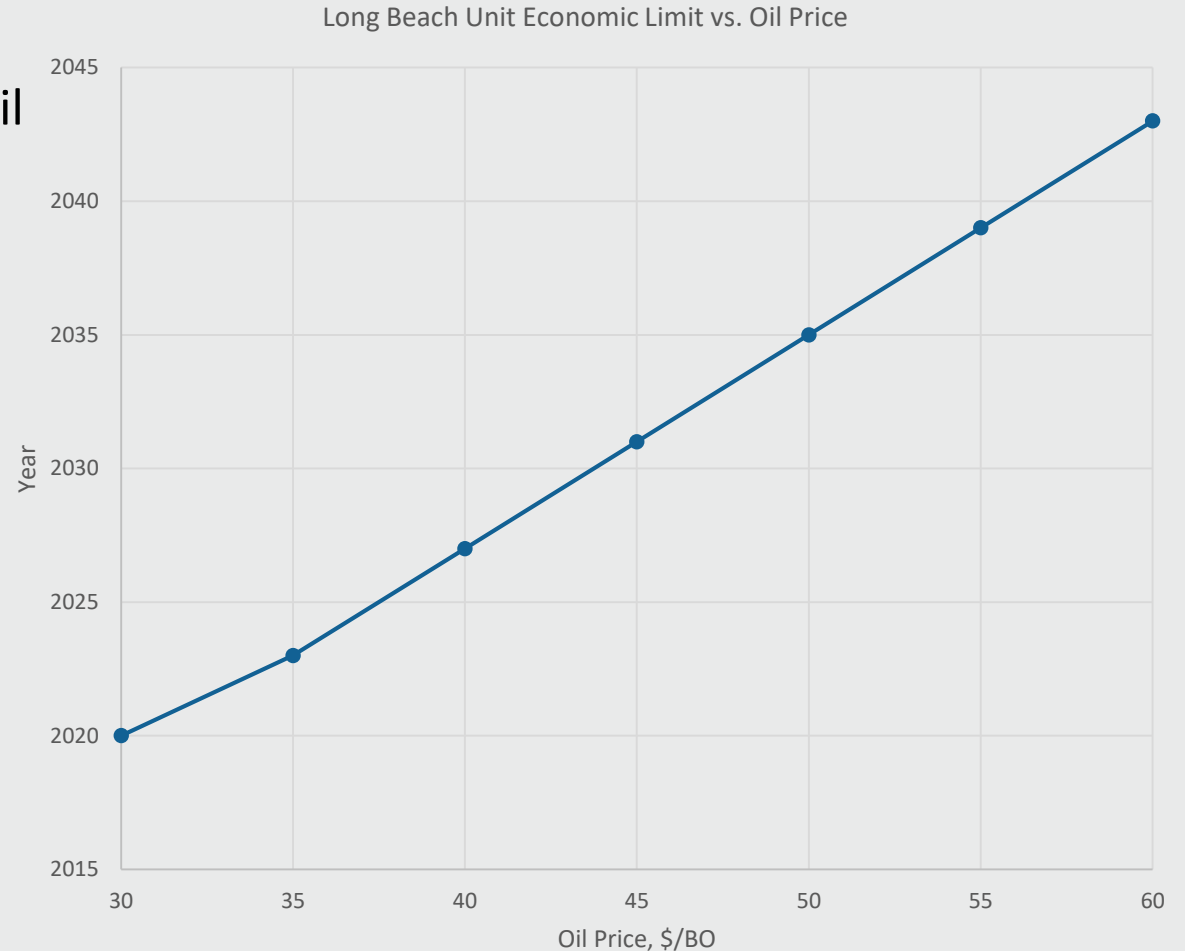
- Unknown what impact elevations will have once the oil field is no longer operational.
- Injection will be required for a period of time after the production wells have been shut-in.
- Post production injection may last 5 to 15 years.
- Post production injection will require wells, facilities and a source of water.
- State legislation established a subsidence fund to pay for the management of elevations post production. The fund has \$180 million available.
- Once the injection is no longer needed, the remaining wells and facilities will be abandoned.

