

Enhancing equity while eliminating emissions in California's supply of transportation fuels

California Carbon Neutrality Study 2
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UC SANTA BARBARA

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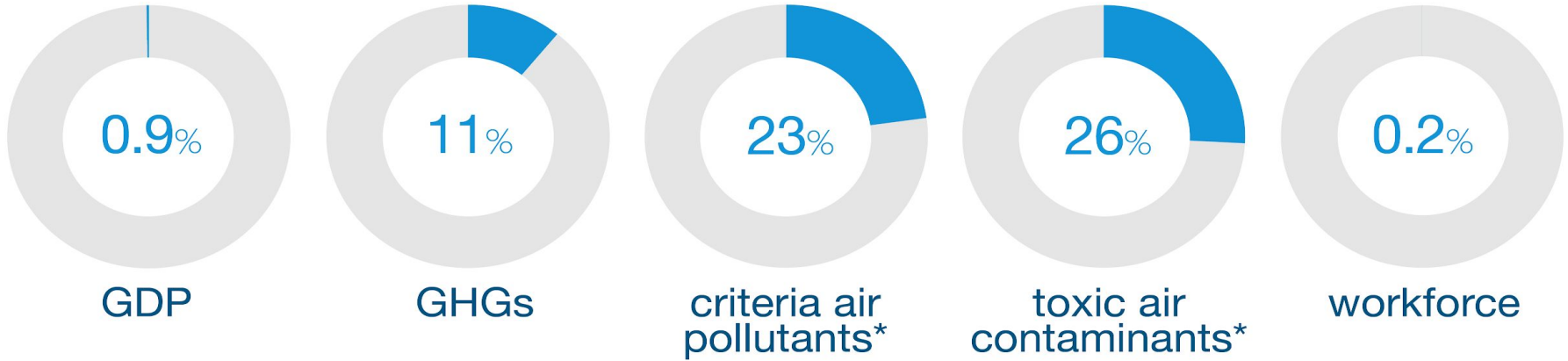
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California's transportation fossil fuel supply sector



**apply to point sources only*

OIL EXTRACTION

- 4% GHG emissions; ~30% CA demand
- 91% extraction in 5 counties
- 7th largest state; declining since mid-80s

REFINING

- 7% GHG emissions; ~100% CA demand
- All refineries located in 5 counties

STUDY OBJECTIVE

Inform the State's efforts to manage an equitable decline of in-state transportation fuel supply - in parallel with a decreased demand - through 2045

RESEARCH QUESTIONS

What are the outcomes (emissions, health and labor impacts) of statewide policies aimed at reducing GHGs in the transportation fossil fuel supply sector?

Can decarbonization policies reduce existing inequities?

