



1616 P Street, NW  
Suite 300  
Washington, DC 20036  
T +202.683.2500  
F +202.683.2501  
[foodandwaterwatch.org](http://foodandwaterwatch.org)

Adam Saul  
Washington State Department of Ecology  
Climate Pollution Reduction Program  
**Re:** Proposed Updates to the Clean Fuels Program Rule

Dear Mr. Saul and Department of Ecology,

The undersigned organizations (collectively, “Commenters”) provide these comments on the Department of Ecology’s proposed updates to the Clean Fuels Program Rule, WAC 173-424 (“the Rules”). We offer these comments to express our concerns with how Ecology is proposing to incentivize biomethane production at large animal confinement operations, known as factory farm gas. The Clean Fuel Standard (“CFS”) was created to curb carbon pollution from Washington’s transportation sector and to provide alternative fuels that will improve air quality. Ecology must keep those goals in mind and avoid replicating the perverse incentives and harm to frontline communities we see from California’s Low Carbon Fuel Standard (“LCFS”).

The problem largely comes down to allowing “avoided methane crediting” for factory farms that capture and refine the methane emissions caused by their manure management practices. This policy has been a major problem for the LCFS since its adoption around 2018, and has led to controversy, litigation, and a weakened program. Media attention has also increasingly covered the growing concerns with how the LCFS rewards factory farm pollution.<sup>1</sup> Ecology should not make the same mistakes in the CFS.

To avoid this and as explained in detail below, Commenters request Ecology change the proposed updates in the following ways:

- Reject avoided methane crediting for factory farm gas;
- Do not encourage dirty hydrogen production paired with factory farm gas; and
- Conduct accurate, rigorous lifecycle analysis for factory farm gas fuels to render appropriate carbon intensity values.

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<sup>1</sup> E.g., Evan Halper & Samuel Oakford, *California Draws Ire as Out-of-State Factory Farms Turn Pig Poop into Cash*, WASH. POST (Apr. 19, 2025), <https://www.washingtonpost.com/business/2025/04/19/climate-factory-farms-carbon-credit-california/>; Kenny Torrella, *Big Oil and Big Ag Are Teaming Up to Turn Cow Poop into Energy – and Profits. The Math Doesn’t Add Up.*, VOX (Jan. 14, 2025), <https://www.vox.com/future-perfect/392881/dairy-biogas-manure-digester>; Michael Sainato, *California Subsidies for Dairy Cows’ Biogas Are a Lose-Lose, Campaigners Say*, GUARDIAN (Feb. 4, 2022), <https://www.theguardian.com/environment/2022/feb/04/california-subsidies-biogas-dairy-cows-emissions-climate>.

## Avoided Methane Crediting

We strongly oppose including avoided methane crediting for factory farm gas in the Rules. Ecology proposes to add a section to the Rules governing avoided methane crediting, including a limit on the number of years factory farm gas producers will be eligible for this special treatment to 15 years or less. While Commenters support limits if Ecology allows avoided methane crediting, we ask that Ecology abandon the policy entirely to avoid the many problems it is causing under California’s LCFS. Avoided methane crediting for factory farm gas is a misguided policy that will compromise the CFS and Washington’s climate efforts.

Avoided methane crediting was first adopted in the LCFS approximately seven years ago and transformed that program into a lucrative profit center for factory farm operations around the country, spurring what the Wall Street Journal termed a “gold rush in cow manure.”<sup>2</sup> As explained below, avoided methane crediting rewards factory farms for polluting, distracts from real climate solutions, undermines program integrity, and distorts dairy and livestock markets. Ecology must reject this backward policy.