Financial Impact of Oil Operations

- Net revenue in FY 19 of approximately \$21 million to TOF and \$12 million to Uplands.
- Additional revenue of \$5 million from the City's barrel tax.
- Over 2,000 jobs supported by oil operations in the City.
- Oil fields pay property tax to the County and approximately \$51 million paid in FY 19.
- State of California's net revenue in FY 19 from the Wilmington Oil Field was approximately \$95 million.
- Thousands of individual owners are also stakeholders in Wilmington; mineral rights were acquired with the purchase of real estate.

Wilmington Breakeven Cost Projection

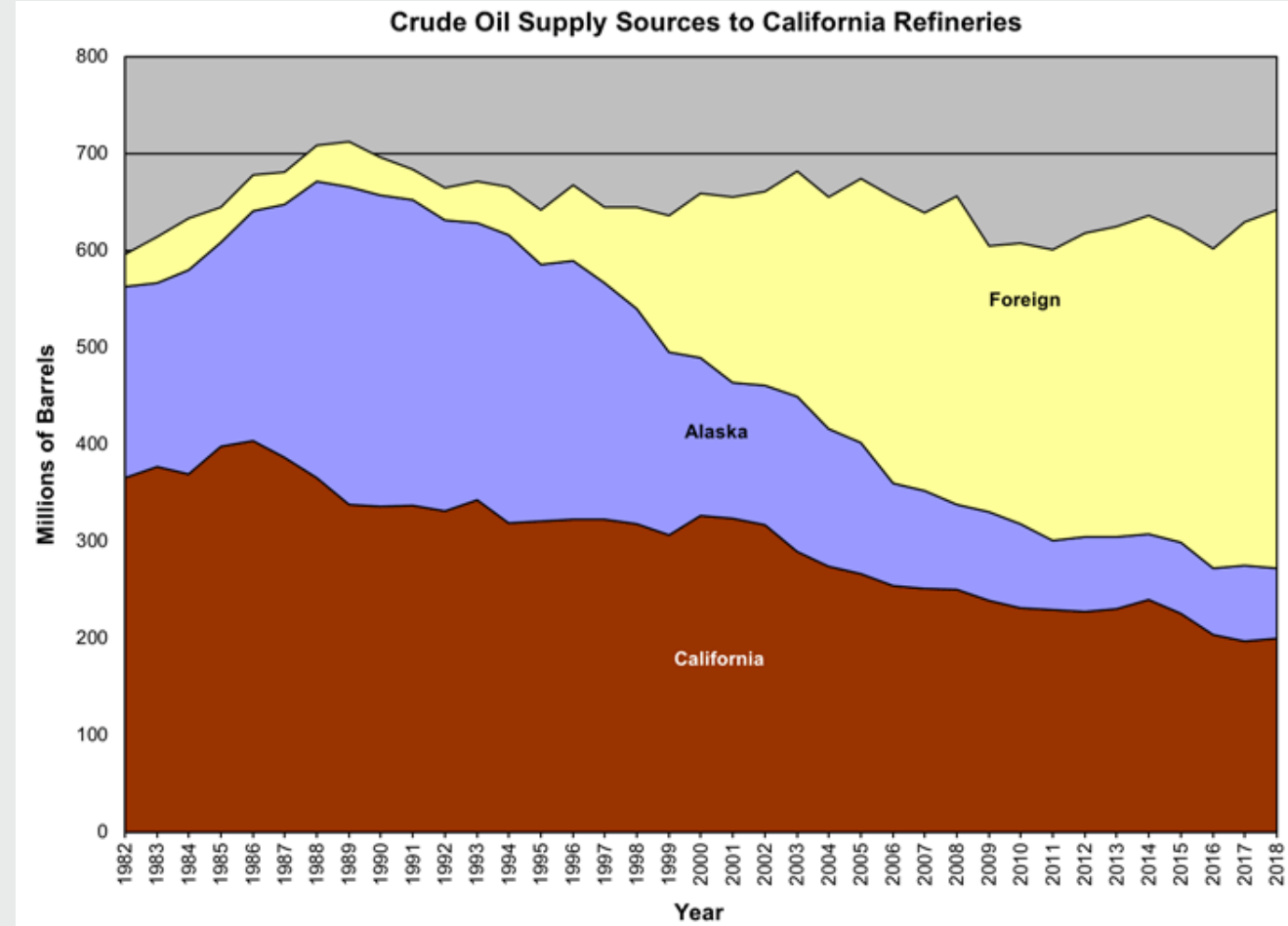
- January 2020 production is 26,000 barrels of oil per day.
- Breakeven is based on operating costs only.
- Economic limit based on current production forecast is at least 20 years if prices remain stable at \$55 per barrel.
- Exact timing will be contingent on economic hurdles required by financial partners.
- Any major unexpected expense could change timing



