



Report of Funded Projects (2015 – 2019)



2020 Report to the Joint
Legislative Audit Committee



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Executive Summary

The California Department of Food and Agriculture’s (CDFA) Dairy Digester Research and Development Program (DDRDP) awards competitive grants to implement dairy digesters that result in long-term methane emission reductions on California dairies and minimize or mitigate adverse environmental impacts.

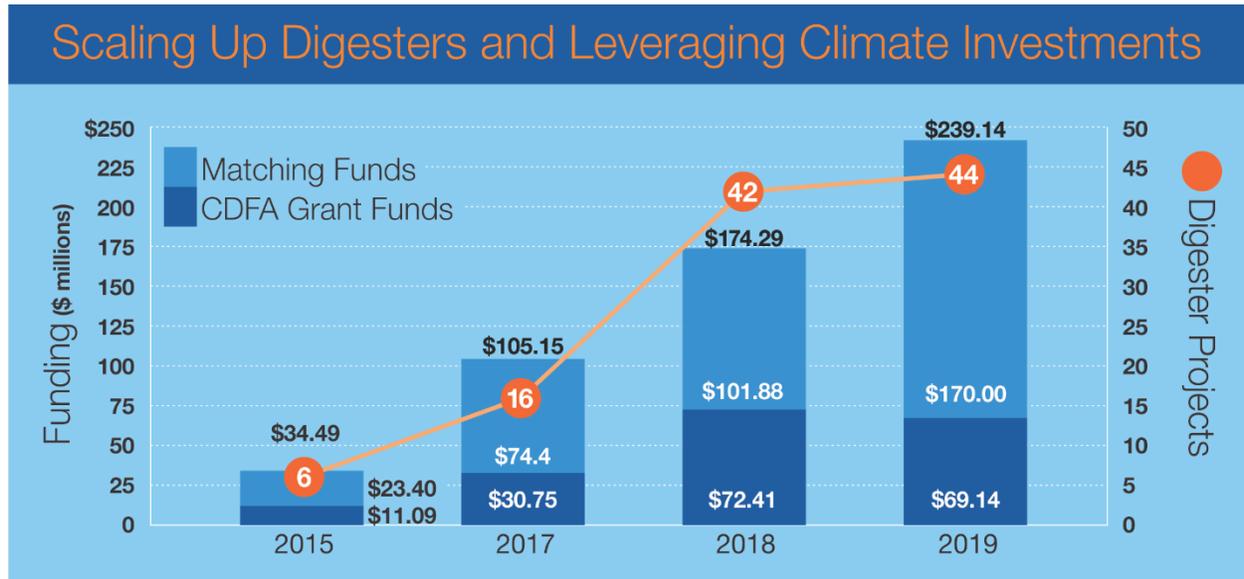


Figure 1. Number of funded digester projects by year, with total investments from CDFA grants and matching funds for each grant cycle.

The Budget Act of 2017-18 (Item 8570-101-3228) required CDFA to provide ongoing updates on the Department’s DDRDP projects in January of each year beginning in 2018 and continuing through 2027. This legislative mandate is designed to evaluate the efficiency and cost-effectiveness of strategies to reduce emissions of short-lived climate pollutants including methane (a greenhouse gas) from dairy operations. This report includes information on all DDRDP projects funded by CDFA.

CDFA has received \$295 million since 2014 for the DDRDP and Alternative Manure Management Program (AMMP).

- DDRDP provides financial assistance for the installation of dairy digesters in California, which will result in reduced greenhouse gas emissions.
- AMMP provides financial assistance for the implementation of non-digester manure management practices in California, which will result in reduced greenhouse gas emissions.

CDFA has funded a total of \$183.4 million to 108 dairy digester projects, with \$369.7 million provided in matching funds by grant awardees. This funding has been awarded to projects that will result in methane emissions reductions from California agriculture sector. In 2017, Agriculture contributed approximately 32.4 million metric tons of carbon dioxide equivalents (MMTCO₂e) or 8 percent of California’s total annual GHG emissions.

Methane emissions resulting from manure management, a subset of these total statewide agricultural methane emissions, account for approximately 2.7 percent of the total statewide GHG emissions, or approximately 35.9 percent of the agricultural GHG emissions¹. These projects having a cumulative estimated GHG reduction of 19.9 MMTCO₂e over ten years, or approximately 1.99 MMTCO₂e annually, equate to an 17 percent reduction in methane emissions from manure management in California (**Figure 3**).

I. Program Background and Award Selection Process

Methane is a potent greenhouse gas (GHG) that has a global warming potential 25 times that of carbon dioxide (using 100-year global warming potential). It is also a Short-lived Climate Pollutant (SLCP). SLCPs are climate gases that remain in the atmosphere for a much shorter period of time than longer lived climate pollutants such as carbon dioxide. SLCPs are powerful climate forcers that have relatively short atmospheric lifetimes. Because SLCP impacts are especially strong over the short term, acting now to reduce their emissions can have an immediate beneficial impact on climate change and public health. In California, dairy and livestock sector accounts for over half of statewide methane emissions, with half of these emissions coming from enteric fermentation and the rest from manure management. Because no viable enteric methane mitigation option is currently available, the State has focused on methane mitigation strategies related to dairy manure management. With regards to manure management, methane is primarily emitted from manure lagoons on dairy operations. CDFA's DDRDP provides financial assistance for the installation of dairy digesters in California to reduce quantifiable GHG emissions including methane.

- CDFA was appropriated \$12 million in the Budget Act of 2014 to fund dairy digesters; \$11.1 was awarded to fund six projects in 2015 through the DDRDP competitive grant process.
- CDFA received an additional \$50 million from the Greenhouse Gas Reduction Fund (GGRF), authorized by the Budget Act of 2016, to fund dairy digesters as well as non-digester practices for methane reduction on California's dairy and livestock operations. Non-digester manure management projects are implemented under a separate program, the Alternative Manure Management Program (AMMP), which provides financial assistance to California dairy and livestock operations.
 - \$35.3 million of the FY 2016-17 allocation were awarded to dairy digester projects and \$9.9 million were awarded to alternative manure management projects in 2017.
- The Budget Act of 2017 and the Budget Act of 2018 allocated \$99 million each year (total of \$198 million) to CDFA to support dairy and livestock methane reduction projects.
 - In 2018, \$72.4 million of the FY 2017-18 allocation were awarded to dairy digester projects and \$21.6 million were awarded to non-digester projects.

¹ CARB. California Greenhouse Gas Inventory Program. <https://ww2.arb.ca.gov/our-work/programs/ghg-inventory-program>

- In 2019, \$69.1 million of the FY 2018-19 allocation were awarded to dairy digester projects through DDRDP and DDRDP Demonstration Projects (DDRDP Demo), and \$32.8 million were awarded to non-digester projects through AMMP, AMMP Demonstration Projects - New Technologies and Practices (AMMP Demo - NTP), and AMMP Demonstration Projects - Advancing Practices Farmer-To-Farmer (AMMP Demo – APFF).
- Most recently, the Budget Act of 2019 allocated \$34 million to CDFA to continue funding to DDRDP and AMMP.
 - Funds appropriated in FY 2019-18 have not yet been awarded, CDFA anticipates accepting grant applications for these funds in February 2020.

A summary of funds allocated to the DDRDP is provided in [Table 1](#).

Table 1. Summary of CDFA DDRDP funding to date

Year	Dollar Allocation (millions)	Dairy Methane Reduction Grant Funds Awarded (millions)			Administrative Cost not to Exceed 5% (millions)
		Dairy Digesters	Dairy Digester Research	Non-digester Practices (Alternative Manure Management Program)	
2014-15	\$12	\$11.09	\$0.2	Not applicable	\$0.68
2016-17	\$50	\$35.25	Not applicable	\$9.64	\$5
2017-18	\$99	\$72.41	Not applicable	\$21.29	\$4.9
2018-19	\$99	\$61-75	Not applicable	\$19-33	\$4.9
2019-20	\$34	\$20-25*	Not Applicable	\$6-11*	\$1.9
* Anticipated release of Request for Grant Applications in February 2020.					

CDFA has awarded a total of \$183.4 million for 108 dairy digester projects starting in 2014 through 2019. These projects, collectively, have an estimated greenhouse gas (GHG) reduction of 19.9 million metric tons of carbon dioxide equivalents (MMT_{CO₂e}) over ten years. Dairy digesters remain one of the most efficient GHG programs in terms of cost of each ton of GHG reduced².

- All 2015 awarded projects have been completed and operational.
- Of the 16 funded projects in 2017, 4 are completed and currently operational; 12 are under construction.
- Of the 42 funded projects in 2018, 3 are completed and 39 are under construction.
- All the 44 funded projects in 2019 are under construction.

² CARB. 2019 Annual Report on Cap and Trade Auction Proceeds. https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/2019_cci_annual_report.pdf



Figure 2. Number of DDRDP funded projects that are complete and under progress since 2015.

In September 2019, CDFA awarded \$1.75 million in competitive grants to California dairy operations and digester developers for the implementation of dairy digester projects that demonstrate innovative technologies to achieve long-term methane emission reductions on California dairies and minimize or mitigate adverse environmental impacts.

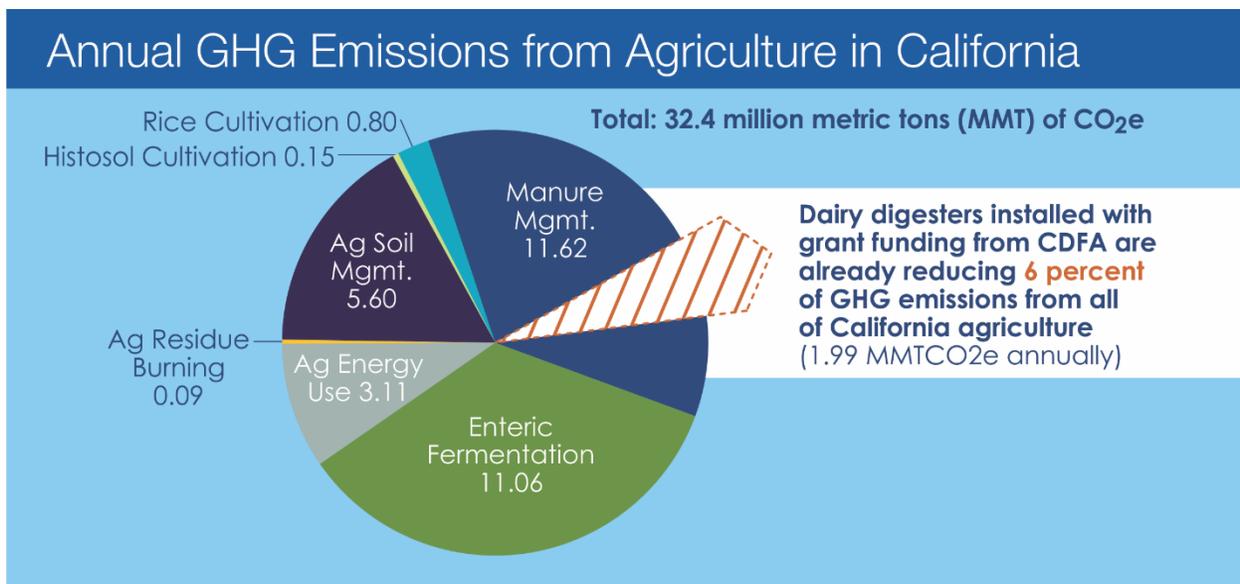


Figure 3. GHG emissions from Manure Management as a proportion of total Agriculture Sector GHG emissions inventory (8 percent or 32.4 MMTCO₂e) in California in 2017. Source: [California Greenhouse Gas Inventory Program](#).

All funded projects since 2016-17 must comply with SB 859 (2016 Budget Bill), which requires CDFA, prior to awarding grant funds from moneys from the GGRF, to review the applicant’s analysis identifying potential adverse impacts of a proposed project. The requirements specified in the bill prohibits a project from receiving funding from the Department unless the applicant has conducted outreach in areas that will potentially be adversely impacted by the project, determined potential adverse impacts of the projects, and committed to measures to mitigate impacts. The bill requires the CDFA to prioritize

projects based on the criteria pollutant emission benefits achieved by the project. This is an important component of the program and CDFA has diligently worked to comply with SB 859 requirements.