### *A. Avoided Methane Crediting Encourages Factory Farms to Pollute*

Avoided methane crediting perversely *encourages* factory farms to generate methane pollution – and along with it, other pollutants left unaddressed by anaerobic digestion. Manure does not contain, nor does it naturally emit, methane emissions. Only when manure is collected, mixed with water, and left to decompose in anaerobic environments (*i.e.*, low oxygen) does the waste begin emitting large amounts of methane.<sup>3</sup> This typically occurs in earthen pits, or “lagoons,” at factory farms where manure and wastewater are cheaply stored prior to being applied to nearby fields. In short, when factory farms emit large amounts of methane from manure management, it is the result of harmful manure management choices. Avoided methane crediting inaccurately assumes the opposite – that manure methane is inevitable, and any methane captured by a highly polluting facility represents a reduction from baseline emissions. Accordingly, avoided methane crediting rewards factory farms for adopting the most climate polluting manure management practices.

<sup>2</sup> Phred Dvorak, *California’s Green-Energy Subsidies Spur a Gold Rush in Cow Manure*, WALL STREET J. (Feb. 19, 2022), <https://www.wsj.com/articles/californias-green-energy-subsidies-spur-a-gold-rush-in-cow-manure-11645279200>.

<sup>3</sup> U.S. EPA, EPA-430-R-24-004, Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2022 (2024), at 5-11, [https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text\\_04-18-2024.pdf](https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text_04-18-2024.pdf) (“When livestock manure is stored or treated in systems that promote anaerobic conditions (e.g., as a liquid/slurry in lagoons, ponds, tanks, or pits), the decomposition of the volatile solids component in the manure tends to produce CH<sub>4</sub>. When manure is handled as a solid (e.g., in stacks or drylots) or deposited on pasture, range, or paddock lands, it tends to decompose aerobically and produce CO<sub>2</sub> and little or no CH<sub>4</sub>.”).

This dynamic simultaneously *discourages* sensible and long-term solutions to manure methane emissions. Managing manure in “dry” systems can eliminate manure methane emissions by more than 90 percent.<sup>4</sup> But that will not happen if Ecology allows avoided methane crediting in the CFS because of the large financial incentive to build or maintain manure management systems with massive methane emissions so a portion of it can be captured for profit. Because the CFS only recognizes efforts that produce or make available a transportation fuel of some kind, simply polluting less to begin with is not rewarded by the CFS. As a former CARB Branch Chief who oversaw the LCFS during his tenure has explained, “[e]xcessively rewarding an industry for poor historic environmental performance is troubling in the least and furthermore, doing so only through a transportation fuels program distorts the market against the consideration of less costly and more sustainable methane mitigation options.”<sup>5</sup> A recent study of factory farm gas and the LCFS found the same: giving factory farm gas deeply negative carbon intensity values “ha[s] the potential to significantly distort the market for dairy and livestock products ... and the nascent market for emissions offsets by offering a significant incentive only for emission abatement that can be tied to a fuel pathway, whether or not these are the least-cost abatements or those with the best climate or environmental performance.”<sup>6</sup>

In addition to encouraging climate pollution, incentivizing factory farm gas production incentivizes co-pollutants from the underlying factory farm, most of which are left unaddressed or even exacerbated by anaerobic digestion and biogas production. The waste left over after gas production, known as “digestate,” must still be managed and disposed of. But digestate poses unique and elevated pollution risks compared with undigested manure, exacerbating water and air pollution from digestate storage and disposal. Recent studies confirm that digestate behaves differently on the landscape than undigested manure due to its altered chemistry, causing increased short-term nitrogen loss and the potential to accumulate heavy metals and antibiotic-resistant pathogens.<sup>7</sup> For example, digestion does not remove nitrogen or phosphorus but instead concentrates them in the resulting digestate and makes them more soluble, and thus more likely

<sup>4</sup> Cal. Dept. of Food and Agric., Recommendations for Short-Lived Climate Pollutants (June 2015), at 12–13, [https://www.cdffa.ca.gov/oefi/climate/docs/SLCP\\_Reommendations.pdf](https://www.cdffa.ca.gov/oefi/climate/docs/SLCP_Reommendations.pdf) (“[M]ethane emissions can be dramatically reduced – perhaps by more than 90 percent – when dry systems are used.”).

