

# East Bay projects are redefining refineries

**CHEVRON**  
Richmond



DOUG DURAN/STAFF PHOTOS

**Upgrades:** Projects to allow flexibility to respond to changing energy markets, but environmentalists raise concerns

By Tom Lochner and Robert Rogers  
*Staff writers*

The East Bay's first oil refinery opened in 1896 near the site of Porkopolis-of-the-West, a defunct stockyard and slaughterhouse in the town of Rodeo. In the ensuing decades, four more East Bay refineries joined it, defining the region and powering its growth like no other industry.

A century later, the Contra Costa-Solano refinery belt, California's largest, continues to cast an enormous shadow over surrounding cities, influencing their politics, their economies, even their aesthetics. And at a time when fossil fuel seems like yesterday's energy source, the Bay Area's five refineries have all embarked on ambitious projects to transform the way they do business — and ensure their economic viability in a rapidly changing global energy market for decades to come.

**\$4.3 billion**

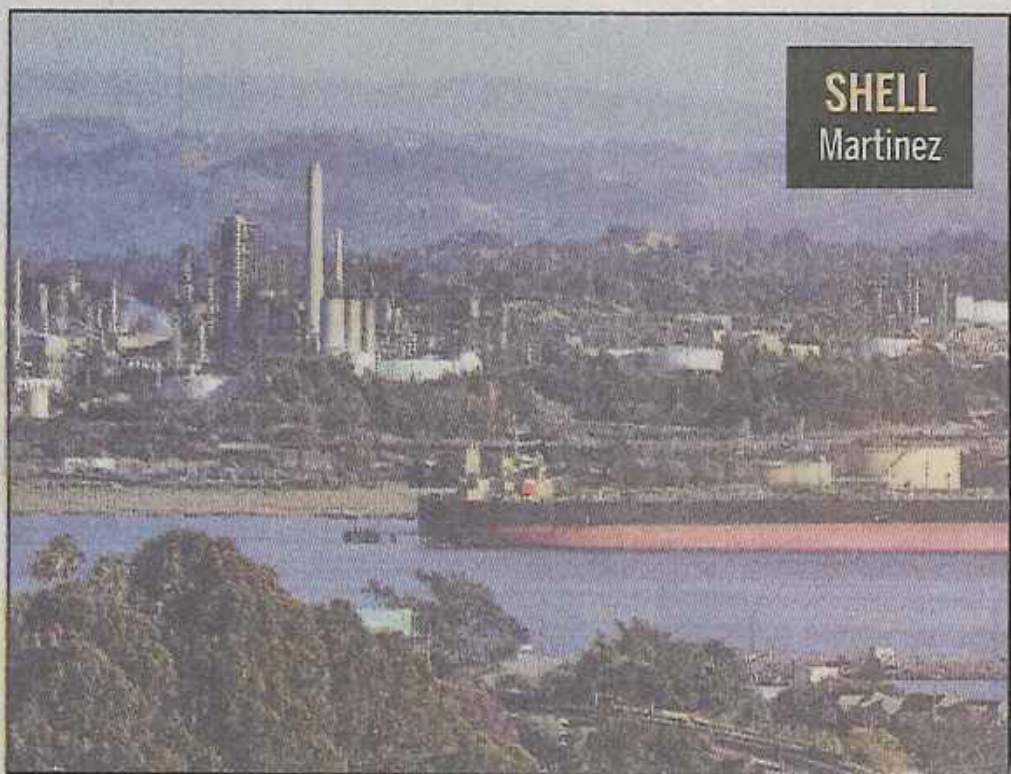
Amount of state and local taxes the oil and gas industry generated in the Bay Area in 2012, plus another \$3.8 billion in federal taxes.

These projects, if seen to completion, will diversify the refineries' operations by allowing them to process both dirtier, heavier oil and cleaner, lighter crude. Two refineries are looking to build their future, at least in part, on crude-by-rail operations, expanding available sources of petroleum while intensifying a controversy over whether that transportation method endangers East Bay communities.

