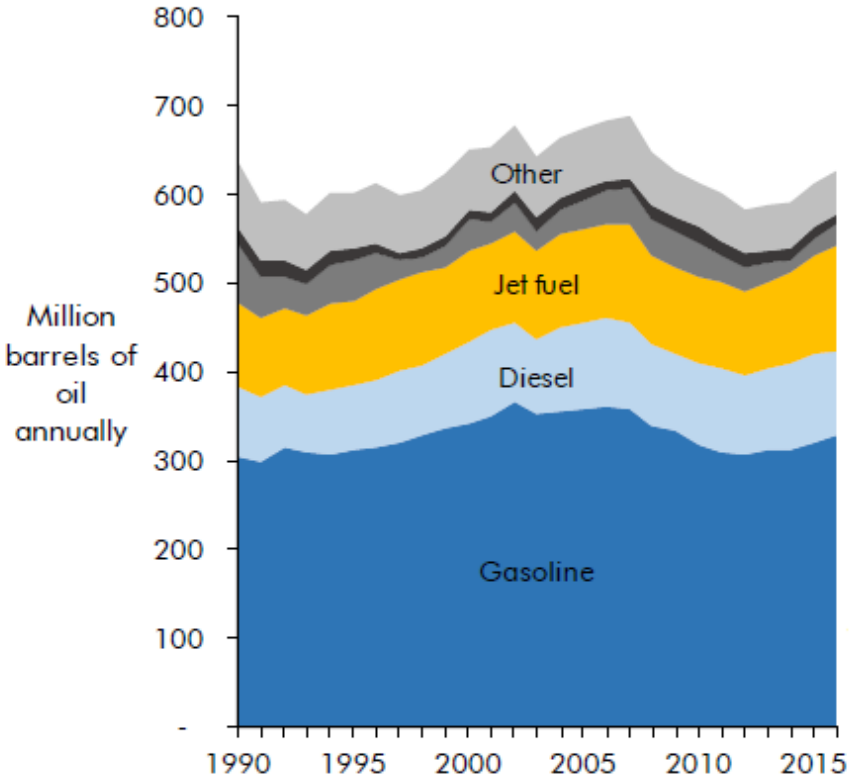
Oil jack near Bakersfield
Photo: © Sarah Craig

Oil!

Why limiting oil production can make good climate policy

Peter Erickson
California Air Resources Board, Petroleum Transport Fuels Workshop, August 20, 2018