CDFA has funded \$63.2 million to 108 projects for AMMP projects from 2016-2019. Approximately \$9 million has been provided in matching funds by awardees. These projects, having a cumulative estimated GHG reduction of approximately 1 MMTCO_{2e} over five years, or approximately 211,760 MTCO_{2e} annually, equate to 1.8 percent reduction in methane emissions from manure management in California. The AMMP funds a diverse range of manure management practices that provide options to dairy and livestock operations where digesters may not be economically feasible. These practices include pasture-based management (such as conversion of a non-pasture operation to pasture or increased time spent by animals on pasture), alternative manure storage options such as compost bedded pack barn or slatted floor pit storage manure collection, separation of manure solids in conjunction with drying or composting of solids, and, conversion of a flush-based system to scrape system in conjunction with drying or composting of solids.

A. DDRDP Eligibility and Application Process

Under the DDRDP, CDFA funds up to 50 percent of the total project cost with a maximum grant award up to \$3 million per project. Funded projects are expected to be completed within 2 years of the execution of the grant agreement. To be eligible for funding, the project site must be located on a commercial California dairy operation. A group of dairy operations can submit one grant application to develop centralized dairy digesters and gas clean up facilities, known as a “cluster” or “hub and spoke” project. Defunct digesters that were constructed in the past and have become entirely non-functional for a minimum of 12 months due to technical or other issues are also considered eligible for funding through the DDRDP. However, CDFA does not fund upgrades to existing functional dairy digesters to boost emission reductions and energy production. Additionally, projects that propose to switch existing management practices on the dairy operation to those that increase baseline GHG emissions are not eligible for DDRDP funding.

Applicants are required to use the quantification methodology and its associated calculator tool developed by the California Air Resources Board (CARB) for the DDRDP to calculate estimated GHG emission reductions achievable from projects. The quantification methodology and calculator are available on CARB’s [CCI Quantification, Benefits and Reporting Materials](#) website. Any project benefits provided to [AB 1550 \(Gomez, 2016\) Priority Populations](#) are determined and reported to CARB using the [methodologies](#) developed by the CARB consistent with the [Funding Guidelines for Administering Agencies](#).

Funded projects must demonstrate protection of water and air quality. The design and construction of digester vessels (*i.e.*, ponds and tanks) under this program must be demonstrated to be protective of surface and ground water quality. To meet the DDRDP water quality requirements, one of the following is required: double-lined ponds consistent with the Tier 1 specification of the Dairy General Order (R52013-0122) of the

Central Valley Regional Water Quality Control Board, an above-ground or below-ground digester vessels that are considered protective of water quality provided they are designed to be water tight (e.g., vinyl water seals at joints, proper rebar density to minimize cracking) and built in accordance with a strict construction quality assurance (CQA) program (e.g., any cracks sealed). The digester system design, construction, and operation must minimize emission of air pollutants. For power production projects, the total NOx (mono-nitrogen oxides) emissions must be no greater than 0.50 lb/MW-hr. These represent the most stringent water and air quality protection standards across the State and must be met by a project regardless of its location in California. Funded projects must use commercially-available technologies to produce or capture methane for energy production or transportation fuel.

B. DDRDP Review Process

CDFA conducts three levels of review during the grant submission and review process. The first is an administrative review to determine if all grant application requirements are met. The second is a comprehensive financial review to evaluate the merits of the grant applications based on the scoring criteria. The third is a technical review by subject matter experts and the Technical Advisory Committee (TAC). The TAC is a sub-committee of the [California-Federal Dairy Digester Working Group](#). The scoring criteria for the review process is listed in [Table 2](#). The TAC is further assisted in the review process through the following:

- (i) The evaluation of the GHG emission reductions calculations and technical soundness of the project by academic experts associated with California universities (University of California and California State University systems), and,
- (ii) The review of financial information submitted with the grant application by CDFA’s Audit Office.

Table 2. CDFA DDRDP Scoring Criteria for Project Selection.

Criteria	Points
Digester Project Plan and Long-term Viability	20
Budget Work Sheet and Financials	10
Estimated Greenhouse Gas Emissions Reduction	35
Project Readiness	10
Environmental Performance	15
Community Impact	10
Total	100

II. CDFA Public Outreach for DDRDP

The development of the DDRDP framework and grant solicitation (Request for Grant Applications) involves a stakeholder and public engagement process. Additionally, during

the application period, CDFA provides application assistance workshops as well as guidance on conducting community outreach about the projects. A summary of these workshops is provided in [Table 3](#).

Table 3. Summary of CDFA DDRDP Outreach.

Program Development Outreach Public Meetings			
Meeting	Date	Location	Number of Attendees
2015 Digester Grant Development - Stakeholder Input	11/6/2014	Modesto	12
2015 Digester Grant Development - Stakeholder Input	11/10/2014	Tulare	7
2015 Digester Grant Development - Stakeholder Input	11/13/2014	Sacramento	14
2015 Digester Research Development - Stakeholder Input	3/4/2015	Sacramento	0
2016 Environmental Justice Listening Session	11/9/2016	Tulare	9
2017 Digester Grant Development - Stakeholder Input	11/17/2016	Clovis	23
2017 Digester Grant Development - Stakeholder Input	11/21/2016	Sacramento	13
2017 Digester Grant Development - Stakeholder Input	11/22/2016	Modesto	10
2017 Digester Grant Development - Stakeholder Input	11/30/2016	Webinar	40
2017 Digester Grant Development - Stakeholder Input on Draft Solicitation	2/6/2017	Webinar	42
2019 Digester Grant Development – Expanding Access and Enhancing Competitiveness	9/17/2018	Tulare	6
2019 Digester Grant Development – Expanding Access and Enhancing Competitiveness	9/18/2018	Modesto	3
2019 Digester Grant Development – Expanding Access and Enhancing Competitiveness	9/19/2018	Webinar	28
2019 Digester Grant Development – Stakeholder Input	10/23/2018	Tulare	2
2019 Digester Grant Development – Stakeholder Input	10/24/2018	Modesto	2
2019 Digester Grant Development – Stakeholder Input	10/26/2018	Webinar	20
2020 Digester Grant Development – Stakeholder Input	09/17/2019	Tulare/Webinar	19
2020 Digester Grant Development – Stakeholder Input	09/18/2019	Petaluma/ Webinar	16
2020 Digester Grant Development – Stakeholder Input	09/19/2019	Sacramento/ Webinar	24
Application Assistance Outreach Public Meetings			
Meeting	Date	Location	Number of Attendees
2015 Digester Grant - Application Workshop	1/21/2015	Tulare	13
2015 Digester Grant - Application Workshop	1/27/2015	Webinar	26

2015 Digester Grant - Application Workshop	1/28/2015	Sacramento	12
2015 Digester Research - Application Workshop	4/23/2015	Webinar	8
2017 Digester Grant - Application Workshop	5/12/2017	Sacramento	15
2017 Digester Grant - Application Workshop	5/15/2017	Tulare	20
2017 Digester Grant - Application Workshop	5/16/2017	Webinar	22
2017 Digester Grant – Community Outreach Assistance through UC Davis	May 2017	One-on-one Assistance and Consultation	9
2018 Digester Grant – Application Workshop	1/3/2018	Modesto	9
2018 Digester Grant – Application Workshop	1/4/2018	Tulare	14
2018 Digester Grant – Application Workshop	1/8/2018	Webinar	35
2019 Digester Grant – Application Workshop	1/23/2019	Tulare/ Webinar	12
2019 Digester Grant – Application Workshop	1/24/2019	Modesto/ Webinar	10

III. Projects Funded by the CDFA DDRDP

A summary of the 108 projects funded to date by the CDFA DDRDP is provided in [Table 4](#). The collective GHG emission reductions estimated from the 108 projects is 19.9 million MTCO_{2e} over 10 years, and the approximate cost to achieve one MTCO_{2e} (10-year) reduction is approximately \$27.80. Of this cost, the share of the GGRF monies (i.e., the CDFA grant) is approximately \$9.22 or 33 percent, and the remainder is achieved through matching funds provided by the grant recipient. A map showing the locations of the funded projects can be found in [Figure 3](#). As evident from [Figure 3](#), funded projects are primarily located in the Central Valley, which is home to the majority of large-scale dairy operations in the state. The Cost Effectiveness Summary of the DDRDP is presented in [Table 5](#). In case of canceled projects (see [Table 4](#) and [Section IV](#)), no amount of the grant award funds was invoiced to CDFA. CDFA awarded these funds to subsequently next-in-line ranked projects based on their total scores.

IV. Community Engagement and Outreach by CDFA DDRDP Award Recipients

California Government Code Section 16428.86(a) (i.e., SB 859 Section 6) requires CDFA to review the applicant’s analysis identifying potential adverse impacts of the proposed project, including a net increase in criteria pollutants, toxic air contaminants, and hazardous air pollutants; groundwater and surface water impacts; and truck traffic and odor prior to awarding DDRDP grant funds from moneys made available from GGRF. Additionally, statute states that:

- (i) A digester project shall not receive funding unless the applicant has demonstrated to CDFA that the applicant has done all of the following:
 - a. Conducted outreach in areas that will potentially be adversely impacted by the project.

- b. Determined potential adverse impacts of the project.
- c. Committed to measures to mitigate impacts.
- (ii) In making awards, CDFA shall prioritize projects based on the criteria pollutant emission benefits achieved by the digester project.
- (iii) A digester project funded by CDFA that results in localized impacts in disadvantaged communities shall not be considered to provide a benefit to disadvantaged communities for the purposes of Section 39713 of the Health and Safety Code.

To meet these requirements, DDRDP applicants are required to conduct community outreach actions and describe community needs. Additionally, they are required to describe how the community was involved in the local planning and environmental review processes for this project, including how neighbors were contacted, public meeting dates, and whether translation was needed and provided. Applicants are required to summarize the results of this outreach; identify community's concerns, questions, or comments and how they will be addressed, and to provide up to 3 letters of support from community members demonstrating that outreach was conducted.

Applicants are encouraged to (a) approach residents, community leaders, elected officials, advocacy organizations, local businesses, and members of vulnerable or underserved populations (i.e. elderly, youth, physically and/or mentally disabled, members from disadvantaged communities), departments, agencies, jurisdictions, etc. impacted by the project such as local health department, schools/school districts, emergency services, law enforcement, metropolitan planning organization, etc.; and (b) to use various methods to notify the community of outreach efforts, such as local newspaper, county website, radio and television. The topics of discussion during outreach efforts must include potential adverse impacts of digester projects, including a net increase in criteria pollutants, toxic air contaminants, hazardous air pollutants, groundwater and surface water impacts, and truck traffic and odor. Additionally, applicants are required to describe what, if any, mitigation measures will be included in the project, including but not limited to: mitigating potential impacts such as toxic air contaminants, hazardous air pollutants, groundwater and surface water impacts, truck traffic, odor; noting that mitigation measures committed to by applicant must be specific to the digester project and be included in the project Work Plan.

Applicants are also required to explain economic benefits that will be provided to the community (or communities) where a project is located, such as number and duration of temporary or permanent jobs, job classification/trade, approximate salaries and benefits for each job classification and trade, how long these jobs will last, and how they compare to current unemployment rates.

CARB developed the [Community Engagement Co-benefit Assessment Methodology](#) in 2018-19. Questions from the Fillable Community Engagement Questionnaire as part of this methodology has been included as part of the DDRDP application since the 2019 round, to be completed by applicants.

CDFA contracted with the University of California, Davis Extension Collaboration Center in 2017 and 2018, and with California State University, Sacramento in 2019 to assist applicants with planning and executing their community outreach efforts.

