



Feasibility Report For A Small Dairy Biodigester Lending Program In California

Submitted to California FarmLink by Community Capital Advisors and
Urban Rural Regional Strategies



Thank you!

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Summary



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Community Capital Advisors (CCA) and Urban Rural Regional Strategies (URRS) (the “CCA Team”) are pleased to submit a feasibility study and framework for the development of a financial mechanism for North Coast small dairy farms to acquire and operate small scale methane digesters while allowing farm owners to mitigate financial risks, ensure economic security, and build future wealth. The nine sections that follow correspond to the CCA Team’s scope of work and demonstrate the CCA Team’s understanding of the interest and demand, concerns and barriers, and complexities of financing digester systems within the context of small dairy farms in California, and specifically the North Coast. The CCA Team looked beyond the research, data, and testimonials highlighting methane digesters for large scale dairy operators, and instead focused solely on addressing the financial needs and challenges of small dairy farmers, who, to date, have not received noteworthy financial or political support in adopting methane digestion technology from state or federal programs. This narrative report is accompanied by an Excel-based financial model.

The CCA Team narrowed down the feasibility study area to include the “North Bay Milkshed” which encompasses Sonoma and Marin Counties with a total of approximately 93 dairies (69 in Sonoma County and 24 in Marin County), where the average dairy has 333 milk cows. While some small dairy farms exist throughout California (notably in Humboldt County and some in the Central Valley), the most concentrated location of the 250-600 herd size is the North Bay Milkshed. Alarming, over the last 12 years, Marin County has seen a 20 percent loss of dairy farms. One potential path for stabilizing this trend and providing greater economic security and future viability of the dairy industry in the North Bay is investment in small scale dairy digesters.

Based on our review of multiple models, we have found a solution to creating a methane digester beta lending program in the North Bay. This solution includes leveraging the knowledge from the existing Straus and Giacomini digesters, interviews with digester developers, funders, and others, and financial modeling. The CCA Team has identified a solution estimated to cost \$410,000. Based on our calculations and projections, we feel certain this solution can not only be financially self-sufficient and build wealth, but also provide a revenue and cost avoidance strategy for the farmer.

Our model assumes support from the Natural Resource Conservation Service’s Environmental Quality Incentives Program (NRCS’s EQIP grant), additional grant funding and a loan from a mission-oriented lender. Further, we base our recommendation on a Low Carbon Fuel Standard (LCFS) credit price of \$95 (effective July 12, 2022). When these sources are braided together, a sustainable financial model exist. Assumptions are explained below.

¹ Marin Agricultural Commissioner, number of dairy farms in 2010 and 2022. Information for Sonoma County was not accessed.

The CCA Team recommends that FarmLink evaluate the recommendations and findings in this report while considering the following key assumptions:

1. Like the advent of solar power, methane digesters require innovation, product development, and iteration.
2. A beta project helps build a market and encourage a scalable model.
3. Most small dairy farmers do not have access to commercial funding for innovation or technology.
4. Energy costs continue to rise due to the ongoing war in Ukraine and the economic implications of the war worldwide. The rise in energy costs, one of the largest expenses a farmer faces, does not leave much room for innovation and long-term sustainability if farmers stay the course. Innovation and intervention are needed to both reduce emissions and build new revenue sources, yet few ideas beyond digesters exist.
5. The LCFS market changes daily and should be analyzed before making any funding decisions. A base credit price of \$95 is required in this model to create a financially feasible project, based on the assumptions outlined in this report. It should also be noted that the Federal government is in the midst of evaluating eligibility for dairy digesters within a corollary program which would provide additional revenue to the farmer on top of the LCFS program. Should the Renewable Fuel Standard program decide to include dairy digesters, the financial projections and revenue for the farmer would increase significantly. The RFS is described in the policy section of this report
6. While the CCA Team analyzed the funding and policies affecting digesters, there are significant shifts pending, including potential funding from the California Department of Food and Agriculture (CDFA) and possibly new Federal funding programs.
7. Grant funding will be required to support the digester program. The CCA Team has identified a list of environmental and economic benefits the digester program would offer. Further, the CCA Team provided a list of potential funders.
8. Finally, there has been much discussion in the dairy sector about the role of the Alternative Manure Management Program (AMMP). The small-scale methane digester model which the CCA Team has identified falls within the scope of AMMP practices. Two key components of the digester program which fall under AMMP include a manure solids separator and a concrete composting pad. The CCA Team has confirmed with NRCS that an EQIP grant would provide payments for these components of a digester project.

Climate and Economic Benefits of Small Farm Dairy Digesters

Small-scale anaerobic biodigesters represent a local climate solution that can reduce greenhouse gas emissions, improve watershed quality, and have other environmental co-benefits as well as improve the economic livelihoods for small farmers.