Our approach

FUTURE SCENARIOS



decarbonization
policy levers



macroeconomic
conditions

FUEL DEMAND PROJECTIONS



in-state demand for
transportation fuels
from Study 1



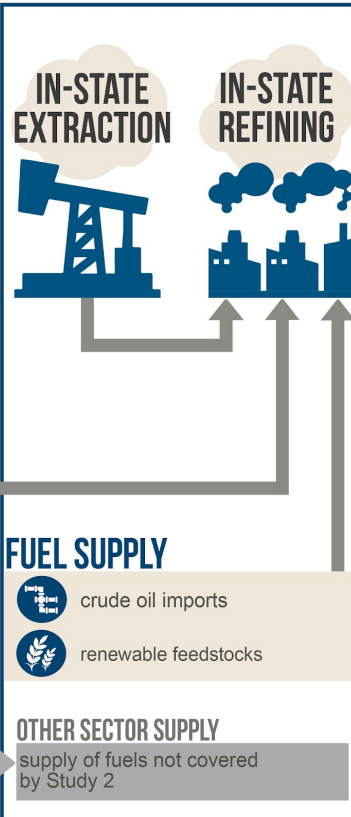
interstate aviation
from CEC



fuel exports



other sector demand



EMISSIONS & EQUITY IMPACTS



statewide
greenhouse gas
emissions



census-tract level
air pollution, health
& equity impacts



county-level
labor market
impacts



county-level
tax
revenues

Six detailed scenarios

EXTRACTION SCENARIOS

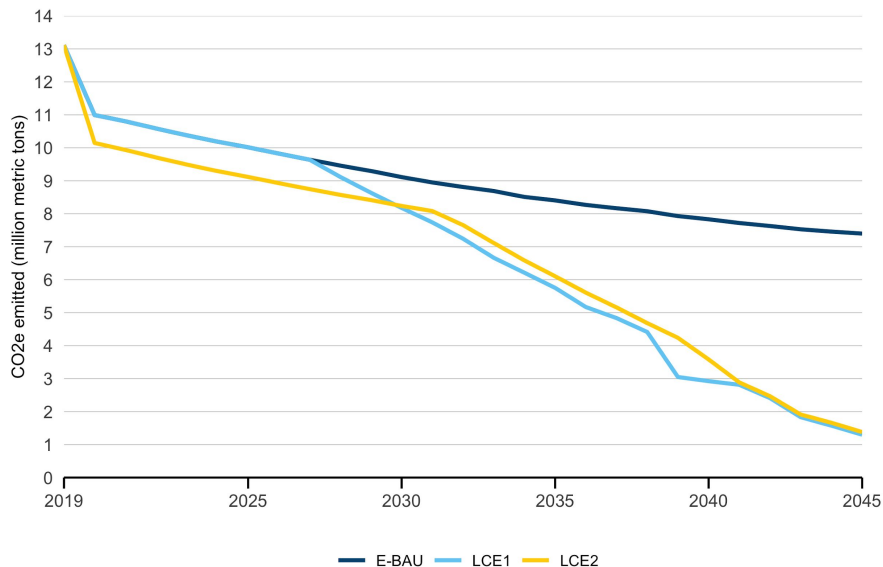
- (a) Business-As-Usual,
- (b) 80% reduction via annual **production quota** (or equivalent excise tax),
- (c) Annual production quota + 2,500-foot **setbacks** on new and existing wells

REFINING SCENARIOS

- (a) Business-As-Usual fuel demand from Study 1,
- (b) Low-carbon scenario fuel demand from Study 1 + historic refined product exports
- (c) Low-carbon scenario fuel demand + refined product exports to 0 by 2045



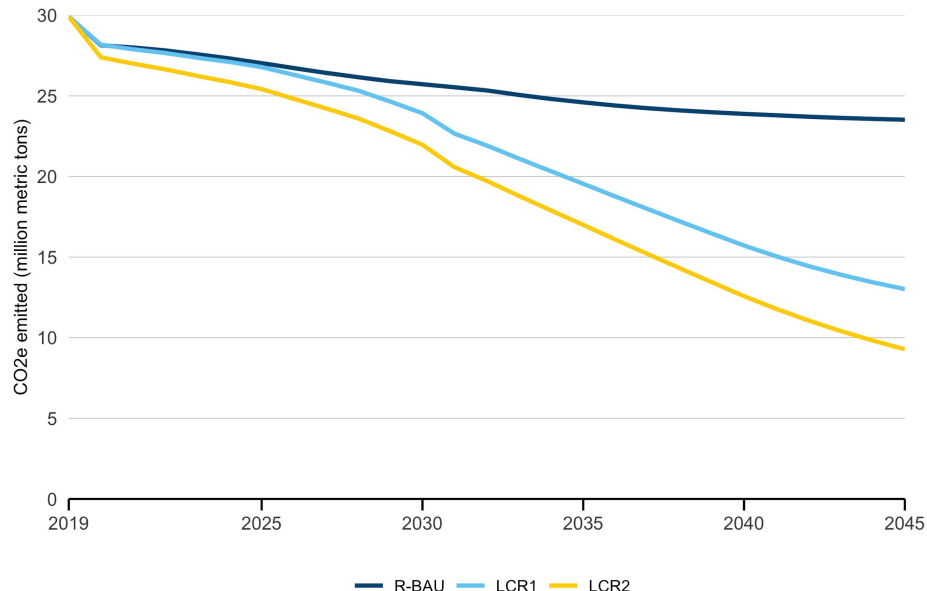
Projected statewide extraction greenhouse gas emissions