<sup>5</sup> Comments of Jim Duffy to the California Air Resources Board (Feb. 19, 2024), at 2, <https://www.arb.ca.gov/lists/com-attach/6792-lcfs2024-AWUGdQdgVmMHeAZZ.pdf>.

<sup>6</sup> Kevin Fingerma et al., *Risks of Crediting Carbon Offsets in Low Carbon Fuel Standard: Lessons Learned from Dairy Biomethane*, 206 ENERGY POLICY 114738 (print version coming Nov. 2025), <https://www.sciencedirect.com/science/article/pii/S0301421525002459>.

<sup>7</sup> Roger Nkoa, *Agricultural Benefits and Environmental Risks of Soil Fertilization with Anaerobic Digestates: A Review*, 34 AGRONOMY FOR SUSTAINABLE DEVELOPMENT 473, 482–84 (2014); Chengjun Pu, et al., *Impact of Direct Application of Biogas Slurry and Residue in Fields: In Situ Analysis of Antibiotic Resistance Genes from Pig Manure to Fields*, 344 J. HAZARDOUS MATERIALS 441, 443, 446–47 (2018).

to pollute local surface and ground waters.<sup>8</sup> This poses a particularly unacceptable risk to Washingtonians already exposed to unsafe levels of nitrated caused by dairy operations.<sup>9</sup> Digestate also has higher potential to emit ammonia and nitrous oxide, the latter of which is a very powerful greenhouse gas, than undigested manure.<sup>10</sup> Simply stated, rewarding the production of factory farm biogas necessarily encourages other pollution problems, worsening local communities' air and water quality and offsetting purported reductions in greenhouse gas emissions.

These issues are exacerbated by the fact that massive incentives for manure methane pollution leads to larger factory farms with larger herds, and thus more manure and more pollution. The most recent United States Department of Agriculture livestock census data for California's dairy industry shows that, in California's most intensive dairy-producing counties, herd consolidation and size increases more than tripled when comparing the period before avoided methane crediting was introduced into the LCFS (2012–2017, growth rate of 12.68 percent) and the period after (2017–2022, growth rate of 42.68 percent).<sup>11</sup>

This is a key reason environmental, climate, and environmental justice advocates have sharply criticized avoided methane crediting. In fact, CARB's Environmental Justice Advisory Committee passed a resolution calling on CARB to eliminate avoided methane crediting

<sup>8</sup> USDA, Nat. Res. Conservation Service, CPS 366: Anaerobic Digester (Aug. 2023), at 8–9, [https://www.nrcs.usda.gov/sites/default/files/2023-08/366\\_NHCP\\_CPS\\_Anaerobic\\_Digester\\_2023.pdf](https://www.nrcs.usda.gov/sites/default/files/2023-08/366_NHCP_CPS_Anaerobic_Digester_2023.pdf) (“[L]and application of digester effluent, compared with fresh manure, may have a higher risk for both ground and surface water quality problems. Compounds such as nitrogen, phosphorus, and other elements become more soluble due to anaerobic digestion and therefore have higher potential to move with water.”).

<sup>9</sup> See U.S. EPA, *Lower Yakima Valley Groundwater*, <https://www.epa.gov/wa/lower-yakima-valley-groundwater>; Center for Food Safety, *Groups Petition EPA to Protect Washington's Drinking Water from Factory Farm Pollution*, <https://centerforfoodsafety.org/video/2519/cfs-videos/press-releases/6476/groups-petition-epa-to-protect-washingtons-drinking-water-from-factory-farm-pollution>.