In Marin County, manure management accounts for 43 percent of agriculture's greenhouse emissions. The County set the goal of achieving 33 percent of the estimated emission reduction potential by 2030, (equivalent to reducing 26,191 MTCO₂e annually) through beneficial, alternative manure management practices. Such practices include methane digesters, dry scraping, compost bedding, and woodchip production for composting. The County estimates that the methane reduction potential that dairy digesters alone could achieve as a part of this solution is 16,365 MTCO₂e annually², the equivalent to removing 3,526 passenger driven cars or 40 million miles from the road every year.

On average, a single Marin County dairy biodigester can reduce climate emissions by 750-1,000 metric tons of MTCO₂e per year. If 20 Marin dairy farms implemented a digester, the reduction potential would be 15,000-20,000 MTCO₂e per year from these digesters, nearing or surpassing the County's total goals for manure management methane reductions.

“Dairy digesters remain one of the most efficient GHG programs in terms of cost of each ton of GHG reduced.”

—Dairy Digester Research and Development Program, 2021 Report to the Joint Legislative Budget Committee

Small-scale dairy digesters are not only reducing emissions, they provide myriad benefits to improve the economic livelihoods of dairy farmers while also contributing to multiple climate and other environmental solutions. For example, while reducing emissions, they are simultaneously contributing to the low-carbon fuel market for transportation when farmers opt to participate in the California Low Carbon Fuel Standard (LCFS). Through the LCFS, dairy digesters can improve the challenging economics of dairy farming by supplementing the income of dairy operations through the retirement of renewable energy credits. At the same time, dairy farmers are saving costs and carbon-intensive energy by powering farms with on-site renewable electricity.

² [Marin County Carbon Action Plan 2030](#)

Feasibility Report For A Small Dairy Biodigester Lending Program In California - July 2022

CO-BENEFITS	
Climate Mitigation, Adaptation, and Resilience	
Methane and other Greenhouse Gas Reductions	Small dairy digesters can reduce manure lagoon methane emissions by 90 percent. Solution for SB 1383 mandates that requires dairy and livestock operations to reduce methane emissions by 40 percent below 2013 levels.
Avoided GHGs	The electricity generated from digesters offsets additional greenhouse gas emissions by replacing carbon-intensive grid electricity with farm-generated renewable electricity.
Increased carbon sequestration and overall resilience	Manure solids become a byproduct of the manure management process. They are used for compost application for carbon farming which builds soil organic matter, improves long-term water retention, and sequesters 300 MTCO ₂ e per year with the reutilization of manure solids for soil carbon enhancements.
Additive energy efficiencies and close-loop systems	From the digester process, heat is captured to heat water for on-farm operations, as well as feed heat back to the digester to create more biogas production. This can add up to 500 gallons per year of avoided propane use, supporting fossil fuel independence.
Spur innovation in on-farm climate beneficial practices	<ul style="list-style-type: none"> Digesters on small farms are a growing practice and have the potential to influence and scale throughout the region, the state, and the country. Digesters do not compete with other alternative manure management practices, and in fact, can enhance other practices with the use of on-farm compost from the separated manure solids, building carbon stock over years. Composting is a major climate adaptation practice that augments water retention, in turn allowing farmers to grow feed on-farm, further reducing costs to the farmer as well as GHG emissions associated with transporting feed.
Supplying the market with alternative low-carbon fuel	<ul style="list-style-type: none"> Ten years ago, most natural gas used in transportation in California was from fossil sources. Through the LCFS, low-carbon fuels such as the electricity generated by digesters, are replacing nonrenewable natural gas, creating a new market for low-carbon alternative fuel.

CO-BENEFITS	
Small Farmer Economic Viability	
Income diversification	North Bay organic dairy farmers face pressures that threaten continuing operations. Participating in the LCFS, farmers can earn \$0.13 to \$0.20 per kWh of electricity, which can be up to \$35,000 in additional annual income.
Reduced energy costs	Digesters on small farms can produce enough electricity to power an entire farm's operation at 200,000 kWh usage per year (while also participating in the LCFS).
Building long-term wealth	Small dairy digesters can increase revenue and decrease operating expenses, supporting viable wealth creation for small family farms.

CO-BENEFITS	
Watershed Health & Resilience	
Improved Groundwater Quality	<ul style="list-style-type: none"> As a part of the digester process, pathogenic bacteria are destroyed from the liquids, allowing for clean water to enter the watershed. Observations show a reduction of coliform by 99 percent. Compliance with water quality regulations.
Water conservation	<ul style="list-style-type: none"> The flush system's ability to reduce pathogens allows for the recycling of liquid digestate from the manure collection process, eliminating the need for excess water that is typical with other manure management systems such as dry scrape.

Other Co-Benefits	
Workforce health and well-being	<ul style="list-style-type: none"> Odor reduction Eliminate stagnant water that can create mosquito habitat Flush alleys are not slick and safer for cows and workers

While the CCA Team believes there is a viable program offering, we have outlined a list of key risks and mitigating factors of the program in the sections that follow. These risks include financial, operating, reputation, and overall program design. And while the CCA Team believes these risks can

be mitigated, it would be wise to consider a beta program before rolling out a statewide offering. During the beta testing, the program manager would be able to iterate, learn from experiences, develop new partners, and solidify additional funding.

