

Dear Chair Randolph,

It is now well known that curbing methane emissions is critical for achieving our climate goals. We are a team of Berkeley engineers who undertook a semester-long design project¹ to understand methane emissions from the oil and gas industry in CA and to propose solutions.

There have been 4,240 new oil wells in CA since Governor Newsom took office, most located in communities already overburdened with high pollution. There are 150,000 abandoned wells in CA, plus 9,000 wells whose status has been reported as "unknown" - numbers that have not changed significantly since the 2012 Scoping Plan. There has also been a net *increase* in leak-related emissions in California over the past decade.

Strong action is needed now in the 2022 Scoping Plan if we are going to change this trajectory. California is already in a position to combat methane emissions, and most interventions result in net monetary *gain* to industry. For instance, Leak Detection and Repair (LDAR) best principles are predicted to result in a 63% reduction in emissions due to leaks (EPA, 2007). The measures proposed for rapid scale down of oil and gas in Scenario 1 of the Scoping Plan are critical for public health and climate action. California's future is dependent on the adoption of stringent harm reduction measures in the oil and gas industry. Our recommendations for such an approach are the following:

1. Elimination of emissions at the source

As one of the largest producers of crude oil in the world, California has a responsibility to deploy measures to eliminate upstream emissions. Our research found a large overlap between oil companies with the highest number of orphaned wells and those paying the least per well using a blanket bond.

- We need to transition to a “polluter pays” principle that penalizes the high rates of insolvency and subsequent well abandonment in California. Create a Liability Management Framework that bases a company's bond eligibility and ability to purchase an existing bond on multiple factors:
 - i. Number of existing orphaned wells for which bonds were initially issued to the company,
 - ii. The financial standing of the company and its ability to fund remediation of wells at end of life,
 - iii. The vulnerability of populations in proposed drilling locations, and
 - iv. Plans for scaling down fossil fuel operations in California.
- California imports 85% of its natural gas, mostly from the Permian basin. Many sources were flagged by Carbon Mapper in 2019 as being super emitters of methane. It is essential that we uphold regulatory standards such as bans on venting and flaring of gas in out-of-state sources and account for these emissions in internal reports.
- We found that the reported employment in the oil and gas industry has historically been inflated. To ensure a successful transition to renewable energy, we call for transparency in

¹ As a part of an engineering design course called Design for Global Transformation, taught by Prof. Tina Chow in Spring 2022, see <https://chow.ce.berkeley.edu/teaching/ce-105-spring-2022/>

employment records in the oil and gas sectors and deliberate measures to provide skilling in other energy sectors.

2. Reducing fugitive downstream emissions

Addressing equipment defects can prevent 88% of fugitive emissions from occurring along the oil and gas utility chain, equating to around 6.8 MT of methane per year, in addition to being economically advantageous.

- We estimate that fixing Grade 3 leaks within 1 year, instead of the current average of 730 days, would result in a 50% reduction in net methane emissions due to leaks. Hence, we propose reevaluating the current LDAR gradation system for leaks to account for methane emissions as well as proximity to residential areas.
- Reducing response times is advantageous to both industry and air quality. Therefore, a first repair attempt must be made on all leaks no later than 5 days after detection even if they don't appear to have any immediate consequence.
- Revise the payment strategy of contractors engaged in LDAR inspection to a per-hour basis for a fixed cap on the number of inspections per day, as opposed to the current system that pays for each component inspected.

3. Remediation of existing orphaned oil and gas wells

There are around 350,000 Californians living within 600 ft of unplugged oil wells. These emissions are not quantified and are associated with adverse respiratory, cardiovascular, psychological, and perinatal outcomes. Many wells have been orphaned for an unknown amount of time, raising concerns about long-term public health impacts.

- We urgently need a comprehensive health assessment of the wells identified by CalGEM as having an unknown current status.
- We must prioritize the closure and remediation of wells that are within 3200 ft of sensitive receptors, including schools and medical facilities, residential or commercial areas, and wells that have been idle for more than 10 years.

4. Ensuring accountability

Data from CARB and CalGEM should be leveraged to enable transparency in the implementation of the Scoping Plan and to aid community engagement.

- In light of the 2023 launch of Carbon Mapper satellites, make data publicly accessible and improve response times for leak repair.
- Establish partnerships with historically underserved communities that have borne the brunt of fracking and the after-effects of well idling.

California has historically been a pioneer in climate action, and methane emissions must be prioritized now. We believe that a target for carbon neutrality by 2035 and scale down in fossil fuel usage would set a critical global precedent.

Sincerely,

Samyukta Shrivatsa

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On behalf of our UC Berkeley student team - Samyukta Shrivatsa, Naveen Bahadur, Gustavo Oseguera, and Pratiyush Singh, with Prof. Tina Chow in Civil and Environmental Engineering

The StoryMap summary of our work is here:

<https://storymaps.arcgis.com/stories/6bfb51e6408746a0b935e08187b94c79>

Our final semester report is attached for further details.