<sup>10</sup> Michael A. Holly et al., *Greenhouse Gas and Ammonia Emissions from Digested and Separated Dairy Manure During Storage and After Land Application*, 239 AGRIC. ECOSYSTEMS & ENV'T 410, 418 (Feb. 15, 2017), <https://doi.org/10.1016/j.agee.2017.02.007>; Thomas Kupper et al., *Ammonia and Greenhouse Gas Emissions from Slurry Storage – A Review*, 300 AGRIC., ECOSYS., & ENV'T at 1 (May 2020), <https://doi.org/10.1016/j.agee.2020.106963> (“Anaerobically digested slurry shows higher emissions during storage for NH<sub>3</sub> while losses tend to be lower for CH<sub>4</sub> and little changes occur for N<sub>2</sub>O and CO<sub>2</sub> compared to untreated slurry.”); Henrik Møller et al., *Agricultural Biogas Production—Climate and Environmental Impacts*, 14 SUSTAINABILITY at 20 (2022), <https://doi.org/10.3390/su14031849> (“The ammonia emission potential of digestate applied in the field was higher than that from untreated cattle and pig slurry because of digestates' higher pH, resulting in an increase in ammonia emission.”); Lowry A. Harper et al., *Dinitrogen and Methane Gas Production During the Anaerobic/Anoxic Decomposition of Animal Manure*, 100 NUTRIENT CYCLING IN AGROECOSYS. 53, 63 (2014), <https://link.springer.com/article/10.1007/s10705-014-9626-9> (“we find in these studies that a reduction of C causes an increase in NH<sub>3</sub> [ammonia] emissions”).

<sup>11</sup> The average dairy herd in California grew from approximately 940 to 1059 dairy cows between 2012 and 2017, while the average dairy herd jumped from approximately 1059 to 1511 between 2017 and 2022. Compare USDA, 2017 Census of Agriculture: California State and County Data 20 tbl. 12, with USDA, 2022 Census of Agriculture: California State and County Data 16 tbl. 12.

altogether due to the policy’s unintended consequences and harm to California communities living near large dairies.<sup>12</sup> CARB did not follow the Committee’s resolution, and after CARB adopted its most recent amendments to the LCFS, several organizations including Commenters Food & Water Watch, Center for Food Safety, and Earthjustice have taken the agency to court, in part targeting the harmful and irrational use of avoided methane crediting.<sup>13</sup>

### *B. Avoided Methane Crediting Will Compromise the CFS*

Avoided methane crediting also undermines program integrity by operating differently than all other alternative fuels and by undermining combustion-free options. On the first, this policy operates like a powerful offset mechanism for fossil fuel producers, so its primary operation is to generate tradeable credits as opposed to displacing the dirtiest transportation fuels. It floods the credit market with credits but delivers very little actual transportation fuel. Therefore, “[m]anure biogas currently accounts for 21% of credit generation in the LCFS program (Q3 2024), while providing about 1% of energy used for transportation.”<sup>14</sup> This means that avoided methane crediting for factory farm gas uniquely allows for fossil fuel business as usual because companies can simply buy factory farm offsets rather than altering what fuels they sell, undermining Ecology’s goal of moving Washington to a cleaner transportation sector.

Avoided methane crediting also distorts the CFS by incentivizing combustion-based, greenhouse gas emitting factory farm gas far more than solar, wind, or installing EV charging stations. This drives investment and attention to the production of more gas for combustion, with all the local air quality impacts that follow. To put this in concrete terms, under avoided methane crediting, an investor could make more money by deploying a fleet of four CNG trucks with one of them running off factory farm gas than to deploy a fleet of four, zero-combustion electric trucks.<sup>15</sup> That is an absurd outcome. This problem is particularly acute regarding hydrogen

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<sup>12</sup> CARB, Assembly Bill 32 Environmental Justice Advisory Committee (EJAC) DRAFT Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard (Aug. 28, 2023), <https://ww2.arb.ca.gov/sites/default/files/2023-08/EJAC%20DRAFT%20Low%20Carbon%20Fuel%20Standard%20Recommendations%20Version%202%20082823.pdf>.