Among the 18 DDRDP applications that were selected for award in 2017, a total of 6 letters (supporting 28 projects across 7 clusters) from community-based organizations were provided in support of the projects. These included educational institutions such as California State University, Bakersfield – School of Natural Sciences, Mathematics, and Engineering, College of the Sequoias – Tulare College Center, and Lakeside Union School District; and, local employment focused nonprofit organizations such as Proteus, Inc. These letters specifically noted the activities that were conducted by the applicants in their community. For example, the educational institution College of the Sequoias – Tulare College Center stated that the applicant for projects Rancho Teresita Dairy Biogas, Bos Farms Dairy Biogas, Moonlight Dairy Biogas, S&S Dairy Biogas, and Hamstra Dairy Biogas “reviewed the choice they have in the use of the dairy biogas - as a source for electricity generation or vehicle fuel and the relative environmental impacts of the different approaches” in the community meetings. In addition, the educational institution acknowledged that the same applicant “developed a program to advance our students learning about dairy digesters and provide valuable paid and competitive internship programs, focused on members of disadvantaged communities.”

In 2018, among the 42 DDRDP applications that were selected for award, over 10 letters (supporting 62 projects across 11 clusters) from community-based organizations were provided in support of the projects. These included environmental justice organizations such as Project Clean Air; educational institutions such as California State University, Bakersfield – School of Natural Sciences, Mathematics, and Engineering, College of the Sequoias – Tulare College Center, Lakeside Union School District, and a teacher from Linwood Elementary in Visalia; local employment focused and training nonprofit organizations such as Proteus, Inc, Community Services Employment Training and Sequoia Community Corps; and nonprofit community development organizations such as Self-Help Enterprises. These letters specifically noted the activities that were conducted by the applicants in their community and highlighted the positive impact of these future projects to their local community. For example, the nonprofit organization Project Clean Air stated that the applicant for projects Belonave Dairy Biogas LLC, BV Dairy Biogas, and Western Sky Dairy Biogas “in addition of reviewing the environmental benefits of dairy digesters transporting biogas via pipelines, the applicant has discussed the economic development and job creation benefits that will arise with the projects implementation.” Moreover, the educational institutions California State University, Bakersfield – School of Natural Sciences, Mathematics, and Engineering and College of the Sequoias – Tulare College Center acknowledged that this same applicant “is continuing their efforts in developing educational opportunities to teach our students about the history, role and technology of dairy digesters both in classes and field trips, as well as to further expand already established paid and competitive internship programs to students from local disadvantaged communities.”

In 2019, among the 43 DDRDP and 1 DDRDP Demo applications that were selected for award, over 7 letters (supporting 52 projects across 9 clusters) from community-based

organizations were provided in support of these projects. These included educational institutions such as College of the Sequoias – Tulare College Center, Lakeside Union School District, Hilmar Unified School District, and a teacher from Linwood Elementary in Visalia; local employment focused and training nonprofit organizations such as Proteus, Inc, Community Services Employment Training and Sequoia Community Corps. These letters once again specifically noted the activities that were conducted by the applicants in their community and highlighted the positive impact of these future projects to their local community. For example, the educational institution College of the Sequoias (COS) – Tulare College Center stated that the applicant for projects Art Leyendekker Dairy Biogas, Elkhorn Dairy Biogas, Gerben Leyendekker Dairy Biogas, GP Dairy Biogas, Curtimade Dairy Biogas, Dairyland Farms Dairy Biogas, Elk Creek Dairy Biogas, Friesian Farms Dairy Biogas, Rib-Arrow Dairy Biogas, Ribeiro Dairy Biogas, and Rio Blanco Dairy Biogas and the College “have a significant scholarship program in development, with the first phase planned for the 2020-2021 academic year” that “will serve currently enrolled COS students or those COS students who have met the requirements to transfer to a four-year institution... from disadvantaged communities and will focus on students studying agriculture or programs related to energy and environment.” In addition, COS asserted that the applicant “has established and continued paid and competitive internship programs to students from local disadvantaged communities” which “will be extended for one to two years.” Local employment focused and training nonprofit organization Proteus, Inc supports the applicant for Double Diamond Dairy Digester Pipeline Project, Homen Dairy Digester Pipeline Project and Melo Dairy Digester Pipeline Project as these “will generate jobs” and will “create working opportunities and training for low income populations and minorities” and “that at least 10% of the of each project’s work hours will be performed by residents of a low income AB 1550 community.”

The breadth of community outreach activities conducted by applicants included conducting public meetings that provide opportunities to learn about the advantages and disadvantages of construction in the community, engagement with local schools and universities to educate students and faculty on dairy digesters and providing paid internships to local students, interaction with local environmental and other non-profit organizations for feedback on projects, and, facilitation of public digester tours for interested local residents.

V. DDRDP Project Co-Benefits

Dairy digesters have the potential to provide several environmental and agronomic co-benefits, notably, reduction in odor and flies due to elimination of open, uncovered manure storage lagoons. Additionally, manure solids after digestion can be easier to handle to transport nutrients, have reduction in pathogens, and can have more stabilized form of nutrients for plant uptake, relative to raw manure. Additionally, the below DDRDP requirements, as noted previously in [Section 1. A.](#), have set the precedent for dairy digester projects to follow the highest air and water quality protection standards across the State, which in many cases are more stringent than their local Air District or Water Board requirements:

1. Double-lined ponds consistent with the Tier 1 specification of the Dairy General Order (R52013-0122) of the Central Valley Regional Water Quality Control Board, an above-ground or below-ground digester vessels that are considered protective of water quality provided they are designed to be water tight (e.g., vinyl water seals at joints, proper rebar density to minimize cracking) and built in accordance with a strict construction quality assurance (CQA) program (e.g., any cracks sealed).
2. For power production projects, the total NO_x (mono-nitrogen oxides) emissions must be no greater than 0.50 lb/MW-hr.

Of the 108 DDRDP funded projects, 8 projects are generating electric power. Of these, 6 projects funded in 2015 involved internal combustion engines and met the criteria stated above. Two remaining projects have been funded in 2019 and propose to employ fuel cells, a technology with lower criteria pollutant emissions than internal combustion engines. Projects awarded in 2016-17, 2017-18 and 2018-19 did not include electricity generation end-use through internal combustion engine. These projects involve end-uses such as renewable natural gas (RNG) production and electricity generation through fuel cells. These technologies have minimal local air quality impacts relative to internal combustion engines.

Since the 2019 round of DDRDP, the CARB methodology for calculation of GHG emission reductions has been revised to include quantification of co-benefits such as fossil fuel use reduction, energy and fuel cost savings, renewable fuel and energy generation, reduction in local and remote emissions of Reactive Organic Gases (ROG), NO_x, PM 2.5 and diesel PM, and, compost production.

All funded projects are also evaluated for benefits to disadvantaged communities based on the criteria provided in [Funding Guidelines for Administering Agencies](#).

As noted in [Section IV](#), DDRDP grant recipients report economic benefits, including jobs creation to CDFA. For example, Vander Poel Dairy Digester Pipeline Project located in Tulare county, funded in 2018, created 56 jobs, of which 42 jobs were provided to priority populations in the region. Another project, the K&M Visser Dairy Digester Fuel Pipeline Project located in Tulare, funded in 2017, created 46 jobs, of which 25 jobs were provided to priority populations in the region. Since 2019, CARB has developed the [Job Co-Benefit Assessment Methodology and Modeling Tool](#), which was utilized to estimate jobs benefits provided by projects at the time of application. These estimates would be updated with data provided by grant recipients through the term of the grant agreement and reported to CARB for inclusion in the CARB's [CCI Annual Report to the Legislature](#).

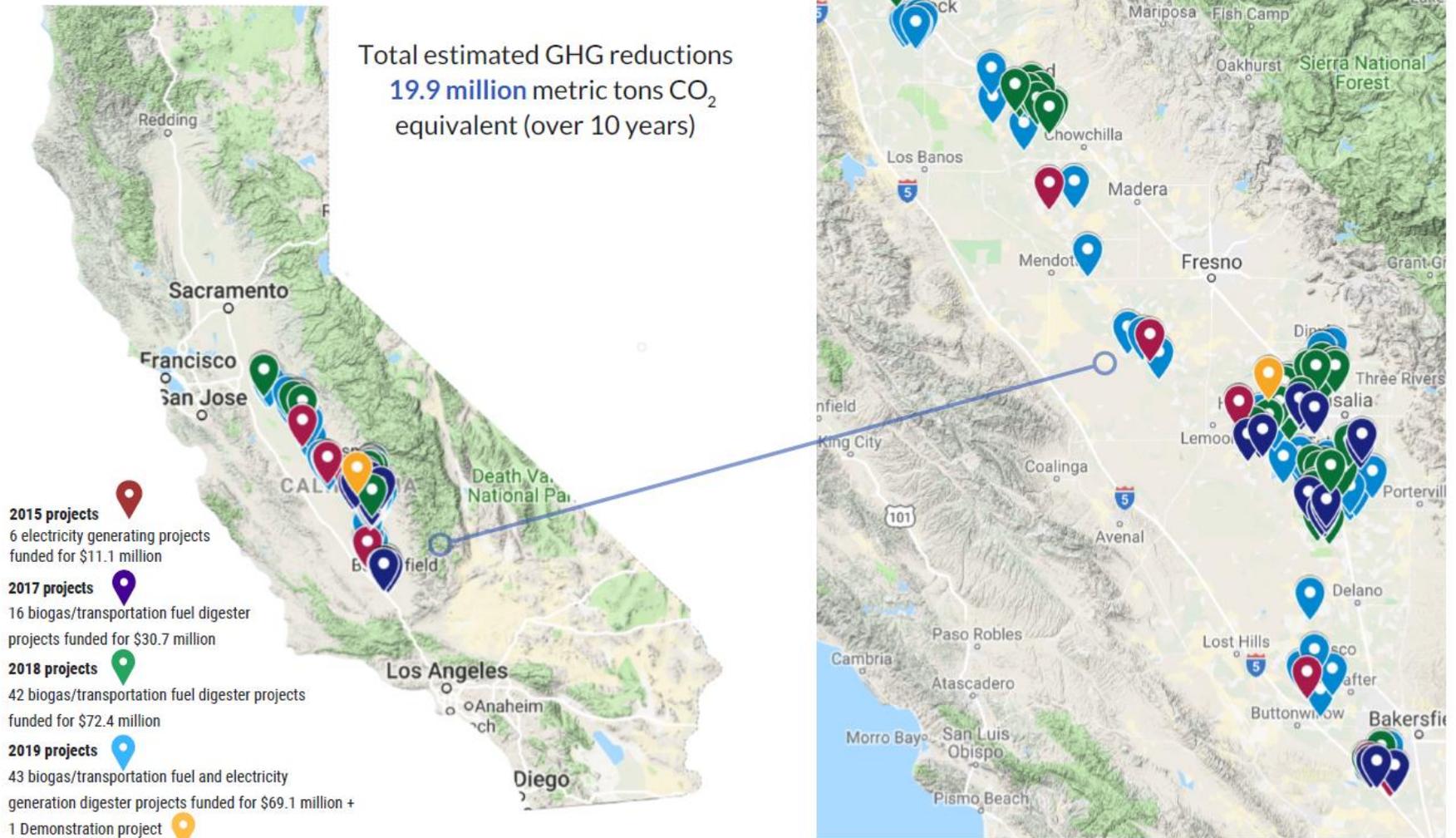


Figure 3: Geographical Distribution of CDFA funded Dairy Digesters in California.

Table 4. Summary of Dairy Digester Projects Funded by CDFA.