California uses and produces a lot of oil



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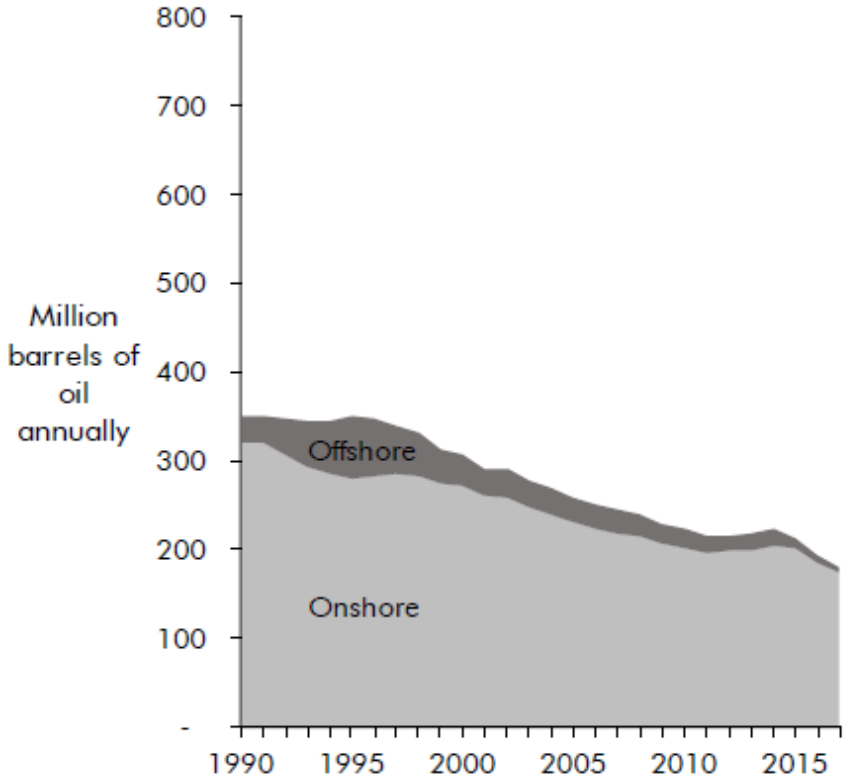
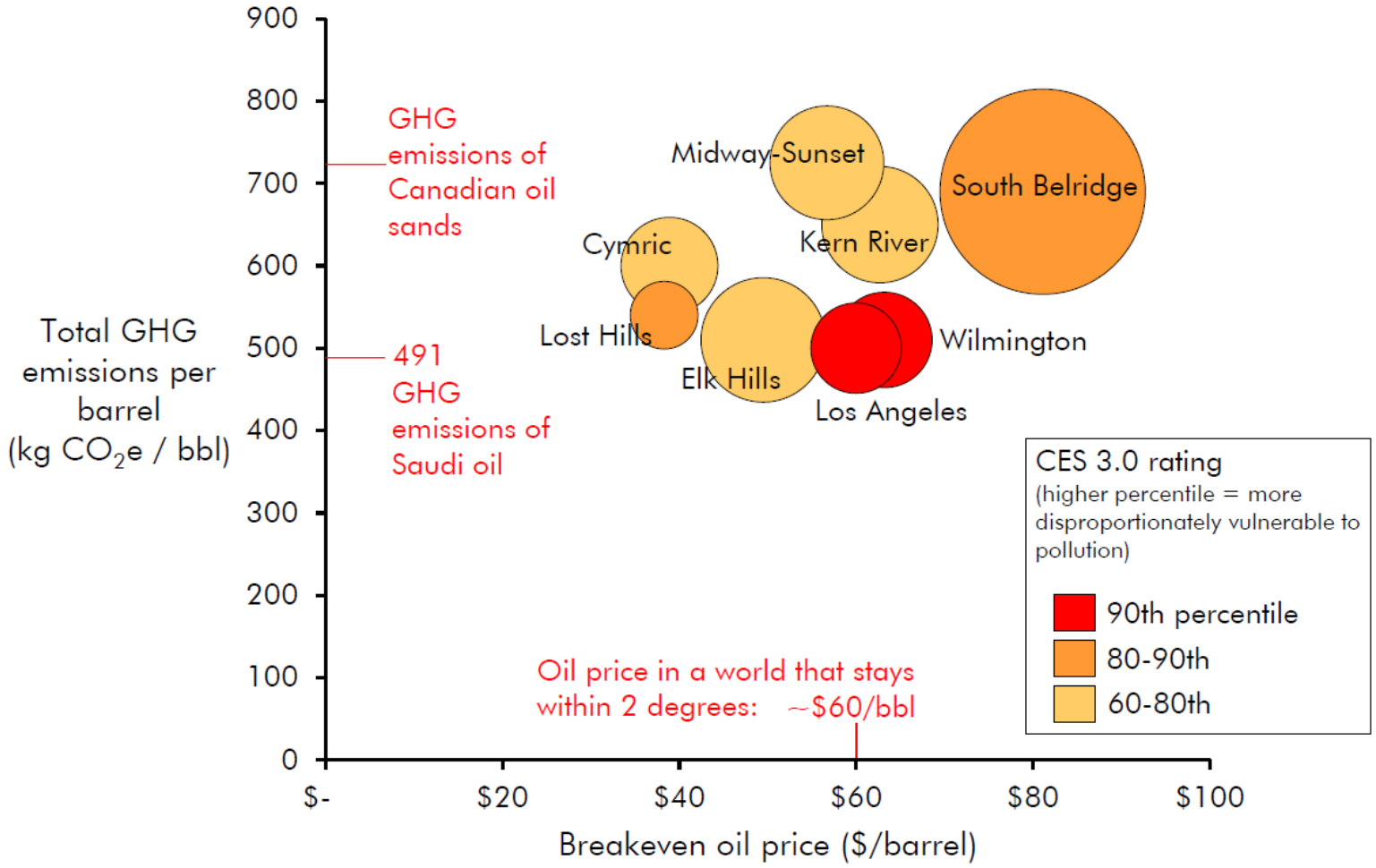


Production

Much of CA's oil is high-emissions, high-cost, and in pollution-vulnerable communities