<sup>13</sup> Earthjustice, *Environmental Justice Group Sues California Agency Over Flawed Low Carbon Fuel Standard Changes* (Dec. 18, 2024), <https://earthjustice.org/press/2024/environmental-justice-group-sues-california-agency-over-flawed-low-carbon-fuel-standard-changes>; Food & Water Watch, *Groups Sue CARB Over Environmental Impacts of Flagship Climate Program* (Dec. 19, 2024), <https://www.foodandwaterwatch.org/2024/12/19/groups-sue-carb-over-environmental-impacts-of-flagship-climate-program/>; Food & Water Watch, *Groups File New Lawsuit Against CARB’s LCFS* (July 25, 2025), <https://www.foodandwaterwatch.org/2025/07/25/groups-file-new-lawsuit-against-carbs-lcfs/>.

<sup>14</sup> Fingerman et al., *supra* note 6.

<sup>15</sup> See Greg Roche, *3 Reasons RNG Is Decarbonizing Trucking Today*, FREIGHTWAVES (Oct. 18, 2021), <https://www.freightwaves.com/news/3-reasons-rng-is-decarbonizing-trucking-today>.

production, as discussed below. Avoided methane crediting is simply bad public policy that will take Washington further from its climate goals. Ecology should abandon it in the final rules.

*C. Commenters Support Limits on Avoided Methane Crediting if Ecology Retains It in the Proposal*

If Ecology moves forward with avoided methane crediting, it must at least retain limitations on avoided methane crediting to no more than two 7.5-year crediting periods and use baseline emissions less subject to gamesmanship. On the first, limiting the duration of avoided methane crediting is a critical check because, as explained above, manure methane emissions are a choice that can be largely eliminated with better operational practices. Avoided methane crediting severely kneecaps those other practices because they simply avoid methane pollution in the first place, which does not allow for production of biomethane. If Ecology ultimately includes avoided methane crediting, this time limit is essential and Ecology must commit to adhering to the phase out schedule.

We also support a requirement that avoided methane crediting be “additional to any regulatory requirement” but strongly oppose this provision being limited to requirements for “the capture and destruction of biomethane.”<sup>16</sup> As explained above and supported by peer reviewed research, focusing only on methane capture ignores more effective and less expensive manure management options like dry manure handling. If Washington adopts a regulatory requirement that factory farms reduce their manure methane emissions through other means, that must also cut off avoided methane crediting for those mandatory reductions. Ecology has worded section (16)(a)(ii) far too narrowly; therefore, Commenters request that it be rewritten as follows: “The baseline quantity of avoided methane reflected in the CI calculation is additional to any regulatory requirement *for the reduction of methane.*”

Regarding setting baseline emissions, Commenters support Ecology’s effort to limit the ability of factory farm gas producers to game the system by, for example, transitioning to more emissions intensive manure management systems in anticipation of applying for a CFS pathway. These are important checks that can curb some of the worst abuses of the perverse incentive created by allowing avoided methane crediting for factory farm gas.

But even these safeguards do not alleviate the fundamental problems with the policy. Fifteen years of lavish credit generation is more than enough to encourage factory farms to double down on polluting systems and shun more sustainable, less harmful practices. And Ecology should consider what will happen once factory farms are no longer eligible for this

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<sup>16</sup> Proposal at section 173-424-610(16)(a)(ii).

massive subsidy but have structured their operations in line with producing factory farm gas; Ecology should expect that it will be much harder to unwind avoided methane crediting than it was to adopt it because industry will threaten to go right back to freely emitting all their methane pollution unless they continue to receive significant financial support. This is not a long-term solution to the problem.

Washington should learn from the lessons in California and not buy into a policy that rewards the biggest polluters and shuns good actors. Ecology should eliminate section 173-424-610(16) from the proposed amendments and cease certifying pathways that use avoided methane crediting for factory farm gas before all the problems we see in California take hold in Washington.