Year of Award	Applicant Organization	Project Title	Submitting Organization	Project Location	Cluster	Project Type	Biogas End-Use	Estimated 10 year GHG reductions (MTCO _{2e})*	Grant Funds	Matching Funds	Total Project Cost	Status
2015	Philip Verwey Farms	Verwey-Hanford Dairy Digester	Maas Energy Works Inc	Hanford, Kings Co.	NA	New covered lagoon digester	Electrical power generation	535,770	\$3,000,000	\$3,011,595	\$6,011,595	Complete
2015	Open Sky Ranch Inc.	Open Sky Ranch Dairy Digester	Maas Energy Works Inc	Riverdale, Fresno Co.	NA	Retrofit covered lagoon digester	Electrical power generation	258,911	\$973,430	\$990,486	\$1,963,916	Complete
2015	Philip Verwey Farms	Verwey-Madera Dairy Digester	Maas Energy Works Inc	Madera, Madera Co.	NA	New covered lagoon digester	Electrical power generation	240,000	\$2,281,091	\$2,331,935	\$4,613,026	Complete
2015	ABEC #2 LLC dba West-Star North Dairy Biogas	West-Star North Dairy Digester	California Bioenergy, LLC	Buttonwillow, Kern Co.	NA	New covered lagoon digester	Electrical power generation	158,700	\$1,837,005	\$6,381,069	\$8,218,114	Complete
2015	ABEC #3 LLC, dba Lakeview Farms Dairy Biogas	Lakeview Dairy Digester	California Bioenergy LLC	Bakersfield, Kern Co.	NA	New covered lagoon digester	Electrical power generation and RCNG	144,090	\$2,000,000	\$5,128,324	\$7,128,324	Complete
2015	ABEC #4 LLC, dba Carlos Echeverria & Sons Dairy Biogas	Carlos Echeverria & Sons Dairy Biogas Project	California Bioenergy, LLC	Bakersfield, Kern Co.	NA	New covered lagoon digester	Combined heat and electrical power generation	201,200	\$1,000,000	\$5,560,375	\$6,560,375	Complete
2017	Wreden Ranch Dairy Biogas	Wreden Ranch Dairy Biogas	California Bioenergy, LLC	Hanford, Kings Co.	South Tulare	New covered lagoon digester	RCNG**	393,915	\$3,000,000	\$4,735,860	\$7,735,860	In Progress
2017	Trilogy Dairy Biogas	Trilogy Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	Calgren	New covered lagoon digester	RCNG	254,577	\$2,250,000	\$4,200,840	\$6,450,840	In Progress
2017	Cloverdale Dairy Biogas	Cloverdale Dairy Biogas	California Bioenergy, LLC	Hanford, Kings Co.	Hanford	New covered lagoon digester	RCNG	360,851	\$3,000,000	\$4,836,793	\$7,836,793	In Progress
2017	T & W Dairy Biogas	T & W Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	South Tulare	New covered lagoon digester	RCNG	294,982	\$2,600,000	\$4,695,759	\$7,295,759	In Progress
2017	Aligned Digester Cooperative LLC	Red Top Madera Dairy	Aligned Digester Cooperative LLC	Chowchilla, Madera Co.	Hanford	New covered lagoon digester	RCNG	282,475	\$3,000,000	\$3,046,875	\$6,046,875	Canceled ***

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		Digester Project										
2017	Calgren Dairy Fuels LLC	Williams Family Dairy Digester Fuel Pipeline	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	Combustion in Cogeneration (ethanol) and RCNG	201,208	\$1,500,000	\$2,524,659	\$4,024,659	Canceled ***
2017	Calgren Dairy Fuels LLC	K&M Visser Dairy Digester Fuel Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	Combustion in Cogeneration (ethanol) and RCNG.	203,416	\$1,500,000	\$1,902,047	\$3,402,047	Completed
2017	Maple Dairy Biogas	Maple Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	Kern	New covered lagoon digester	RCNG	348,171	\$3,000,000	\$5,331,773	\$8,331,773	In Progress
2017	S&S Dairy Biogas	S&S Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	West Visalia	New covered lagoon digester	RCNG	167,417	\$1,600,000	\$5,087,926	\$6,687,926	In Progress
2017	Calgren Dairy Fuels LLC	Pixley Dairy Digester Fuel Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	Combustion in Cogeneration (ethanol) and RCNG.	212,622	\$1,600,000	\$1,847,237	\$3,447,237	In Progress
2017	Calgren Dairy Fuels LLC	Legacy Dairy Digester Fuel Pipeline	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	Combustion in Cogeneration (ethanol) and RCNG.	207,209	\$1,550,000	\$1,887,320	\$3,437,320	Completed
2017	Moonlight Dairy Biogas	Moonlight Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	154,834	\$1,500,000	\$4,855,146	\$6,355,146	In Progress
2017	Calgren Dairy Fuels LLC	R Vander Eyk Dairy Digester Fuel Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	NA	New covered lagoon digester	Combustion in Cogeneration (ethanol) and RCNG.	132,586	\$1,000,000	\$1,604,440	\$2,604,440	Complete
2017	Calgren Dairy Fuels LLC	Circle A Dairy Digester Fuel Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	West Visalia	New covered lagoon digester	Combustion in Cogeneration (ethanol) and RCNG.	138,745	\$1,050,000	\$1,429,744	\$2,479,744	Complete
2017	Bos Farms Dairy Biogas	Bos Farms Dairy Biogas	California Bioenergy	Tulare, Tulare Co.	Kern	New covered lagoon digester	RCNG	168,398	\$1,500,000	\$11,334,030	\$12,834,030	In Progress
2017	Hamstra Dairy Biogas	Hamstra Dairy Biogas	California Bioenergy	Tulare, Tulare Co.	Kern	New covered lagoon digester	RCNG	205,115	\$2,000,000	\$4,580,840	\$6,580,840	In Progress

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2017	Hollandia Farms Dairy Biogas	Hollandia Farms Dairy Biogas	California Bioenergy	Hanford, Kings Co.	Calgren	New covered lagoon digester	RCNG	178,426	\$1,500,000	\$5,816,291	\$7,316,291	In Progress
2017	Rancho Teresita Dairy Biogas	Rancho Teresita Dairy Biogas	California Bioenergy	Tulare, Tulare Co.	Hanford	New covered lagoon digester	RCNG	236,251	\$2,100,000	\$10,400,558	\$12,500,558	In Progress
2018	Calgren Dairy Fuels LLC	4K Dairy Digester Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	RCNG	192,143	\$1,780,588	\$1,780,588	\$3,561,176	In Progress
2018	Aemetis Advanced Fuels Inc	Ackerman Dairy Digester Pipeline Project	Maas Energy Works Inc	Ceres, Stanislaus Co.	Aemetis	New covered lagoon digester	RCNG	89,574	\$1,331,291	\$1,331,291	\$2,662,582	In Progress
2018	Aukeman Farms Dairy Biogas	Aukeman Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	207,701	\$1,765,457	\$3,233,051	\$4,998,508	In Progress
2018	Belonave Dairy Biogas LLC	Belonave Dairy Biogas LLC	California Bioenergy, LLC	Bakersfield, Kern Co.	Kern	New covered lagoon digester	RCNG	225,659	\$1,918,099	\$3,540,063	\$5,458,162	In Progress
2018	BV Dairy LLC	BV Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	Kern	New covered lagoon digester	RCNG	205,835	\$1,749,596	\$2,085,855	\$3,835,451	In Progress
2018	Calgren Dairy Fuels LLC	Cornerstone Dairy Digester Pipeline Project	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	185,238	\$1,266,053	\$1,275,663	\$2,541,716	Completed
2018	De Groot North Dairy Biogas	De Groot North Dairy Biogas	California Bioenergy, LLC	Hanford, Kings Co.	West Visalia	New covered lagoon digester	RCNG	169,699	\$1,442,440	\$2,401,778	\$3,844,218	In Progress
2018	De Groot South Dairy Biogas	De Groot South Dairy Biogas	California Bioenergy, LLC	Hanford, Kings Co.	West Visalia	New covered lagoon digester	RCNG	181,494	\$1,542,697	\$1,758,946	\$3,301,643	In Progress
2018	Decade Energy LLC	Decade Centralized Dairy Digester Pipeline Project	Maas Energy Works Inc	Tulare, Tulare Co.	Hanford-Lakeside	New covered lagoon digester	RCNG	192,558	\$1,773,587	\$1,773,587	\$3,547,174	In Progress
2018	DJ South Dairy Biogas LLC	DJ South Dairy Digester Pipeline Project	Maas Energy Works Inc	Chowchilla, Madera Co.	Merced-South	New covered lagoon digester	RCNG	150,175	\$1,810,526	\$1,810,525	\$3,621,051	In Progress
2018	Aemetis Advanced Fuels Inc	Double D Dairy Digester Pipeline Project	Maas Energy Works Inc	Ceres, Stanislaus Co.	Aemetis	New covered lagoon digester	RCNG	189,850	\$1,822,668	\$1,822,668	\$3,645,336	In Progress

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2018	Double J Dairy Biogas	Double J Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	285,496	\$2,426,716	\$4,289,806	\$6,716,522	In Progress
2018	Double L Dairy Biogas LLC	Double L Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Hanford-Lakeside	New covered lagoon digester	RCNG	136,148	\$1,762,347	\$1,762,347	\$3,524,694	In Progress
2018	Dykstra Dairy Biogas	Dykstra Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	265,936	\$2,260,454	\$3,436,003	\$5,696,457	In Progress
2018	The El Monte Dairy Biogas	El Monte Dairy Biogas	California Bioenergy, LLC	Tipton, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	118,903	\$1,010,674	\$3,122,303	\$4,132,977	In Progress
2018	5H Dairy Biogas LLC	Five H Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced-South	New covered lagoon digester	RCNG	122,183	\$1,851,297	\$1,851,297	\$3,702,594	In Progress
2018	FM Jersey Biogas LLC	FM Jerseys Dairy Digester Virtual Pipeline Project	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	161,960	\$2,010,747	\$2,010,747	\$4,021,494	In Progress
2018	Hoogendam Dairy Biogas LLC	Hoogendam Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced-South	New covered lagoon digester	RCNG	142,354	\$1,809,452	\$1,809,453	\$3,618,905	In Progress
2018	Horizon Jersey Dairy Biogas	Horizon Jersey Dairy Biogas	California Bioenergy, LLC	Tipton, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	335,398	\$2,850,886	\$4,134,949	\$6,985,835	In Progress
2018	California Bioenergy LLC	Jacobus De Groot #2 Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	61,616	\$523,736	\$2,857,688	\$3,381,424	In Progress
2018	Calgren Dairy Fuels LLC	Little Rock Centralized Dairy Digester Pipeline Project	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	146,839	\$2,096,578	\$2,096,578	\$4,193,156	In Progress
2018	Lone Oak Energy LLC	Lone Oak #1 Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Hanford-Lakeside	New covered lagoon digester	RCNG	247,703	\$1,869,269	\$1,869,269	\$3,738,538	In Progress
2018	Meirinho Dairy Biogas LLC	Meirinho Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced-South	New covered lagoon digester	RCNG	147,352	\$1,832,358	\$1,832,357	\$3,664,715	In Progress

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2018	Mellema Dairy Biogas	Mellema Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	152,057	\$1,292,485	\$3,921,216	\$5,213,701	In Progress
2018	Milky Way Dairy Biogas	Milky Way Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	347,462	\$2,953,427	\$4,244,734	\$7,198,161	In Progress
2018	Mineral King Dairy Biogas	Mineral King Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	194,751	\$1,655,384	\$3,416,032	\$5,071,416	In Progress
2018	Rancho Sierra Vista Dairy Biogas	Rancho Sierra Vista Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	172,958	\$1,470,143	\$3,474,018	\$4,944,161	In Progress
2018	Red Rock Dairy Biogas LLC	Red Rock Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced-South	New covered lagoon digester	RCNG	156,242	\$2,031,126	\$2,031,126	\$4,062,252	In Progress
2018	River Ranch Farms LLC	River Ranch Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Hanford-Lakeside	New covered lagoon digester	RCNG	187,884	\$1,994,860	\$1,994,861	\$3,989,721	In Progress
2018	Riverbend Dairy Biogas	Riverbend Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	245,930	\$2,090,404	\$2,731,981	\$4,822,385	In Progress
2018	Calgren Dairy Fuels LLC	Riverview Dairy Digester Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	RCNG	90,093	\$1,332,070	\$1,332,070	\$2,664,140	In Progress
2018	Rob Van Grouw Dairy Biogas	Rob Van Grouw Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	140,442	\$1,193,757	\$3,751,897	\$4,945,654	In Progress
2018	Rocking Horse Dairy Biogas	Rocking Horse Dairy Biogas	California Bioenergy, LLC	Hanford, Kings Co.	Hanford	New covered lagoon digester	RCNG	119,540	\$1,016,091	\$2,681,538	\$3,697,629	In Progress
2018	Rockshar Dairy Biogas LLC	Rockshar Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced-South	New covered lagoon digester	RCNG	124,664	\$1,679,093	\$1,679,093	\$3,358,186	In Progress
2018	Scheenstra Dairy Biogas	Scheenstra Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	220,360	\$1,873,064	\$3,596,847	\$5,469,911	In Progress
2018	Calgren Dairy Fuels LLC	Sousa & Sousa Dairy Digester Pipeline Project	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	68,700	\$886,934	\$892,931	\$1,779,865	Complete