E-BAU: 44% GHG reduction
LCE1: 90% GHG reduction
LCE2: 90% GHG reduction



Projected statewide refining greenhouse gas emissions



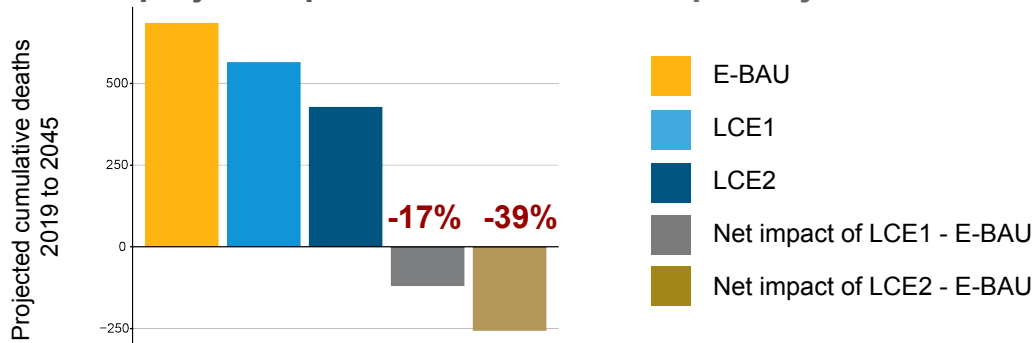
R-BAU: 21% GHG reduction
LCR1: 56% GHG reduction
LCR2: 69% GHG reduction

*Refining emissions persist because of jet and renewable liquid fuels demand

Health: Low carbon scenarios reduce pollution-related deaths and morbidity

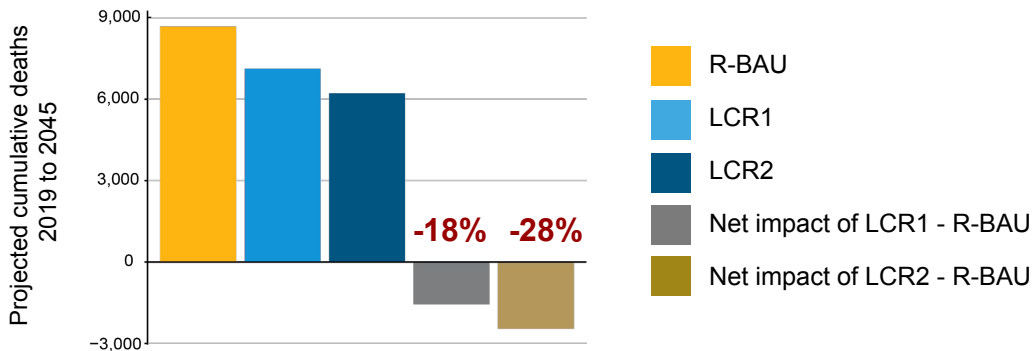
Cumulative projected premature deaths from primary and secondary PM2.5 from 2019 to 2045*