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## WHERE REFINERIES ARE BEING UPGRADED



**SHELL**  
Martinez

**Chevron (Richmond):** \$1 billion modernization plan received City Council approval in July.

**Phillips 66 (Rodeo):** Plan to upgrade region's oldest refinery approved, but appeals remain.

**Valero (Benicia):** Improvements would bring in more oil by rail, drawing sharp criticism.

**Shell (Martinez):** Refinery would shift to lighter crudes, with goal of cutting greenhouse gas emissions.

**Tesoro (Pacheco):** Firm's Golden Eagle refinery has done nearly \$1 billion in upgrades since 2008.

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All told, the upgrades will generate a collective investment in the East Bay of more than \$2 billion, while adding hundreds of construction jobs. And once they are completed, proponents say, the projects should result in a substantial combined cut to greenhouse gas emissions, even though many environmentalists remain unsatisfied.

"While some of these local refinery projects promise to reduce greenhouse gasses, or pollution in general, that's not nearly enough," Tom Griffith, co-founder of Martinez Environmental Group, said in a recent email. "And it's arguable given the cumulative costs."

Catherine Reheis-Boyd, president of the Western States Petroleum Association, said oil companies are looking to increase efficiency through these refinery projects while meeting the state's stricter environmental requirements — not an easy balancing act.

"They want to continue to supply California. And they want to contribute to the economy of the state," she said. "What's different right now is, a lot of the policies being contemplated in California, either at the state level or locally, are making it more difficult to achieve that. The biggest thing is, how do you balance our energy policy with our climate change policies?"

Even without the new projects, the five East Bay refineries are a critical part of the local economy.

## Largest project

In 2012, Chevron, Tesoro, Shell, Phillips 66 and Valero processed a total of about 800,000 barrels a day of crude oil, providing more than 7,500 direct jobs, according to industry sources. The oil and gas industry as a whole in the Bay Area generated \$4.3 billion that year in state and local taxes, plus another \$3.8 billion in federal taxes, according to an April 2014 Los Angeles County Economic Development Corporation study commissioned by the Western States Petroleum Association.

The biggest project underway is at Chevron, a \$1 billion investment to upgrade parts of its century-old 2,900-acre Richmond refinery allowing it to refine dirtier blends of crude with no increase in greenhouse gas emissions, according to the project application.

Tesoro's Golden Eagle refinery, near Martinez, has spent nearly as much on upgrades since 2008, and other projects are underway at Shell in Martinez, Phillips 66 in Rodeo and Valero in Benicia.

While these sweeping investments offer the promise of new jobs and cleaner, more efficient operations, many environmentalists complain that they don't go far enough to curb emissions of greenhouse gases that contribute to global warming by trapping heat in the lower atmosphere, and sulfur dioxide and other pollutants that can cause serious health problems in people in surrounding communities.

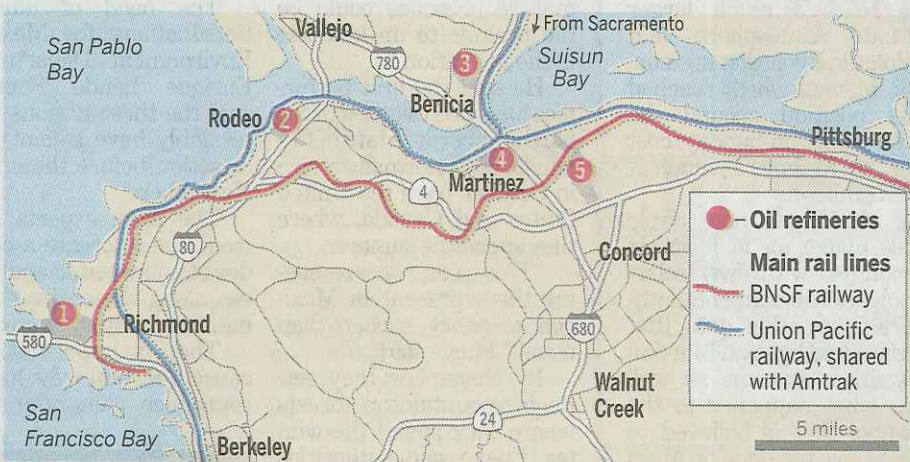
And others warn that the improvements will smooth the path for highly flammable crude oil from North America's Bakken shale region to the East Bay on railroad lines, raising the specter of spectacular explosions from train derailments, as happened last summer in Lac-Mégantic,



DOUG DURAN/STAFF

## Bay Area refineries plan to fuel future

The Bay Area's five refineries have ambitious projects to diversify operations to process both dirtier, heavier oil and cleaner, lighter crude. The upgrades will generate a collective investment in the East Bay of more than \$2 billion, while adding hundreds of construction jobs. The projects should result in a substantial combined cut to greenhouse gas emissions, even though many environmentalists remain unsatisfied.