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2018	Udder Dairy Biogas	Udder Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	West Visalia	New covered lagoon digester	RCNG	135,701	\$1,153,459	\$2,049,345	\$3,202,804	In Progress
2018	Valadao Dairy Biogas	Valadao Dairy Biogas	California Bioenergy, LLC	Hanford, Kings Co.	Hanford	New covered lagoon digester	RCNG	121,005	\$1,028,545	\$1,877,850	\$2,906,395	In Progress
2018	Calgren Dairy Fuels LLC	Vander Poel Dairy Digester Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	RCNG	290,060	\$1,972,485	\$2,222,073	\$4,194,558	Complete
2018	Vander Woude Dairy	Vander Woude Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced-South	New covered lagoon digester	RCNG	188,575	\$1,863,562	\$1,863,562	\$3,727,124	In Progress
2018	Vista Verde Dairy Biogas LLC	Vista Verde Dairy Digester Pipeline Project	Maas Energy Works Inc	Chowchilla, Madera Co.	Merced-South	New covered lagoon digester	RCNG	140,653	\$1,594,109	\$1,594,108	\$3,188,217	In Progress
2018	Western Sky Dairy Biogas	Western Sky Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	Kern	New covered lagoon digester	RCNG	352,595	\$2,820,762	\$2,902,189	\$5,722,951	In Progress
2019	Ahlem Farms Dairy Biogas	Ahlem Farms Dairy Biogas	California Bioenergy, LLC	Hilmar, Merced Co.	Hilmar	New covered lagoon digester	RCNG	153,151	\$1,546,738	\$4,557,504	\$6,104,242	In Progress
2019	Albert Goyenette Dairy Biogas	Albert Goyenette Dairy Biogas	California Bioenergy, LLC	Buttonwillow, Kern Co.	Buttonwillow	New covered lagoon digester	RCNG	199,706	\$1,609,316	\$6,993,567	\$8,602,883	In Progress
2019	Art Leyendekker Dairy Biogas	Art Leyendekker Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	77,697	\$769,784	\$2,915,284	\$3,685,068	In Progress
2019	DG Energy LLC	Avalon Dairy Digester Project	Maas Energy Works Inc	Wasco, Kern Co.	Calgren	New covered lagoon digester	RCNG	159,758	\$1,917,757	\$1,917,757	\$3,835,514	In Progress
2019	Bar 20 Dairy Biogas, LLC	Bar 20 Dairy Biogas	California Bioenergy, LLC	Kerman, Fresno Co.	NA	New covered lagoon digester	Electric Vehicle - Fuel Cell	374,390	\$3,000,000	\$13,989,069	\$16,989,069	In Progress
2019	Charles Ahlem Ranch Dairy Biogas	Charles Ahlem Ranch Dairy Biogas	California Bioenergy, LLC	Hilmar, Merced Co.	Hilmar	New covered lagoon digester	RCNG	136,018	\$1,373,697	\$5,758,275	\$7,131,972	In Progress
2019	Clauss and Sunwest Dairy Biogas	Clauss and Sunwest Dairy Biogas	California Bioenergy, LLC	Hilmar, Merced Co.	Hilmar	New covered lagoon digester	RCNG	155,682	\$1,572,301	\$4,780,296	\$6,352,597	In Progress
2019	Curtimade Dairy Biogas	Curtimade Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	174,734	\$1,747,336	\$3,025,858	\$4,773,194	In Progress

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2019	Dairyland Farms Dairy Biogas	Dairyland Farms Dairy Biogas	California Bioenergy, LLC	Tipton, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	177,475	\$1,760,347	\$3,140,466	\$4,900,813	In Progress
2019	Tipton Pipeline LLC	De Boer Dairy Digester Pipeline Project	Maas Energy Works Inc	Tulare, Tulare Co.	Calgren	New covered lagoon digester	RCNG (trucking)	191,647	\$1,825,261	\$1,825,262	\$3,650,523	In Progress
2019	Lone Oak Energy LLC	Dixie Creek Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Lakeside	New covered lagoon digester	RCNG	271,176	\$2,436,030	\$2,436,030	\$4,872,060	In Progress
2019	El Nido Biogas LLC	Double Diamond Dairy Digester Pipeline Project	Maas Energy Works Inc	El Nido, Merced Co.	Merced	New covered lagoon digester	RCNG	290,633	\$2,037,766	\$2,037,766	\$4,075,532	In Progress
2019	Elk Creek Dairy Biogas	Elk Creek Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	59,555	\$512,706	\$3,596,502	\$4,109,208	In Progress
2019	Elkhorn Dairy Biogas	Elkhorn Dairy Biogas	California Bioenergy, LLC	Dinuba, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	211,940	\$2,125,882	\$4,520,035	\$6,645,917	In Progress
2019	Tipton Pipeline LLC	Fern Oaks Dairy Digester Pipeline Project	Maas Energy Works Inc	Porterville, Tulare Co.	Calgren	New covered lagoon digester	RCNG	169,370	\$1,688,894	\$1,688,894	\$3,377,788	In Progress
2019	Friesian Farms Dairy Biogas	Friesian Farms Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	63,145	\$639,602	\$3,175,183	\$3,814,785	In Progress
2019	Gerben Leyendekker Dairy Biogas	Gerben Leyendekker Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	85,419	\$845,589	\$2,902,768	\$3,748,357	In Progress
2019	GP Dairy Biogas	GP Dairy Biogas	California Bioenergy, LLC	Visalia, Tulare Co.	North Visalia	New covered lagoon digester	RCNG	50,722	\$502,554	\$2,915,623	\$3,418,177	In Progress
2019	Calgren Dairy Fuels LLC	Hettinga Centralized Dairy Digester Pipeline Project	Maas Energy Works Inc	Pixley, Tulare Co.	Calgren	New covered lagoon digester	RCNG	167,339	\$2,352,909	\$2,352,909	\$4,705,818	In Progress
2019	River Ranch Farms LLC	High Roller Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Lakeside	New covered lagoon digester	RCNG	105,257	\$1,412,136	\$1,412,136	\$2,824,272	In Progress

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2019	Merced Pipeline LLC	Homen Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced	New covered lagoon digester	RCNG	124,000	\$1,640,419	\$1,640,420	\$3,280,839	In Progress
2019	James Ahlem Dairy Biogas	James Ahlem Dairy Biogas	California Bioenergy, LLC	Hilmar, Merced Co.	Hilmar	New covered lagoon digester	RCNG	82,216	\$830,349	\$4,861,351	\$5,691,700	In Progress
2019	Lakeside Energy LLC	Lakeside Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Lakeside	New covered lagoon digester	RCNG	218,679	\$2,213,063	\$2,213,063	\$4,426,126	In Progress
2019	Maya Dairy Biogas	Maya Dairy Biogas	California Bioenergy, LLC	Buttonwillow, Kern Co.	Buttonwillow	New covered lagoon digester	RCNG	250,090	\$2,015,393	\$6,954,582	\$8,969,975	In Progress
2019	McMoo Farms Dairy Biogas	McMoo Farms Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	Kern	New covered lagoon digester	RCNG	164,384	\$1,598,893	\$2,321,639	\$3,920,532	In Progress
2019	Merced Pipeline LLC	Melo Dairy Digester Pipeline Project	Maas Energy Works Inc	Merced, Merced Co.	Merced	New covered lagoon digester	RCNG	272,690	\$2,910,554	\$2,910,555	\$5,821,109	In Progress
2019	Newhouse Dairy Biogas	Newhouse Dairy Biogas	California Bioenergy, LLC	Bakersfield, Kern Co.	Kern	New covered lagoon digester	RCNG	171,098	\$1,665,037	\$2,945,573	\$4,610,610	In Progress
2019	Calgren Dairy Fuels LLC	Northstar Dairy Digester Pipeline Project	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	170,658	\$1,576,438	\$1,576,438	\$3,152,876	In Progress
2019	Nyman Brothers Dairy Biogas	Nyman Brothers Dairy Biogas	California Bioenergy, LLC	Hilmar, Merced Co.	Hilmar	New covered lagoon digester	RCNG	68,026	\$687,006	\$4,654,902	\$5,341,908	In Progress
2019	Poplar Lane Dairy Biogas LLC	Poplar Lane Dairy Digester Pipeline Project	Maas Energy Works Inc	Hanford, Kings Co.	Lakeside	New covered lagoon digester	RCNG	131,195	\$1,756,966	\$1,756,966	\$3,513,932	In Progress
2019	Rib-Arrow Dairy Biogas	Rib-Arrow Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	76,343	\$657,231	\$3,517,919	\$4,175,150	In Progress
2019	Ribeiro Dairy Biogas	Ribeiro Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	132,348	\$1,124,962	\$2,689,080	\$3,814,042	In Progress
2019	Rio Blanco Dairy Biogas	Rio Blanco Dairy Biogas	California Bioenergy, LLC	Tulare, Tulare Co.	South Tulare	New covered lagoon digester	RCNG	100,886	\$1,002,797	\$2,556,018	\$3,558,815	In Progress
2019	Calgren Dairy Fuels LLC	Schott Dairy Digester	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	129,082	\$1,444,592	\$1,444,592	\$2,889,184	In Progress

2019	Calgren Dairy Fuels LLC	Pipeline Project Simoes Centralized Digester Pipeline Project	Maas Energy Works Inc	Tipton, Tulare Co.	Calgren	New covered lagoon digester	RCNG	161,275	\$2,036,460	\$2,036,460	\$4,072,920	In Progress
2019	Skyview Dairy Biogas	Skyview Dairy Biogas	California Bioenergy, LLC	Shafter, Kern Co.	Buttonwillow	New covered lagoon digester	RCNG	85,174	\$686,620	\$7,686,172	\$8,372,792	In Progress
2019	Southern Cross Dairy Biogas	Southern Cross Dairy Biogas	California Bioenergy, LLC	Buttonwillow, Kern Co.	Buttonwillow	New covered lagoon digester	RCNG	125,872	\$1,019,121	\$8,072,067	\$9,091,188	In Progress
2019	Southpoint Ranch Dairy Biogas	Southpoint Ranch Dairy Biogas	California Bioenergy, LLC	Madera, Madera Co.	NA	New covered lagoon digester	Electric Vehicle - Fuel Cell	484,999	\$3,000,000	\$13,642,393	\$16,642,393	In Progress
2019	Van Der Hoek Dairy Biogas LLC	Van Der Hoek Dairy Digester Pipeline Project	Maas Energy Works Inc	Helm, Fresno Co.	Five Points	New covered lagoon digester	RCNG	168,447	\$2,061,968	\$2,061,968	\$4,123,936	In Progress
2019	Van Der Kooi Power LLC	Van Der Kooi Dairy Digester Pipeline Project	Maas Energy Works Inc	Riverdale, Fresno Co.	Five Points	New covered lagoon digester	RCNG	170,089	\$1,897,438	\$1,897,438	\$3,794,876	In Progress
2019	L&J Vanderham Dairy	Vanderham Dairy Digester Pipeline Project	Maas Energy Works Inc	Riverdale, Fresno Co.	Five Points	New covered lagoon digester	RCNG	186,037	\$1,984,951	\$1,984,951	\$3,969,902	In Progress
2019	ENV-TWO LLC	Flint Dairy Biogas Project	ENV-TWO LLC	Hanford, Kings Co.	NA	Demonstration Project: New up-flow anaerobic sludge blanket digester	RCNG	126,988	\$1,750,000	\$3,374,782	\$5,124,782	In Progress
Totals									\$183,394,392	\$370,123,077	\$553,517,468	

*Estimated reductions calculated using the CARB Quantification Methodology and calculator tool. MTCO_{2e}: Metric tonnes of carbon dioxide equivalent.

