



June 15, 2023

Re: Comments by the UC Berkeley Center for Law, Energy & the Environment on the presentation entitled *Preliminary Concepts for Potential Improvements to Landfill Methane Regulation*

Thank you for the opportunity to comment on the May 18 presentation entitled *Preliminary Concepts for Potential Improvements to Landfill Methane Regulation*. This workshop succeeded in surfacing a thoughtful vision for landfill emissions monitoring with the power to meaningfully address the climate crisis. We commend the California Air Resources Board (CARB) for its leadership and wish to offer some brief feedback that may be of value as the rulemaking process unfolds.

The Center for Law, Energy, & the Environment

The enclosed comments are submitted on behalf of the Center for Law, Energy, & the Environment (CLEE) at UC Berkeley Law School. At CLEE, our Project Climate team focuses on moving methane solutions to scale, recognizing that methane reductions can quickly impact the trajectory of the climate crisis. We analyze law, data, and policy to evaluate methane strategies for federal agencies, non-governmental organizations, and subnational jurisdictions. In the waste sector, we have begun to collaborate with engineers, economists, roboticists, and scientists to develop low-cost, next-generation landfill monitoring solutions in California.

The Imperative for Updating the Landfill Methane Regulation

The 2010 Landfill Methane Regulation (LMR) is a landmark measure that has underpinned California's waste sector climate efforts. Employing many of the leading monitoring and mitigation practices of the time, it succeeded in improving the state's emissions profile. However, a great deal has changed since then, and the LMR must be overhauled to match the policy ambition, technological capacity, and climate needs of today's world.

1. **Policy ambition:** Since 2010, California has upgraded its methane ambitions, including through SB 1383 and the Short-Lived Climate Pollutant Reduction Strategy. The world, meanwhile, has begun to take notice of methane, with the Biden Administration championing the Global Methane Pledge—an effort to reduce global anthropogenic methane emissions 30 percent by 2030. National and subnational policies now multiply across sectors, with innovative waste strategies emerging from [Ontario](#) to [Thiruvananthapuram, India](#). To meet its own goals and remain a leader in methane policy, California must refine its waste sector efforts.

2. **Technological capacity:** Technologies for methane monitoring have advanced at a blistering pace, with innovation in handheld, drone-based, and towered sensors. Moreover, satellites will soon identify methane super-emitters with greater precision, frequency, and transparency than ever. At the same time, engineers have brought advances in gas capture systems and passive landfill oxidation techniques. Together, these systems offer rich opportunities for tailored, measurable, and impactful landfill strategies.
3. **Climate needs:** The climate crisis is rapidly worsening, inflicting severe physical, economic, and psychological harm, particularly in vulnerable communities. Methane is responsible for about 30 percent of Earth's warming, driving our planet toward the Paris Agreement's 1.5 °C "guardrail," after which irreversible climate cascades will become [far more likely](#). But through rapid methane cuts, we could prevent up to [0.3 °C](#) of warming by 2050. With landfills releasing 20 percent of California's human methane emissions, aggressive action in the waste sector is not just an opportunity for fast climate mitigation but a requirement.

Recommendations

As demonstrated by the *Preliminary Concepts* presentation, CARB staff have a strong grasp of the actions needed to improve the LMR. Overall, the considerations identified are reasonable, achievable, and urgently necessary. We thank CARB staff for their ambition and offer the following recommendations:

1. Pursue the full—and flexible—integration of remote sensing technologies.

As noted during the presentation, satellites, airplanes, and unmanned aerial vehicles (UAVs) provide additional capabilities that supplement manual monitoring protocols. It is essential that these technologies be used to increase the frequency and coverage of measurements rather than merely mimicking existing manual surface emissions monitoring (SEM) practices. Moreover, CARB should require ground monitoring and mitigation when an operator is notified of leak detection via remote sensing. Finally, CARB should continue developing a process by which new technologies can be evaluated and readily employed as they become available. This flexible, integrated approach will maximize the credibility and climate impact of California's landfill methane initiatives.

2. Promote the use of vegetative biocovers.

Studies from the last decade [show](#) that vegetative biocovers, which host methane-eating bacteria, present a relatively low-cost and [enduring](#) means of addressing methane. The efficacy of biocovers varies by weather and locale, but these systems have been regularly shown to oxidize between 60 and 100 percent of methane. Jurisdictions increasingly employ this technology, led by Denmark, which has spent about \$25 million USD on biocover [programs](#). Because biocovers are made of compost, they may also present a win-win climate solution whereby food waste contributes to the methane solution, rather than the problem. The same may be true for California's surplus forest debris, which can be used for high-quality biocovers. CARB should evaluate the viability of encouraging or requiring biocovers in certain cases, particularly at landfills that are too small to reasonably require gas collection and at those where gas collection systems are not functioning efficiently.

3. Strengthen corrective action procedures.

To ensure the identification of exceedances, CARB should follow through on its suggestion to lower the walking pattern spacing interval at landfills with and without recent exceedances. Further, in promoting timely mitigation, CARB should consider shortening the timeline for both initial and additional corrective action. To address the concerns of some landfill operators, CARB could consider a process by which operators may be exempted if, due to external circumstances (e.g., for monitoring, weather conditions; for corrective action, contractor delays), they are unable to act in a timely manner.

4. Evaluate alternative financing options for automated well-tuning.

While cost is a known barrier to automated well-tuning, this burden may be reduced through crediting on the voluntary offset market. CARB should evaluate financing options to help operators better employ this promising methane reduction strategy.

5. Shift to a more accurate timescale for Global Warming Potential (GWP).

While this recommendation falls outside the scope and authority of the present rulemaking process, we would like to emphasize that CARB should rethink its use of the 100-year Global Warming Potential (GWP100) to quantify the impact of methane. Methane lasts just 12 years in the atmosphere, and reducing its concentration is the best near-term strategy to slow the rate of Earth's warming. By comparing its impact to carbon dioxide over an entire century, CARB dangerously understates the value and urgency of tackling methane. In shifting to GWP20, CARB can better emphasize—and reward—actions to reduce methane emissions across sectors.

Again, thank you for the opportunity to comment. CARB's presentation suggests a promising vision for the LMR, and we look forward to participating further throughout the rulemaking process.

Sincerely,

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