1 Chevron Richmond	2 Phillips 66	3 Valero	4 Shell	5 Tesoro Golden Eagle
<b>Area:</b> 4.5 sq. miles	1.7 sq. miles (refinery is .7 sq. miles)	1.3 sq. miles (refinery is .5 sq. miles)	1.6 sq. miles	3.5 sq. miles
<b>Employees:</b> 1,200 (plus 1,200 contractors)	450 (plus 200 contractors)	450 (plus 250 contractors)	700 (plus 200 contractors)	650 (Contractor total varies)
<b>Refining capacity:</b> 257,200 barrels per day	78,400 barrels per day	132,000 barrels per day	160,000 barrels per day	166,000 barrels per day
<b>Shipments:</b> No crude by rail; mostly sweet crude arrives by ship from Persian Gulf and Alaska	Oil arrives via pipeline and ship	Crude oil by ship, offloaded at its Benicia dock, and by pipeline	Crude arrives via pipeline and ship; no crude by rail; no plans for rail offloading facility	Crude arrives by ship and pipeline; includes 5,000 to 10,000 barrels per day of Midwest and Canada crude
<b>Products:</b> Gasoline, jet fuel, lubricants, diesel fuel	Gasoline and diesel fuel, other products	Gasoline and diesel fuel, jet fuel, liquefied petroleum gas, petroleum coke and asphalt	Gasoline and diesel fuel, jet fuel, heavy fuel oils, liquefied petroleum gas, petroleum coke	Gasoline and diesel fuel, conventional gasoline and diesel, heavy fuel oils, liquefied petroleum gas, petroleum coke
<b>Projects:</b> Proposed \$1 billion modernization to broaden types of crude refined here	Propane recovery project would add a large steam boiler, propane and butane recovery equipment, six propane storage vessels and treatment facilities and two new rail spurs	\$55 million crude-by-rail project includes rail yard to handle two 50-car trains carrying up to 70,000 barrels of oil daily from sources throughout North America	Greenhouse gas reduction project	Nearly \$1 billion in capital upgrades since 2008, including replacement of refinery's coker

Source: Refineries, California Energy Commission

BAY AREA NEWS GROUP

Quebec, where 47 people died. Those fears have dominated debate over a proposed rail terminal at Benicia's Valero refinery.

A growing number of detractors clamor for America to cast off the yoke of fossil-fuel dependency altogether and concentrate on efforts to develop cleaner, renewable energy.

"The missed opportunity here is for the oil companies to refocus their sights on the future of renewable energy," Griffith said.

That aim, albeit more gradual, is the policy of the state under Assembly Bill 32, the California Global Warming Solutions Act of 2006. The legislation calls not only for reducing greenhouse gas emissions but also for reducing the state's dependency on petroleum.

The refineries take that as a challenge but not a death warrant.

"The industry clearly thinks these refineries are here to stay and wants them to adjust to the changes of the makeup of the world's oil supply, which is dirtier, more dangerous oil," said Antonia Juhasz, an oil and energy analyst and author of the book "The Tyranny of Oil."

Juhasz cited Canadian tar sands oil as the prime

example of dirtier crude, and pointed to oil from the Bakken shale formation, mostly in North Dakota, as the prime example of the more dangerous variety.

Scott Anderson, a San Francisco-based senior vice president and chief economist for Bank of the West,

## "The missed opportunity here is for the oil companies to refocus their sights on the future of renewable energy."

— Tom Griffith, co-founder of Martinez Environmental Group

agrees that the increases in renewable energy sources pose no threat to the future of oil refineries locally. In fact, he says, increasing global demand for refined oil products makes refineries like those in Contra Costa and Solano counties an "emerging growth industry for the U.S."