**RCNG: Renewable Compressed Natural Gas

***Project canceled due to substantive changes to project scope.

Table 5. Cost Effectiveness Summary of Dairy Digester Projects Funded by CDFA.

Year Awarded	Project Title	Total cost of 1 MTCO ₂ e GHG reduction (\$)	GGRF cost of 1 MTCO ₂ e GHG reduction (\$)	Percent of 1 MTCO ₂ e GHG reduction cost supported cost by GGRF
2015	Carlos Echeverria & Sons Dairy Biogas Project	32.61	4.97	15
2015	Lakeview Dairy Biogas Digester	49.47	13.88	28
2015	Open Sky Ranch Dairy Digester	7.59	3.76	50
2015	Verwey-Hanford Dairy Digester	11.22	5.60	50
2015	Verwey-Madera Dairy Digester	19.22	9.50	49
2015	West-Star North Dairy Digester	51.78	11.58	22
2017	Bos Farms Dairy Biogas	76.21	8.91	12
2017	Circle A Dairy Digester Fuel Pipeline Project	17.87	7.57	42
2017	Cloverdale Dairy Biogas	21.72	8.31	38
2017	Hamstra Dairy Biogas	32.08	9.75	30
2017	Hollandia Farms Dairy Biogas	41.00	8.41	21
2017	K&M Visser Dairy Digester Fuel Pipeline Project	16.72	7.37	44
2017	Legacy Dairy Digester Fuel Pipeline	16.59	7.48	45
2017	Maple Dairy Biogas	23.93	8.62	36
2017	Moonlight Dairy Biogas	41.04	9.69	24
2017	Pixley Dairy Digester Fuel Pipeline Project	16.21	7.53	46
2017	R Vander Eyk Dairy Digester Fuel Pipeline Project	19.64	7.54	38
2017	Rancho Teresita Dairy Biogas	52.91	8.89	17
2017	Red Top Madera Dairy Digester Project	21.41	10.62	50
2017	S&S Dairy Biogas	39.95	9.56	24
2017	T & W Dairy Biogas	24.73	8.81	36

2017	Trilogy Dairy Biogas	25.34	8.84	35
2017	Williams Family Dairy Digester Fuel Pipeline	20.00	7.45	37
2017	Wreden Ranch Dairy Biogas	19.64	7.62	39
2018	4K Dairy Digester Pipeline Project	18.53	9.27	50
2018	Ackerman Dairy Digester Pipeline Project	29.72	14.86	50
2018	Aukeman Dairy Biogas	24.07	8.50	35
2018	Belonave Dairy Biogas LLC	24.19	8.50	35
2018	BV Dairy Biogas	18.63	8.50	46
2018	Cornerstone Dairy Digester Pipeline Project	13.72	6.83	50
2018	De Groot North Dairy Biogas	22.65	8.50	38
2018	De Groot South Dairy Biogas	18.19	8.50	47
2018	Decade Centralized Dairy Digester Pipeline Project	18.42	9.21	50
2018	DJ South Dairy Digester Pipeline Project	24.11	12.06	50
2018	Double D Dairy Digester Pipeline Project	19.20	9.60	50
2018	Double J Dairy Biogas	23.53	8.50	36
2018	Double L Dairy Digester Pipeline Project	25.89	12.94	50
2018	Dykstra Dairy Biogas	21.42	8.50	40
2018	El Monte Dairy Biogas	34.76	8.50	24
2018	Five H Dairy Digester Pipeline Project	30.30	15.15	50
2018	FM Jerseys Dairy Digester Virtual Pipeline Project	24.83	12.42	50
2018	Hoogendam Dairy Digester Pipeline Project	25.42	12.71	50
2018	Horizon Jersey Dairy Biogas	20.83	8.50	41
2018	Jacobus De Groot #2 Dairy Biogas	54.88	8.50	15
2018	Little Rock Centralized Dairy Digester Pipeline Project	28.56	14.28	50

2018	Lone Oak #1 Dairy Digester Pipeline Project	15.09	7.55	50
2018	Meirinho Dairy Digester Pipeline Project	24.87	12.44	50
2018	Mellema Dairy Biogas	34.29	8.50	25
2018	Milky Way Dairy Biogas	20.72	8.50	41
2018	Mineral King Dairy Biogas	26.04	8.50	33
2018	Rancho Sierra Vista Dairy Biogas	28.59	8.50	30
2018	Red Rock Dairy Digester Pipeline Project	26.00	13.00	50
2018	River Ranch Dairy Digester Pipeline Project	21.24	10.62	50
2018	Riverbend Dairy Biogas	19.61	8.50	43
2018	Riverview Dairy Digester Pipeline Project	29.57	14.79	50
2018	Rob Van Grouw Dairy Biogas	35.21	8.50	24
2018	Rocking Horse Dairy Biogas	30.93	8.50	27
2018	Rockshar Dairy Digester Pipeline Project	26.94	13.47	50
2018	Scheenstra Dairy Biogas	24.82	8.50	34
2018	Sousa & Sousa Dairy Digester Pipeline Project	25.91	12.91	50
2018	Udder Dairy Biogas	23.60	8.50	36
2018	Valadao Dairy Biogas	24.02	8.50	35
2018	Vander Poel Dairy Digester Pipeline Project	14.46	6.80	47
2018	Vander Woude Dairy Digester Pipeline Project	19.76	9.88	50
2019	Ahlem Farms Dairy Biogas	39.86	10.10	25
2019	Albert Goyenette Dairy Biogas	43.08	8.06	19
2019	Art Leyendekker Dairy Biogas	47.43	9.91	21
2019	Avalon Dairy Digester Project	24.01	12.00	50
2019	Bar 20 Dairy Biogas	45.38	8.01	18
2019	Charles Ahlem Ranch Dairy Biogas	52.43	10.10	19

2019	Clauss and Sunwest Dairy Biogas	40.80	10.10	25
2019	Curtimade Dairy Biogas	27.32	10.00	37
2019	Dairyland Farms Dairy Biogas	27.61	9.92	36
2019	De Boer Dairy Digester Pipeline Project	19.05	9.52	50
2019	Dixie Creek Dairy Digester Pipeline Project	17.97	8.98	50
2019	Double Diamond Dairy Digester Pipeline Project	14.02	7.01	50
2019	Elk Creek Dairy Biogas	69.00	8.61	12
2019	Elkhorn Dairy Biogas	31.36	10.03	32
2019	Fern Oaks Dairy Digester Pipeline Project	19.94	9.97	50
2019	Friesian Farms Dairy Biogas	60.41	10.13	17
2019	Gerben Leyendekker Dairy Biogas	43.88	9.90	23
2019	GP Dairy Biogas	67.39	9.91	15
2019	Hettinga Centralized Dairy Digester Pipeline Project	28.12	14.06	50
2019	High Roller Dairy Digester Pipeline Project	26.83	13.42	50
2019	Homen Dairy Digester Pipeline Project	26.46	13.23	50
2019	James Ahlem Dairy Biogas	69.23	10.10	15
2019	Lakeside Dairy Digester Pipeline Project	20.24	10.12	50
2019	Maya Dairy Biogas	35.87	8.06	22
2019	McMoo Farms Dairy Biogas	23.85	9.73	41
2019	Melo Dairy Digester Pipeline Project	21.35	10.67	50
2019	Newhouse Dairy Biogas	26.95	9.73	36
2019	Northstar Dairy Digester Pipeline Project	18.47	9.24	50
2019	Nyman Brothers Dairy Biogas	78.53	10.10	13
2019	Poplar Lane Dairy Digester Pipeline Project	26.78	13.39	50
2019	Rib-Arrow Dairy Biogas	54.69	8.61	16

2019	Ribeiro Dairy Biogas	28.82	8.50	29
2019	Rio Blanco Dairy Biogas	35.28	9.94	28
2019	Schott Dairy Digester Pipeline Project	22.38	11.19	50
2019	Simoes Centralized Digester Pipeline Project	25.25	12.63	50
2019	Skyview Dairy Biogas	98.30	8.06	8
2019	Southern Cross Dairy Biogas	72.23	8.10	11
2019	Southpoint Ranch Dairy Biogas	34.31	6.19	18
2019	Van Der Hoek Dairy Digester Pipeline Project	24.48	12.24	50
2019	Van Der Kooi Dairy Digester Pipeline Project	22.31	11.16	50
2019	Vanderham Dairy Digester Pipeline Project	21.34	10.67	50
2019	Whiteside Dairy Biogas	68.41	8.06	12
2019	Yosemite Jersey Dairy Biogas	53.82	10.10	19
2019	Flint Dairy Biogas Project (DDRDP Demonstration Project)_	40.36	13.78	34

VI. Individual Project Information

Information on individual projects funded through the CDFA DDRDP from 2014-2019.

Verwey-Hanford Dairy Digester
Funded: 2015
Completed: 2017
Status: Operational

The Verwey-Hanford Dairy Digester project is a new covered lagoon digester at Philip Verwey Farms #2 dairy. The biogas from the digester will be used to produce approximately 7.6 million kWh of renewable electricity per year.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$3,000,000
- Matching funds - \$3,011,595
- Total Project costs - \$ 6,011,595
- Estimated 10-year GHG reductions - 535,770 MTCO_{2e}.
- GHG reductions per CDFA grant dollar - 0.18 MTCO_{2e}
- GHG reductions per total project dollars - 0.09 MTCO_{2e}
- Total cost per MTCO_{2e} - \$11.22



Image 1. View of the covered lagoon digester at Verwey-Hanford Dairy.

Open Sky Ranch Dairy Digester
Funded: 2015
Completed: 2016
Status: Operational

The Open Sky Ranch Dairy Digester project recommissioned a defunct covered lagoon digester at Open Sky Ranch. The biogas from the digester will be used to produce approximately 6.4 million kWh of renewable electricity per year.

- Location – Riverdale, California (Fresno County)
- CDFA DDRDP Funding - \$973,430
- Matching funds - \$990,486
- Total Projects costs - \$1,963,916
- Estimated 10-year GHG reductions - 258,911 MTCO_{2e}
- GHG reductions per CDFA grant dollars – 0.27 MTCO_{2e}
- GHG reductions per total projects dollars 0.13 MTCO_{2e}
- Total cost per MTCO_{2e} - \$7.59



Image 2. A view of the Open Sky Ranch Dairy digester.

Verwey-Madera Dairy Digester
Funded: 2015
Completed: 2017
Status: Operational

The Verwey-Madera Dairy Digester project is a new covered lagoon digester to be installed at Philip Verwey Farms #1. The biogas from the digester will be used to produce approximately 4.8 million kWh renewable electricity per year.

- Location – Madera, California (Madera County)

- CDFA DDRDP Funding - \$2,281,091
- Matching funds - \$2,331,935
- Total Project costs - \$4,613,026
- Estimated 10-year GHG reductions - 240,000 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reductions per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.22



Image 3. Covered lagoon digester at Verwey-Madera Dairy.



Image 4. Installed electrical genset at Verwey-Madera Dairy.

*West-Star North Dairy Digester
Funded: 2015
Completed: January 2018
Status: Operational*

The West-Star North Dairy digester is a covered lagoon digester project. This project will capture biogas from two covered lagoons at the dairy. Biogas from the digester will produce 7.6 million kWh renewable electricity per year.