EXTRACTION



Greatest health benefits in Kern then Los Angeles counties

REFINING

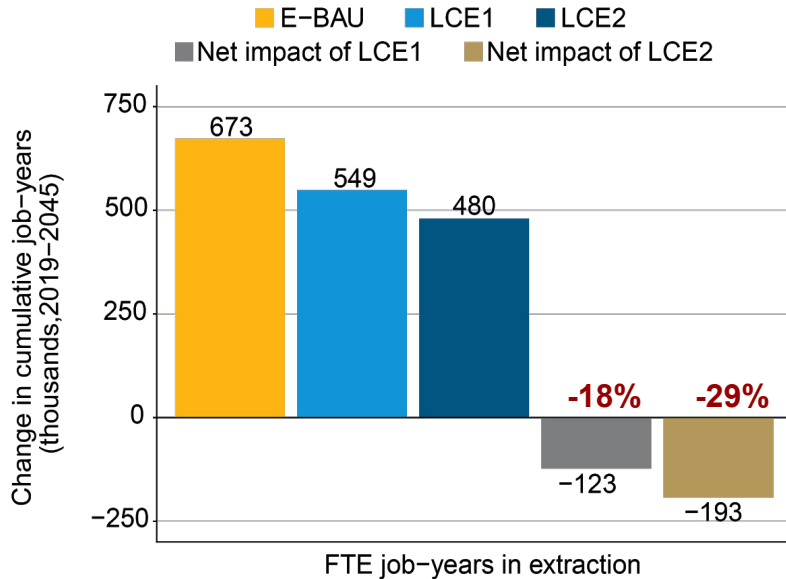


Greatest health benefits in Los Angeles then Contra Costa counties

*Similar % decreases in morbidity

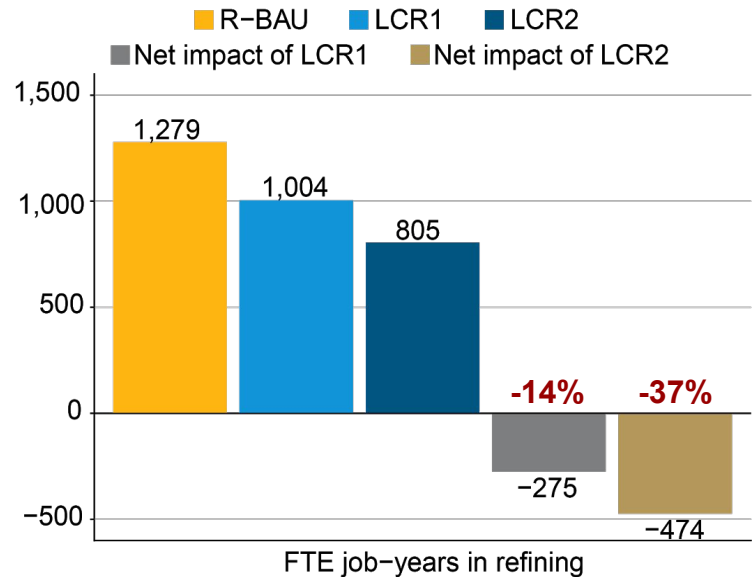
Labor: Low carbon scenarios result in greater losses in direct and indirect employment

EXTRACTION



Largest impacts in Kern followed by Los Angeles counties

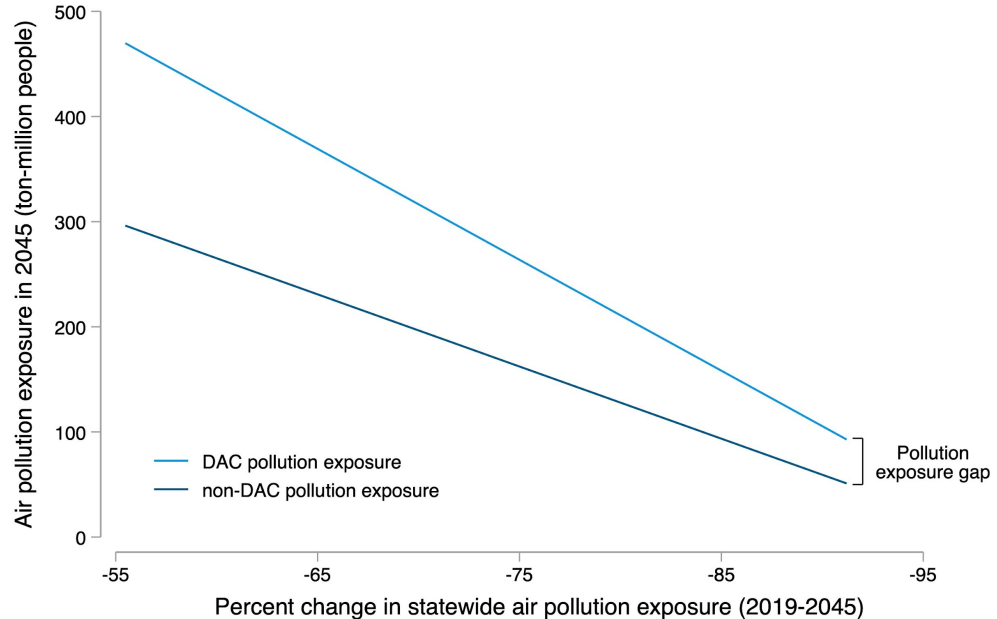
REFINING



Largest impacts in Los Angeles followed by Contra Costa counties

Oil extraction policy considerations

- Continued trend in crude extraction projects **44% decline in GHG emissions** in 2019-2045 **without additional policy**
- Proposed setback distances **not sufficient alone** for 80-90% GHG decline by 2045
 - 2,500 ft setback → 49% GHG reduction
 - 1 mile setback → 58% GHG reduction
- Production quotas/severance tax **generates equity co-benefits**: as total air pollution exposure falls, a greater share of that benefit flows to disadvantaged communities



Thank you

<https://emlab-climate.msi.ucsb.edu/projects/ca-carbon-neutrality>