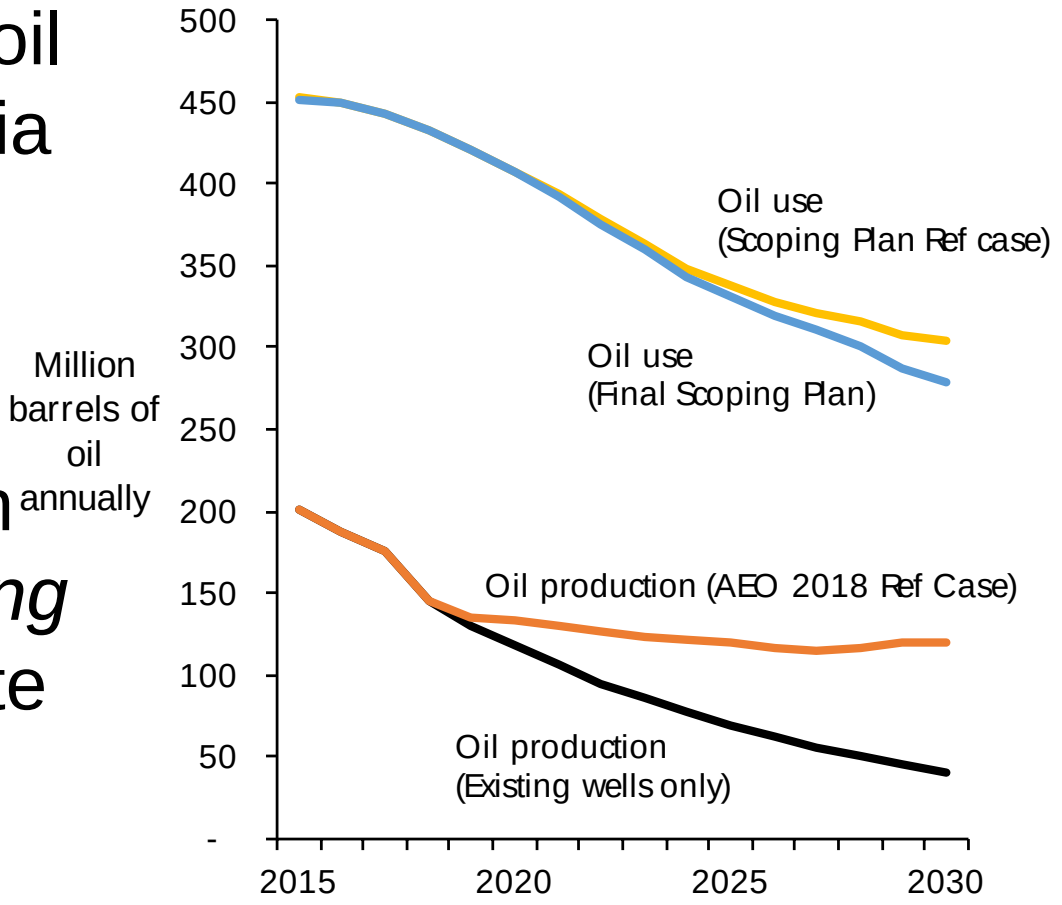
Source: SEI analysis. Seven largest 2030 oil fields shown, representing 70% of 2030 production (bubble size proportional to production), with costs and quantities as in Figure 2. Colors indicate CalEnviroScreen 3.0 Percentiles of overlying census tracts. Low-carbon two degree oil prices as summarized in Erickson and Lazarus (2018)

Phasing down CA oil supply reduces global CO_2, limits lock-in

- Reduces global oil use and CO_2 emissions
  - 8 to 24 million tons CO_2 annually by 2030 for ~100 million barrel decrease in production
  - Plus methane (CH_4) and non-climate benefits
- Demonstrates what an equitable fossil fuel phase-out could look like
  - Going first in wealthy states and countries leaves carbon budget for poorer regions

Hook for ARB could be to address "leakage"

- Leakage = A barrel of oil not burned by California could be burned by someone else!
- Simplistically, for each barrel of oil not used in California, not *producing* a barrel would eliminate any leakage



Possible approaches to limit CA oil

Policy	**Rationale**
Cease issuance of new permits	Expansion of oil supply not consistent with Paris Agreement goals
Limit oil production in areas with disproportionate pollution vulnerability, e.g. using setbacks	Climate change already places disproportionate burdens on vulnerable communities
Charge a carbon 'adder' on oil extraction	Could be added at the wellhead to cover a portion (e.g. 50%) of damages associated with CO2 from combusting oil
Remove subsidies for oil production	Subsidies increase oil production and profits, increasing CO2 emissions
Phase out GHG-intensive oil through an emissions performance standard	Maximizes overall GHG savings per barrel not produced; achieves some emissions reductions regardless of level of substitution