- Location – Buttonwillow, California (Kern County)
- CDFA DDRDP Funding - \$1,837,005
- Matching funds - \$6,381,069
- Total Project costs - \$8,218,114
- Estimated 10-year GHG reductions - 158,370 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}
- GHG reductions per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$51,78



Image 5. Biogas conditioning and electric generation equipment (foreground) with covered lagoon digester (background) at the West-Star North Dairy.

Lakeview Dairy Biogas Digester
Funded: 2015
Completed: January 2018
Status: Operational

Lakeview Dairy Biogas Digester is a covered lagoon digester system. The biogas generated by this project will generate 6.7 million kWh of electricity per day.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$2,000,000
- Matching funds - \$5,128,324
- Total Project costs - \$7,128,324
- Estimated 10-year GHG reductions - 144,090 MTCO_{2e}
- GHG reductions per grant dollar - 0.07 MTCO_{2e}
- GHG reductions per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$49.47

Carlos Echeverria & Sons Dairy Biogas Project
Funded: 2015
Completed: January 2018
Status: Operational

ABEC #4 LLC dba Carlos Echeverria & Sons Dairy Biogas is a new covered lagoon dairy digester system and a biogas-fueled combined heat and power (CHP). An estimated of 7.6 million kWh of renewable electricity per year.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$1,000,000
- Matching funds - \$5,560,375
- Total Project costs - \$6,560,375
- Estimated 10-year GHG reductions - 201,200 MTCO_{2e}
- GHG reductions per CDFA grant dollars - 0.2 MTCO_{2e}
- GHG reductions per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$32.61

Circle A Dairy Digester Fuel Pipeline Project
Funded: 2017
Completed: October 2018
Status: Operational

The Circle A Dairy Digester Fuel Pipeline Project is a covered lagoon anaerobic digester. The project is part of the Calgren Dairy Fuels Cluster. The biogas from the digester supplies via private pipeline to fuel two 5MW gas turbines that power the Calgren ethanol refinery. The cluster will install a RCNG station and later connect to the utility pipeline to supply more RCNG stations.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,050,000
- Matching funds - \$1,429,744
- Total Project costs - \$2,479,744
- Estimated 10-year GHG reductions - 138,745 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.13 MTCO_{2e}
- GHG reductions per total project dollars - 0.06 MTCO_{2e}
- Total cost per MTCO_{2e} - \$17.87



Image 6. View of biogas handling building (foreground) and covered lagoon digester (background) at Circle A dairy.

*R Vander Eyk Dairy Dairy Digester Fuel Pipeline Project
Funded: 2017
Completed: February 2019
Status: Operational*

The Robert Vander Eyk Dairy Digester Fuel Pipeline Project is a covered lagoon anaerobic digester. The project is part of the Calgren Dairy Fuels Cluster. The biogas from the digester supplies via private pipeline to fuel two 5MW gas turbines that power the Calgren ethanol refinery. The cluster will install a RCNG station and later connect to the utility pipeline to supply more RCNG stations.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,000,000
- Matching funds - \$1,604,440
- Total Projects costs - \$2,604,440
- Estimated 10-year GHG reductions - 132,586 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.13 MTCO_{2e}
- GHG reductions per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.64



Image 7. Covered lagoon digester at R Vander Eyk Dairy

Legacy Dairy Digester Fuel Pipeline Project
Funded: 2017
Completed: February 2019
Status: Operational

The Legacy Dairy Digester Fuel Pipeline Project is a covered lagoon anaerobic digester. The project is part of the Calgren Dairy Fuels Cluster. The biogas from

the digester supplies via private pipeline to fuel two 5MW gas turbines that power the Calgren ethanol refinery. The cluster will install a RCNG station and later connect to the utility pipeline to supply more RCNG stations.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,550,000
- Matching funds - \$1,887,320
- Total Project costs - \$3,437,320
- Estimated 10-year GHG reductions - 207,209 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.13 MTCO_{2e}
- GHG reductions per total project dollars - 0.06 MTCO_{2e}
- Total cost per MTCO_{2e} - \$16.59



Image 8. Covered lagoon digester (foreground) and solid separator (background) at Legacy Dairy.

Cornerstone Dairy Digester Pipeline Project
Funded: 2018
Completed: August 2019
Status: Operational

Cornerstone Dairy Digester Pipeline Project is a new covered lagoon digester. Biomethane from the digester is transported via private, low-pressure pipeline to the cluster's central hub near the Calgren ethanol refinery. Once at the hub, it will

be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,266,053
- Matching funds - \$1,275,663
- Total Projects costs - \$2,541,716
- Estimated 10-year GHG reductions – 185,238 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.15 MTCO_{2e}
- GHG reduction per total project dollars - 0.07 MTCO_{2e}
- Total cost per MTCO_{2e} - \$13.72



Image 9. Biogas conditioning equipment (foreground) and covered lagoon digester (background) at Cornerstone Dairy.

K&M Visser Dairy Digester Fuel Pipeline Project
Funded: 2017
Completed: November 2019
Status: Operational

The K&M Visser Dairy Digester Fuel Pipeline Project is a covered lagoon anaerobic digester. The project is part of the Calgren Dairy Fuels Cluster. The biogas from the digester supplies via private pipeline to fuel two 5MW gas turbines that power the Calgren ethanol refinery. The cluster will install a RCNG station and later connect to the utility pipeline to supply more RCNG stations.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,500,000
- Matching funds - \$1,902,047
- Total Project costs - \$3,402,047
- Estimated 10-year GHG reductions - 203,416 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.14 MTCO_{2e}
- GHG reductions per total dollars - 0.06 MTCO_{2e}
- Total cost per MTCO_{2e} - \$16.72



Image 10. Details of the digester lagoon cover at K&M Visser Dairy showing details of welded liners to prevent biogas leakage.

Sousa & Sousa Dairy Digester Pipeline Project
Funded: 2018
Completed: November 2019
Status: Operational

Sousa & Sousa Dairy Digester Pipeline Project is a new covered lagoon digester processing dairy manure. Biomethane from the digester is transported via private, low-pressure pipeline to the cluster's central hub at the Calgren ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$886,934
- Matching funds - \$892,931
- Total Projects costs - \$1,779,865
- Estimated 10-year GHG reductions – 68,700 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$25.91



Image 11. Covered lagoon dairy digester at Sousa & Sousa Dairy.

Vander Poel Dairy Digester Pipeline Project
Funded: 2018
Completion: November 2019
Status: Operational

Vander Poel Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the Calgren ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,972,485
- Matching funds - \$2,222,073
- Total Projects costs - \$4,194,558
- Estimated 10-year GHG reductions – 290,060 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.15 MTCO_{2e}
- GHG reduction per total project dollars - 0.07 MTCO_{2e}
- Total cost per MTCO_{2e} - \$14.46



Image 12. Covered lagoon digester filled with biogas at the Vander Poel Dairy.

Wreden Ranch Dairy Biogas
Funded: 2017
Status: In Progress
Expected Completion Date: March 2021

Wreden Ranch will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$3,000,000
- Matching funds – \$4,735,860
- Total Project costs - \$7,735,860
- Estimated 10-year GHG reductions - 393,915 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.13 MTCO_{2e}
- GHG reductions per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.64

Trilogy Dairy Biogas
Funded: 2017
Status: In Progress
Expected Completion Date: March 2021

Trilogy Dairy will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$2,250,000
- Matching funds - \$4,200,840
- Total Project costs - \$6,450,840
- Estimated 10-year GHG reductions - 254,577 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reductions per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$25.34

Cloverdale Dairy Biogas
Funded: 2017
Status: In Progress

Expected Completion Date: March 2021

Cloverdale Dairy will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$3,000,000
- Matching funds - \$4,836,793
- Total Project costs - \$7,836,793
- Estimated 10-year GHG reductions - 360,851 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reductions per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$21.72

T&W Dairy Biogas

Funded: 2017

Status: In Progress

Expected Completion Date: March 2021

T & W Farms will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding – 2,600,000
- Matching funds - \$4,695,759
- Total Project costs - \$7,295,759
- Estimated 10-year GHG reductions - 294,892 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reductions per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.73

Aligned Digester Cooperative LLC

Funded: 2018

Status: Canceled

Aligned Digester Co., LLC (dba Aligned Digester Cooperative LLC) has partnered with Red Top Jerseys Dairy to develop a covered lagoon digester that

would have produced up to 63,000 MMBtu of RNG expanding the market for near-zero emission natural gas vehicles in the San Joaquin Valley.

- Location – Chowchilla, California (Madera County)
- CDFA DDRDP Funding – \$3,000,000
- Project canceled due to substantial changes in project scope.

*Williams Family Dairy Digester Fuel Pipeline
Funded: 2018
Status: Canceled*

The Williams Family Dairy Digester Fuel Pipeline Project is a covered lagoon anaerobic digester. The project was proposed as part of the Calgren Dairy Fuels Cluster to power the Calgren ethanol refinery.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,500,000
- Project canceled due to substantial change in project objectives and scope.

*Maple Dairy Biogas
Funded: 2017
Status: In Progress
Expected Completion Date: March 2021*

Maple Dairy will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add pre-digester sand lane and screens for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted for with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$3,000,000
- Matching funds – \$5,331,773
- Total Project costs - \$8,331,773
- Estimated 10-year GHG reductions - 348,171 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reductions per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$23.93

*S&S Dairy Biogas
Funded: 2017*

Status: In Progress
Expected Completion Date: March 2020

S&S Dairy will build a covered lagoon with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted for with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding – \$1,600,000
- Matching funds - \$5,087,926
- Total Project costs - \$6,687,926
- Estimated 10-year GHG reductions - 167,417 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.1 MTCO_{2e}
- GHG reductions per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$39.94

Pixley Dairy Digester Fuel Pipeline Project
Funded: 2017
Status: In Progress
Expected Completion Date: December 2019

The Pixley Dairy Digester Fuel Pipeline Project is a covered lagoon anaerobic digester. The project is part of the Calgren Dairy Fuels Cluster. The biogas from the digester will be supplied via private pipeline to fuel two 5MW gas turbines that power the Calgren ethanol refinery. The cluster will install a RCNG station and later connect to the utility pipeline to supply more RCNG stations.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,600,000
- Matching funds - \$1,847,237
- Total Project costs - \$3,447,237
- Estimated 10-year GHG reductions - 212,622 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.13 MTCO_{2e}
- GHG reductions per total project dollars - 0.06 MTCO_{2e}
- Total cost per MTCO_{2e} - \$16.21

Moonlight Dairy Biogas
Funded: 2017

Status: In Progress
Expected Completion Date: March 2021

Moonlight Dairy will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted for with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$1,500,000
- Matching funds - \$4,855,146
- Total Projects costs - \$6,355,146
- Estimated 10-year GHG reductions - 154,834 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.1 MTCO_{2e}
- GHG reductions per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$41.05

Bos Farms Dairy Biogas
Funded: 2017
Status: In Progress
Expected Completion Date: March 2021

Bos Farms is a covered lagoon digester project with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted for with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$1,500,000
- Matching funds - \$11,334,030
- Total Project costs - \$12,834,030
- Estimated 10-year GHG reductions - 168,398 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reductions per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$76.21

Hamstra Dairy Biogas

Funded: 2017
Status: In Progress
Expected Completion Date: March 2021

Hamstra Dairy will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted for with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding – \$2,000,000
- Matching funds - \$4,580,840
- Total Project costs - \$6,580,840
- Estimated 10-year GHG reductions 205,115 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.1 MTCO_{2e}
- GHG reductions per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$32.08

Hollandia Farms Dairy Biogas
Funded: 2017
Status: In Progress
Expected Completion Date: March 2021

Hollandia Farms will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted for with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,500,000
- Matching funds - \$5,816,291
- Total Project costs - \$7,316,291
- Estimated 10-year GHG reductions - 178,426 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reductions per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$41.00

Rancho Teresita Dairy Biogas

Funded: 2017
Status: In Progress
Expected Completion Date: March 2021

Rancho Teresita Dairy will build a covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will add sand lane and screens for pre-digester solid separation. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use. A 1MW generator has been permitted with an emissions mitigation plan in the event an alternate methane destruction device is required.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$2,100,000
- Matching funds - \$10,400,558
- Total Projects costs - \$12,500,558
- Estimated 10-year GHG reductions - 236,251 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$52.91

4K Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: January 2020

4K Dairy Digester Pipeline Project will build a new covered lagoon digester. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near the Calgren ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,780,588
- Matching funds - \$1,780,588
- Total Projects costs - \$3,561,176
- Estimated 10-year GHG reductions – 192.143 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$18.53

Ackerman Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020

Ackerman Dairy Digester Pipeline Project will build a new covered lagoon digester. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the Aemetis ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be used on site to fuel boilers at the Aemetis ethanol refinery to make very low carbon vehicle fuel.