### **Greenwashing Hydrogen with Factory Farm Gas**

Ecology proposes to phase out crediting of hydrogen produced from fossil fuels by 2035 *unless* “biomethane attributes are matched to hydrogen production.”<sup>17</sup> This is irrational, counterproductive, and risks undermining incentives to produce “green electrolytic hydrogen.” Hydrogen can be produced in several ways, the most common currently being steam methane reforming using fossil natural gas as feedstock. This results in hydrogen with a high carbon intensity. Alternatively, hydrogen can be produced using electrolysis with pure water as the feedstock. This process can be powered by combustion-free electricity like solar or wind, resulting in climate friendly “green” hydrogen. But when factory farm gas is assigned a massively negative carbon intensity under avoided methane crediting and then brought into the process—either as feedstock for steam methane reforming or process fuel for electrolysis (*i.e.*, burning the gas to produce electricity to power the process)—the resulting hydrogen can receive a far more favorable carbon intensity value than even truly green hydrogen.

We have seen this problem play out in the LCFS and elsewhere. Hydrogen produced using electrolysis powered by wind or solar power is assigned a zero or slightly positive carbon intensity value while hydrogen from fossil fuels paired with factory farm gas credits receives deeply negative carbon intensity scores. The result is that a fuel producer can generate far more credits by simply buying attributes from factory farms than by investing in green electrolytic hydrogen production.<sup>18</sup>

<sup>17</sup> Proposed section 173-424-120(4)(d).

<sup>18</sup> For example, an LCFS pathway certified by CARB in January 2025 assigns hydrogen produced from factory farm biogas carbon intensity values ranging from -68.32 gCO<sub>2</sub>eq/MJ to -148.98 gCO<sub>2</sub>eq/MJ, values that would never be available to a green electrolytic hydrogen producer. LCFS Application No. B0695, FirstElement Fuel (certified Jan.

Through the passage of SB 5910 in 2022, the Legislature sought to encourage the production of “green electrolytic hydrogen” that is not derived from fossil fuels. But Ecology’s proposal for the CFS cuts in the opposite direction by providing significantly higher incentives for producing hydrogen via steam reforming when paired with factory farm gas credits. Ecology should not put a thumb on the scale in favor of dirty hydrogen paired with factory farm gas, especially when the Legislature has spoken and expressed a clear preference for green electrolytic hydrogen to be at least on par with other kinds of hydrogen.

As Washington transitions away from fossil fuels in the transportation sector and looks for ways to address hard-to-decarbonize sectors, Ecology should not adopt this loophole that will encourage fossil fuel-derived hydrogen while distracting from truly clean, green hydrogen.

### **Carbon Intensities Need Integrity and Fugitive Emissions Need to be Monitored**

Ecology must carefully review carbon intensity values for factory farm gas to ensure accuracy and a full lifecycle accounting. Commenters fully agree with Ecology on the importance of ensuring “that carbon intensities are accurate and appropriately verified” when brought over from California or Oregon.<sup>19</sup> To that end, Ecology cannot use the LCFS as a model, because CARB certifies inaccurate carbon intensity values derived from truncated lifecycle analyses that ignore up and downstream emissions and underestimate fugitive emissions.

CARB’s use of CA-GREET to establish carbon intensity values for factory farm gas pathways is fundamentally flawed because it ignores up and downstream emissions while relying on assumed fugitive emissions lower than real world observations indicate. The LCFS fails to require a full upstream lifecycle analysis; it excludes all emissions associated with raising, feeding, housing, and otherwise sustaining the concentrated and confined herds that produce the manure feedstock used to produce factory farm gas. These emissions include but are not limited to enteric emissions and those from the production, transport, and storage of animal feed. Without manure collection at animal confinement facilities, there is no gas production; and with no animals in confinement there is no manure collection.

Similarly with downstream emissions, the LCFS fails to include emissions from the handling and disposal of digestate in factory farm gas fuels’ lifecycle analysis. As the USDA’s Natural Resources Conservation Service recognizes in its Conservation Practice Standard for

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24, 2025),

[https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0695\\_cover.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0695_cover.pdf).