"Demand is going to continue to increase, and there haven't been any new refineries built in the U.S. in decades. So what we're left with is these projects in existing refineries designed to improve efficiency and flexibility," he said.

## Finding replacements

Here is a look at the major projects underway:

■ At Tesoro's Golden Eagle refinery, one of the biggest shifts has been bringing in up to 10,000 barrels per day of Bakken crude, which company officials say is critical to replace other sources of petroleum.

"Our challenge going forward is, as California and Alaskan crudes decline, to

find replacements that keep the refinery a viable business," General Manager Stephen Hansen said.

"One of those crudes is in the midcontinent, and the only way to get it here is by rail," he added, noting that the refinery receives crude from ship, pipeline and truck after offloading it from rail cars in Richmond.

The refinery's nearly \$1 billion in capital upgrades since 2008 have focused not on increasing capacity but on using a wider variety of crude blends and processing them more efficiently, cleanly and safely.

A \$600 million replacement of the refinery's coker, for example, has reduced annual carbon dioxide emissions by at least 400,000

tons, according to refinery officials.

Shell's Martinez refinery is seeking to shift some of its refining capacity toward lighter crudes, which it says will allow it to trim greenhouse gas emissions. In phases over several years starting in 2015, the refinery would build processing equipment and permanently shut down one of two coker units, resulting in a reduction in greenhouse gas emissions by 700,000 tons per year.

Shell spokesman Steve Leshner said the project involves replacing equipment, not expanding the facility beyond its 160,000 barrels per day. He also said the refinery currently processes heavier oil from the San Joaquin Valley but will be bringing in oil from other, as-yet-identified sources.

Phillips 66 in Rodeo, the region's oldest refinery, hopes to start recovering and selling the propane and butane that are a byproduct of its refining process, rather than burning them off in a highly polluting process called flaring or using them as fuel in refinery boilers.

The project would add new infrastructure, includ-

ing a large steam boiler, propane and butane recovery equipment, six propane storage vessels and treatment facilities and two new rail spurs.

Phillips 66 has said the project, which was approved by the county Planning Commission in November, would reduce emissions of sulfur dioxide by removing sulfur compounds from refinery fuel gas, and reduce other pollutants and greenhouse gases, but those assertions have been questioned by environmentalists and the Bay Area Air Quality Management District, which wants further evaluation before signing off.

Two groups have filed an appeal to overturn the Planning Commission's approval, and in what might be a first for the region, the air district is requiring that the project's emissions and possible health effects must be considered cumulatively with other refinery-related projects in the Bay Area.

Chevron's plan, which received City Council approval in July after months of intense public debate, is touted as an important upgrade in an increasingly competitive global petroleum market. While other refineries are gearing up to exploit the North American oil boom, Chevron will continue to get the bulk of its oil from the Persian Gulf and Alaska.

## 'Safer, cleaner'

But the new modernization plan approved in July would allow the refinery to process crude oil blends and gas oils with higher sulfur content, which refinery officials say is critical to producing competitive-priced transportation fuels and lubricating oils in the coming decades.

In addition, it would replace the refinery's existing hydrogen-production facilities, built in the 1960s, with a modern plant that is more energy-efficient and yields higher-purity hydrogen, and has the capacity to produce more of it.

Valero Refining wants to build a \$55 million crude-by-rail unloading facility at its Benicia refinery that could handle daily shipments of up to 70,000 barrels of oil transported in two 50-car trains daily from sources throughout North America. That plan has drawn sharp criticism from locals and leaders in Sacramento concerned about the hazards of increased rail shipments.

The project would not increase capacity at the refinery but replace crudes that are currently delivered by ship. Nor would it increase emissions from refinery operations, according to a project description on the city of Benicia's website. The document also cites an air quality analysis indicating that rail cars generate fewer emissions locally than marine vessels.

The latest projects, while still drawing criticism, have turned some critics into allies. Henry Clark of the West County Toxics Coalition, who played a leading role in getting millions of dollars in settlements for North Richmond residents stemming from a chemical spill linked to the Chevron refinery in the early 1990s, has come out in support of the Chevron modernization.

"After all the negotiation and community input, we have a better project than we ever expected," Clark said. "Fence-line communities like North Richmond are going to be next to a safer, cleaner facility and get to share in millions in community benefits."