



## **Bioenergy in the Dairy Sector**

Dairy digesters provide one of the most urgent and effective climate solutions, while reducing pollution in local communities, producing carbon negative energy, and creating good jobs. Dairy manure is a major source of methane emissions, one of the most powerful climate super pollutants, that can be eliminated by converting that waste to energy. Dairy digesters can provide carbon negative transportation fuels, electricity, hydrogen, and pipeline biogas. Dairy digesters also reduce air and water pollution from open manure piles and lagoons and create good jobs and economic development in rural communities.

**Reducing Methane is Most Urgent Climate Solution.** Climate scientists around the world agree that reducing methane and other Short-Lived Climate Pollutants (SLCPs) is the most urgent step we can take to address climate change. That is because methane and other SLCPs are tens to thousands of times more damaging to the climate than carbon dioxide, but SLCPs only stay in the atmosphere a short time. Reducing methane has an immediate benefit on the climate while reductions in fossil fuel burning take decades to begin to benefit the climate. According to the head of the United Nations Environment Program, “Cutting methane is the strongest lever we have to slow climate change over the next 25 years and complements necessary efforts to reduce carbon dioxide. The benefits to society, economies, and the environment are numerous and far outweigh the cost.”<sup>1</sup>

**Dairy Digesters Provide Most Effective Methane Reductions.** According to both the California Air Resources Board and the Legislative Analyst’s Office, California’s investments in dairy digesters are the most effective and the most cost-effective of all the state’s climate investments.<sup>2</sup> Dairy digesters are highly effective at reducing methane emissions that would occur from open piles of manure and open lagoons. By converting that methane to energy that is used in place of fossil fuels, the digesters provide a double climate benefit – eliminating methane emissions from dairy manure and climate emissions from fossil fuel burning – which makes dairy biogas carbon negative on a lifecycle basis.

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<sup>1</sup> <https://www.unep.org/news-and-stories/press-release/global-assessment-urgent-steps-must-be-taken-reduce-methane>

<sup>2</sup> California Air Resources Board, *California Climate Investments 2022 Mid-Year Data Update*, September 2022, at Table 2, pages 17-18; Legislative Analyst’s Office, *Administration’s Cap-and-Trade Report Provides New Information, Raises Issues for Consideration*, submitted to Assembly Budget Subcommittee 3, April 2016.

According to the Air Board's lifecycle analysis under the state's Low Carbon Fuel Standard, dairy biomethane is the lowest carbon intensity of any fuel on the road in California, providing several times greater carbon reductions than electric vehicles running on the California power grid.<sup>3</sup>

**Environmental and Public Health Benefits.** According to the Air Board, reductions in methane and other SLCPs also provides outsized benefits to public health because methane is a volatile organic compound that leads to smog formation.<sup>4</sup> Dairy digesters, by putting manure in sealed containers, also reduce nitrous oxide emissions, soil and water contamination, odors, and other pollution from dairies. Dairy digesters also protect aquifers and streams from nitrates leaching into groundwater and they reduce pathogens.

**Jobs and Economic Development.** California's dairy digesters are located in rural and economically disadvantaged regions of the state. According to the California Department of Food and Agriculture, dairy digesters have created hundreds of new jobs and a large portion of those jobs have gone to the most economically disadvantaged populations.

**Valuable Byproducts of Dairy Digestion.** In addition to providing energy and/or revenue for farmers, bioenergy produces marketable byproducts, including organic fertilizer, compost, bedding and more. After anaerobic digestion of dairy waste, a fibrous solids portion remains that can be used in a variety of ways, including commercial compost, dairy bedding, or even as cover material for other waste piles. Effluent from the AD process includes a wet fraction that can be utilized as a marketable agricultural fertilizer. Liquid effluent is very rich in nutrients, in particular nitrogen, phosphorus and potassium.

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<sup>3</sup> See, <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>.

<sup>4</sup> *Short-Lived Climate Pollutant Reduction Strategy*, adopted by the California Air Resources Board, March 2017, at page 22.