California Oil Demand

- In 2018, California consumed 642 million barrels of oil.
- Demand has remained relatively steady while population has grown.
- California In-State production provides 31.1% of the current demand. No pipelines into CA.
- Imported oil via tankers.
- Alaska provides 11.4% and 57.5% comes from foreign sources.

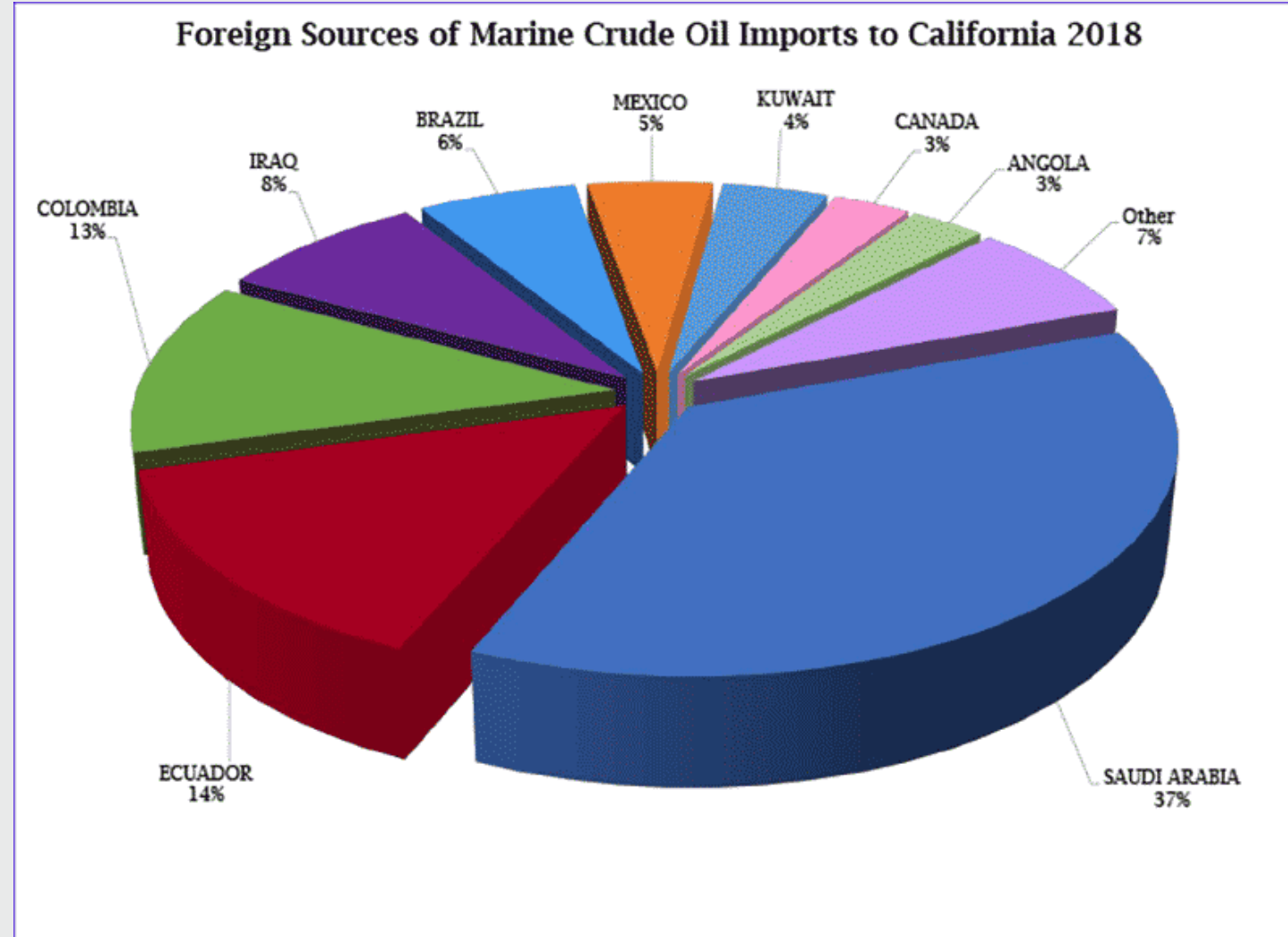
Source: CA Energy Commission



Carbon Intensity Value

- Average Carbon Intensity (CI) value for California is 12.35 grams of CO₂ per Megajoule attributed to the production and transport of crude oil to the refinery.
- Wilmington CI value is 8.31.
- Import CI values:
 - Alaska – 15.91
 - Saudi Arabia – 9.17
 - Ecuador – 9.35
 - Colombia – 9.79
- In 2018, Wilmington production was 10,818,132 barrels. If this production was not available, importing would add carbon emission per year:
 - Alaska - about 500,000 tons of carbon.
 - Saudi Arabia – about 57,000 tons of carbon.