Thank you

- Paper available at www.sei.org
- Goal is to inform debate on extending GHG emissions abatement measures.
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SEI STOCKHOLM ENVIRONMENT INSTITUTE

DISCUSSION BRIEF

How limiting oil production could help California meet its climate goals

By many measures, the U.S. State of California has put in place climate policies that stand among the world's most ambitious. Over the last 15 years, the state has adopted (and extended) the nation's largest cap-and-trade program on greenhouse gases, stringent vehicle fuel efficiency standards, and strong urban planning guidelines. In 2018, it will hold a special climate summit for leaders around the world – with the support of Christiana Figueres, the former executive secretary of the United Nations Framework Convention on Climate Change (UNFCCC).

But even climate leaders like California will have to go well beyond existing actions to achieve the goals of the Paris Agreement – namely, keeping warming well below 2 degrees, plus reaching net zero emissions globally by the second half of the century. Indeed, in adopting its new climate action Scoping Plan in December 2017, California's Air Resources Board resolved to "continue to evaluate and explore opportunities to achieve significant cuts in greenhouse gas emissions from all sources, including supply-side opportunities to reduce production of energy sources."[1] In other words, the State has tasked itself not only to assess ways to increase the ambition of its climate action, but to consider how reducing energy production might also help achieve its climate goals.

This briefing paper examines how the state could limit the production of its principal energy product – oil – and the resulting implications for global GHG emissions. It also considers how such actions might fit in the state's climate portfolio, taking into account cost-effectiveness, equity, and other key considerations.

Though it is beginning to gain traction, limiting oil (or any fossil fuel) production is still relatively new as an element of jurisdictional climate strategies.[i] While there is less research available on the effectiveness and economics of reducing oil supply as compared with other GHG emission reduction strategies, there is nonetheless a sufficient body of theory and work to enable reasonable estimates, which we provide below.[2]

We find that restricting California oil production would likely decrease global GHG emissions by an amount similar to other key policies in the state's recently adopted climate Scoping Plan. We identify several policy approaches to limiting oil production that the state could consider with varying levels of emissions reductions, cost-effectiveness, equity implications, and political feasibility.[ii] These options range from stopping the issuance of new permits for

i For example, in 2016, President Obama cited climate change as a rationale for withdrawing the Arctic from oil exploration and development,[3] as did President Macron of France in 2017.

ii Note that we limit our focus here to oil extraction, and do not look at in-state oil refining.

Three pumpjacks move in synchrony as an oil worker looks on. They are located in the Kern River Oil Field outside Bakersfield, California.

oil production, to establishing thresholds for the GHG-intensity of oil produced, to focusing on regions of oil production where co-benefits, such as environmental justice, are greatest. These measures deserve further consideration by policy-makers in California.

California uses, produces, and refines a lot of oil

For most of the last century, oil has been central to California's economy. Californians long used more gasoline, diesel, and jet fuel in aggregate each year than any other U.S. state – a distinction only recently eclipsed, by Texas in 2014.[4] California has also been a dominant crude oil producer; for decades it was the top crude producer in the nation; it currently ranks third, behind Texas and North Dakota.[5] The vast majority of the crude extracted in California is consumed in-state, though some byproducts, such as petcoke, are exported to countries in Asia.[6]

Since 1990 – the base year for tracking California's climate change goals – the state's oil consumption has held relatively steady at between 600 million and 700 million barrels per year (Figure 1). Most of this oil is refined in-state and consumed as gasoline, diesel, and jet fuel. Together, burning of oil-derived products is the dominant contributor to California's carbon dioxide (CO_2) emissions (about 60%). Continued reliance on oil is a major reason why the state's CO_2 emissions have also held relatively steady, at between 300 and 350 million (metric) tons CO_2 for the past 25 years.[7] How oil consumption will evolve in the future is subject to economic, policy, and social developments in the state, including how quickly the state's residents adopt electric vehicles, a topic of intense current interest.[iii]

iii Current reference-case forecasts by California state agencies and the U.S. Energy Information Administration indicate that, absent new, more-ambitious climate policy, California's oil consumption would hold fairly steady in the future. In these forecasts, continuous declines in gasoline use (e.g., dropping 3 to 4% each year) are foreseen to be offset by modest gains in diesel, jet fuel, and other oils (such as liquid petroleum gas, or LPG).[8,9,10]