<sup>19</sup> Ecology, Publication 25-14-039, Preliminary Regulatory Analyses at 115 (June 2025).

anaerobic digestion, “digestate has increased potential for some air and nutrient emissions compared to raw manure.”<sup>20</sup> This includes up to a threefold increase in methane emissions during digestate handling and storage,<sup>21</sup> as well as increased nitrous oxide emissions.<sup>22</sup>

Finally, the LCFS sets carbon intensity values for factory farm gas that underestimate fugitive emissions, further inflating the purported climate benefits of this fuel. The CA-GREET uses a default methane capture efficiency of 95 percent for lagoon digesters and 98 percent for fully enclosed vessels, unless a pathway applicant discloses otherwise.<sup>23</sup> But these default values do not reflect real-world observations. A study published in 2022 found that fugitive emissions rates were higher for biogas than the oil and gas supply chain and could be more than two times higher than estimated.<sup>24</sup> Other real-world monitoring has found that factory farms with digesters can remain “super emitters” even with a digester in place.<sup>25</sup>

Ecology cannot allow the LCFS’s inaccurate carbon intensity values to undermine the integrity of the CFS. Ecology must rigorously verify carbon intensity values based on a full lifecycle analysis and apply the most recent science, not rely on unsupported and outdated assumptions that tip the scales in favor of factory farm gas.

## Conclusion

Commenters appreciate the opportunity to provide input on Ecology’s proposed changes to the Clean Fuels Program Rule. Ecology should be very careful to not replicate the mistakes of California’s LCFS. The CFS must focus on true climate solutions to reduce the climate impact of Washington’s transportation sector. This requires Ecology to reject counterproductive policies like avoided methane crediting, which serve to enrich the biggest polluters in the agricultural

<sup>20</sup> USDA, Conservation Practice Standard Code 366: Anaerobic Digester, *supra* note 8.

<sup>21</sup> Lena K.K. Rodhe et al., *Greenhouse Gas Emissions from Storage and Field Application of Anaerobically Digested and Non-Digested Cattle Slurry*, 199 AG., ECOSYSTEMS & ENV’T 358 (Jan. 2015), <https://www.sciencedirect.com/science/article/abs/pii/S0167880914004678>; Hambaliou Baldé et al., *Methane Emissions from Digestate at An Agricultural Biogas Plant*, 216 Bioresources Tech. 914 (Sept. 2016), <https://www.sciencedirect.com/science/article/abs/pii/S0960852416308483>.

<sup>22</sup> Holly et al, *supra* note 10.

<sup>23</sup> CARB, Tier 1 Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure, <https://ww2.arb.ca.gov/resources/documents/lcfs-life-cycle-analysis-models-and-documentation> (Reference Tab, Table A.3).

<sup>24</sup> Semra Bakkaloglu et al., *Methane Emissions Along Biomethane and Biogas Supply Chains Are Underestimated*, 5 ONE EARTH 724–736 (June 17, 2022), <https://www.sciencedirect.com/science/article/pii/S2590332222002676>.

<sup>25</sup> An analysis of Carbon Mapper data conducted by Food & Water Watch shows that fifteen LCFS-supported dairy digesters continue to have massive methane plumes despite installation of a digester and certification to generate LCFS credits. Food & Water Watch, *The Proof Is in the Plumbing: Factory Farm Biogas Has no Place in the Low Carbon Fuel Standard* (Feb. 2024), [https://www.foodandwaterwatch.org/wp-content/uploads/2024/01/RB\\_2401\\_LCFS\\_Methane.pdf](https://www.foodandwaterwatch.org/wp-content/uploads/2024/01/RB_2401_LCFS_Methane.pdf).

sector while undermining the transition to solar, wind, and green hydrogen. Commenters respectfully ask Ecology to adopt the changes we have requested.

Sincerely,

Tyler Lobdell  
Food & Water Watch

Selden Prentice  
350 Seattle

Patty Lovera  
Campaign for Family Farms and the Environment

Amy van Saun  
Center for Food Safety

Peter Lehner  
Earthjustice

Maria Fernandez  
ELLA

Kelsey Eberly  
FarmSTAND

Jean Mendoza  
Friends of Toppenish Creek

Charles Anderson and Pamela Gross  
Law Scholars for Change

Rania Masri  
North Carolina Environmental Justice Network