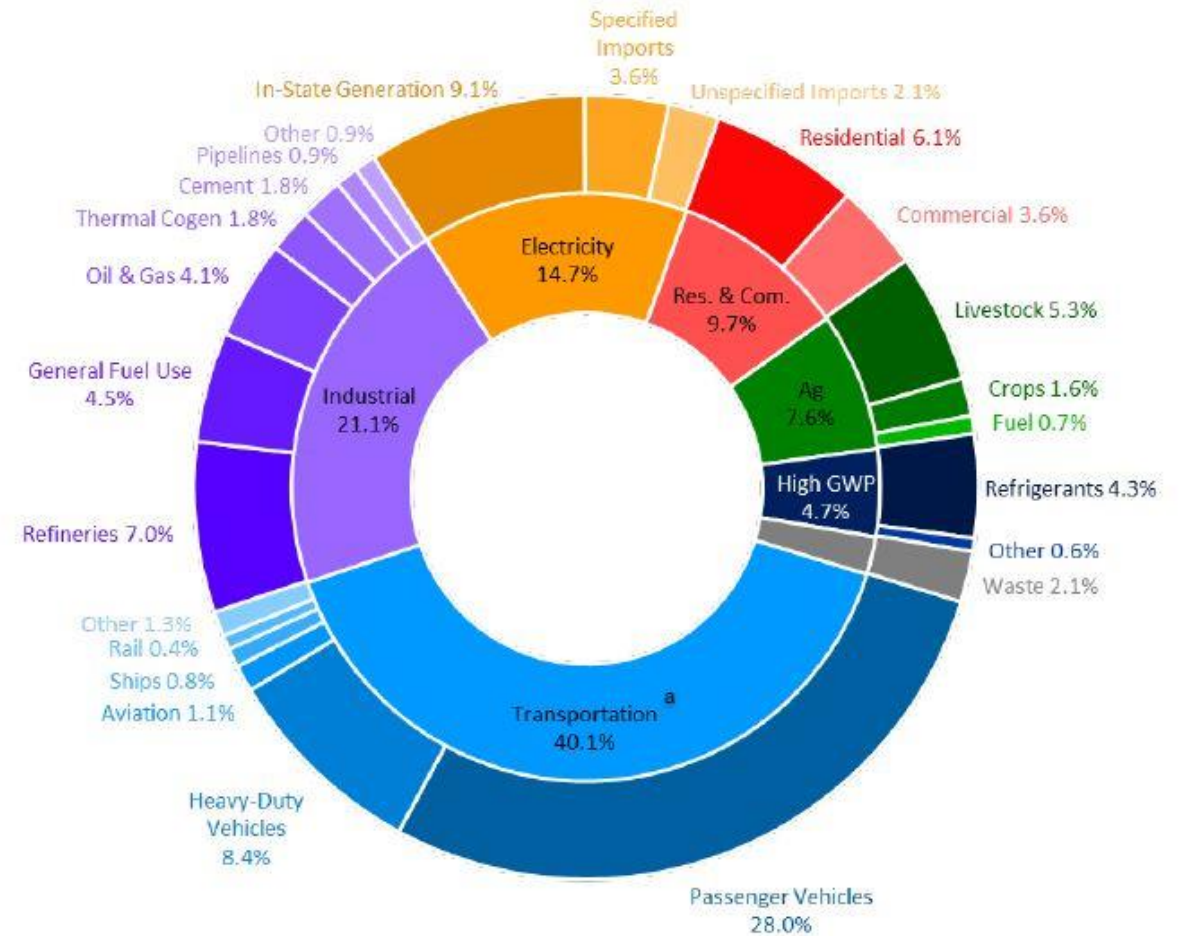
Source: CA Air Resources Board



Oil Consumption

- Crude oil is predominantly used for transportation.
 - Gasoline, Diesel and Jet Fuel.
- Other uses
 - Petrochemical feedstocks
 - Lubricating oils
 - Asphalt
- GHG emissions by sector:
 - Transportation at 40.1% is the largest category.
 - Oil & Gas Production and Refining account for 11.1%
- CA uses approximately 30 million gallons of gasoline per day.

Source: EIA & CARB



Abandonment Planning

- LBER reserves funds from the net revenues of oil operations for the eventual abandonment of the oil field. The funding will be used to abandon wells and associated facilities.
- The State holds the majority of the abandonment liability.
- City's abandonment liability
 - Estimated cost of \$135 million.
 - Reserved to date – \$43 million.
- Goal is to be fully funded before reaching the economic limit of the oil operations.
- Each year, LBER abandons wells with no economic value to lower the future abandonment liability. These abandonments are funded from profits.
- Energy islands will be repurposed after abandonment is complete and post production injection has ceased.

Regulatory Compliance

- CalGEM – drilling, idle well management, abandonments
- AQMD – vapor recovery, inspections, flares
- Local City – zoning requirement and well permits
- State Fire Marshal/Department of Transportation – pipeline permits
- State Water Quality Control Board – injection permits, well stimulation
- CARB – cap & trade compliance, inspections, administers programs that study air quality in neighborhoods near petroleum sources
- Department of Fish & Wildlife – habitat conservation, endangered species regulations, spill prevention contingency, witnesses required safety drills
- State Lands Commission – approves operating budget of the Wilmington oil field
- Coastal Commission – approves activities on the energy islands

Safety and the Environment

- LBER is fully committed to continuing to protect the City's environmental landscape and ensuring no adverse conditions arise as a result of its oil operations
- City's contractor, CRC, has been recognized by the National Safety Council for their excellent safety record.
- The islands have been recognized by the Wildlife Habitat Council for habitat and conservation education efforts.
- Eliminated the use of fresh water in oil operations.
- City staff conduct quarterly safety inspections and assist with inspections by State regulators.
- Working on a project to provide 1 megawatt of solar power by year end.
- No hydraulic fracturing since 2013 with no plans to resurrect the program.



The background of the slide is a composite image. The top half features a night sky filled with numerous bright, white and yellow fireworks exploding. The bottom half shows a large, brightly lit ship, likely a cruise ship, at night, with its lights reflecting on the water. The ship has several yellow funnels and is surrounded by other lights and structures.

Thank you

Kevin Tougas – Oil Operations Manager