- Location – Ceres, California (Stanislaus County)
- CDFA DDRDP Funding - \$1,331,291
- Matching funds - \$1,331,291
- Total Projects costs - \$2,662,582
- Estimated 10-year GHG reductions – 89,574 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$29.72

Aukeman Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Aukeman Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$1,765,457
- Matching funds - \$3,233,051
- Total Projects costs - \$4,998,508
- Estimated 10-year GHG reductions – 207,701 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.07

Belonave Dairy Biogas LLC

Funded: 2018
Status: In Progress
Expected Completion Date: September 2020

Belonave Dairy Biogas LLC will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$1,918,099
- Matching funds - \$3,540,063
- Total Projects costs - \$5,458,162
- Estimated 10-year GHG reductions – 225,659 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.19

BV Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: September 2020

BV Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$1,749,596
- Matching funds - \$2,085,855
- Total Projects costs - \$3,835,451
- Estimated 10-year GHG reductions – 205,835 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$18.63

De Groot North Dairy Biogas
Funded: 2018
Status: In Progress

Expected Completion Date: September 2020

De Groot North Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,442,440
- Matching funds - \$2,401,778
- Total Projects costs - \$3,844,218
- Estimated 10-year GHG reductions – 169,699 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$22.65

*De Groot South Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: September 2020*

De Groot South Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,542,697
- Matching funds - \$1,758,946
- Total Projects costs - \$3,301,643
- Estimated 10-year GHG reductions – 181,494 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$18.19

*Decade Centralized Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: May 2020*

Decade Centralized Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure from two dairies. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near River Ranch. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$1,773,587
- Matching funds - \$1,773,587
- Total Projects costs - \$3,547,174
- Estimated 10-year GHG reductions – 192,558 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$18.42

DJ South Dairy Digester Pipeline Project

Funded: 2018

Status: In Progress

Expected Completion Date: June 2020

DJ South Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Chowchilla, California (Madera County)
- CDFA DDRDP Funding - \$1,810,526
- Matching funds - \$1,810,525
- Total Projects costs - \$3,621,051
- Estimated 10-year GHG reductions – 150,175 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.11

Double D Dairy Digester Pipeline Project

Funded: 2018

Status: In Progress

Expected Completion Date: June 2020

Double D Dairy Digester Pipeline Project will build a new covered lagoon digester. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the Aemetis ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be used on site to fuel boilers at the Aemetis ethanol refinery to make very low carbon vehicle fuel.

- Location – Ceres, California (Stanislaus County)
- CDFA DDRDP Funding - \$1,822,668
- Matching funds - \$1,822,668
- Total Projects costs - \$3,645,336
- Estimated 10-year GHG reductions – 189,850 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.20

Double J Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Double J Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$2,426,716
- Matching funds - \$4,289,806
- Total Projects costs - \$6,716,522
- Estimated 10-year GHG reductions – 285,496 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$23.53

Double L Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020

Double L Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near River Ranch. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,762,347
- Matching funds - \$1,762,347
- Total Projects costs - \$3,524,694
- Estimated 10-year GHG reductions – 136,148 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$25.89

Dykstra Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Dykstra Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$2,260,454
- Matching funds - \$3,436,033
- Total Projects costs - \$5,696,457
- Estimated 10-year GHG reductions – 265,936 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$21.42

El Monte Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

El Monte Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$1,010,674
- Matching funds - \$3,122,303
- Total Projects costs - \$4,132,977
- Estimated 10-year GHG reductions – 118,903 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$34.76

Five H Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: May 2020

Five H Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$1,851,297
- Matching funds - \$1,851,297
- Total Projects costs - \$3,702,594
- Estimated 10-year GHG reductions – 122,183 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$30.30

FM Jerseys Dairy Digester Virtual Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020

FM Jerseys Dairy Digester Virtual Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be hauled using clean-burning renewable CNG-fueled trucks and compressed natural gas tube trailers to create a virtual pipeline to the cluster's central hub at the Calgren ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$2,010,747
- Matching funds - \$2,010,747
- Total Projects costs - \$4,021,494
- Estimated 10-year GHG reductions – 161,960 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.83

Hoogendam Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020

Hoogendam Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$1,809,452
- Matching funds - \$1,809,453
- Total Projects costs - \$3,618,905
- Estimated 10-year GHG reductions – 142,354 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}

- Total cost per MTCO_{2e} - \$25.42

Horizon Jersey Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Horizon Jersey Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$2,850,886
- Matching funds - \$4,134,949
- Total Projects costs - \$6,985,835
- Estimated 10-year GHG reductions – 335,398 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$20.83

Jacobus De Groot #2 Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Jacobus De Groot #2 Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$523,736
- Matching funds - \$2,857,688
- Total Projects costs - \$3,381,424
- Estimated 10-year GHG reductions – 61,616 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$54.88

Little Rock Centralized Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: December 2019

Little Rock Centralized Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure from two smaller dairies. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the Calgren ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$2,096,578
- Matching funds - \$2,096,578
- Total Projects costs - \$4,193,156
- Estimated 10-year GHG reductions – 146,839 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$28.56

Lone Oak #1 Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020

Lone Oak #1 Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near River Ranch. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,869,269
- Matching funds - \$1,869,269
- Total Projects costs - \$3,738,538
- Estimated 10-year GHG reductions – 247,703 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.13 MTCO_{2e}
- GHG reduction per total project dollars - 0.07 MTCO_{2e}

- Total cost per MTCO_{2e} - \$15.09

Meirinho Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: May 2020

Meirinho Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$1,832,358
- Matching funds - \$1,832,357
- Total Projects costs - \$3,664,715
- Estimated 10-year GHG reductions – 147,352 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.87

Mellema Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Mellema Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$1,292,485
- Matching funds - \$3,921,216
- Total Projects costs - \$5,213,701
- Estimated 10-year GHG reductions – 152,057 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}

- Total cost per MTCO_{2e} - \$34.29

Milky Way Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Milky Way Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$2,953,427
- Matching funds - \$4,244,734
- Total Projects costs - \$7,198,161
- Estimated 10-year GHG reductions – 347,462 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$20.72

Mineral King Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Mineral King Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$1,655,384
- Matching funds - \$3,416,032
- Total Projects costs - \$5,071,032
- Estimated 10-year GHG reductions – 194,751 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.04

*Rancho Sierra Vista Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021*

Rancho Sierra Vista Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$1,470,143
- Matching funds - \$3,474,018
- Total Projects costs - \$4,944,161
- Estimated 10-year GHG reductions – 172,958 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$28.59

*Red Rock Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020*

Red Rock Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$2,031,126
- Matching funds - \$2,031,126
- Total Projects costs - \$4,062,252
- Estimated 10-year GHG reductions – 156,242 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.00

River Ranch Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020

River Ranch Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,994,860
- Matching funds - \$1,994,861
- Total Projects costs - \$3,989,721
- Estimated 10-year GHG reductions – 187,884 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$21.24

Riverbend Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Riverbend Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$2,090,404
- Matching funds - \$2,731,981
- Total Projects costs - \$4,822,385
- Estimated 10-year GHG reductions – 245,930 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.61

Riverview Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: February 2020

Riverview Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the Calgren ethanol refinery. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$1,332,070
- Matching funds - \$1,332,070
- Total Projects costs - \$2,664,140
- Estimated 10-year GHG reductions – 90,093 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$29.57

Rob Van Grouw Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Rob Van Grouw Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$1,193,757
- Matching funds - \$3,751,897
- Total Projects costs - \$4,945,654
- Estimated 10-year GHG reductions – 140,442 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$35.21

*Rocking Horse Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: September 2020*

Rocking Horse Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,016,091
- Matching funds - \$2,681,538
- Total Projects costs - \$3,697,629
- Estimated 10-year GHG reductions – 119,540 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$30.93

*Rockshar Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: June 2020*

Rockshar Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$1,679,093
- Matching funds - \$1,679,093
- Total Projects costs - \$3,358,186
- Estimated 10-year GHG reductions – 124,664 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.94

Scheenstra Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: March 2021

Scheenstra Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$1,873,064
- Matching funds - \$3,596,847
- Total Projects costs - \$5,469,911
- Estimated 10-year GHG reductions – 220,360 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.82

Udder Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: September 2020

Udder Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$1,153,459
- Matching funds - \$2,049,345
- Total Projects costs - \$3,202,804
- Estimated 10-year GHG reductions – 135,701 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$23.60

Valadao Dairy Biogas
Funded: 2018

Status: In Progress
Expected Completion Date: September 2020

Valadao Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,028,545
- Matching funds - \$1,877,850
- Total Projects costs - \$2,906,395
- Estimated 10-year GHG reductions – 121,005 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.02

Vander Woude Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: April 2020

Vander Woude Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$1,863,562
- Matching funds - \$1,863,562
- Total Projects costs - \$3,727,124
- Estimated 10-year GHG reductions – 188,575 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.76

Vista Verde Dairy Digester Pipeline Project
Funded: 2018
Status: In Progress
Expected Completion Date: May 2020

Vista Verde Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. Biomethane from the digester will be transported via private, low-pressure pipeline to the cluster's central hub at the center of the dairy group. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Chowchilla, California (Madera County)
- CDFA DDRDP Funding - \$1,594,109
- Matching funds - \$1,594,108
- Total Projects costs - \$3,188,217
- Estimated 10-year GHG reductions – 140,653 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$22.67

Western Sky Dairy Biogas
Funded: 2018
Status: In Progress
Expected Completion Date: September 2020

Western Sky Dairy Biogas will build a new covered lagoon digester with enhanced gas storage, gas pre-treatment and effluent distribution. The project will include a sand lane, screens and mechanical separator with screw press for solid separation pre-digester. Biogas will be conditioned to meet the SoCalGas standards for natural gas fuel and will be used for vehicle fuel use.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$2,820,762
- Matching funds - \$2,902,189
- Total Projects costs - \$5,722,951
- Estimated 10-year GHG reductions – 352,595 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.06 MTCO_{2e}
- Total cost per MTCO_{2e} - \$16.23

Ahlem Farms Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Ahlem Farms Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting PG&E specifications, will be injected into the nearby point of receipt

- Location – Hilmar, California (Merced County)
- CDFA DDRDP Funding - \$1,546,738
- Matching funds - \$4,557,504
- Total Projects costs - \$6,104,242
- Estimated 10-year GHG reductions – 153,151 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$39.86

Albert Goyenette Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Albert Goyenette Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Buttonwillow, California (Kern County)
- CDFA DDRDP Funding - \$1,609,316
- Matching funds - \$6,993,567
- Total Projects costs - \$8,602,883
- Estimated 10-year GHG reductions – 199,706 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$43.08

Art Leyendekker Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Art Leyendekker Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$769,784
- Matching funds - \$2,915,284
- Total Projects costs - \$3,685,068
- Estimated 10-year GHG reductions – 77,697 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$47.43

Avalon Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Avalon Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The project will deliver biogas to the Calgren Dairy Fuels cluster. This Cluster is operational, producing biogas from other digesters and injecting renewable natural gas into the SoCalGas pipeline. The methane-rich biogas from the digester will be compressed on site and then hauled using clean-burning renewable CNG-fueled trucks and compressed natural gas tube trailers to create a virtual pipeline to the cluster's central hub. Once at the hub, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent SoCalGas utility pipeline for delivery to other CNG fueling stations around the Central Valley and the state.

- Location – Wasco, California (Kern County)
- CDFA DDRDP Funding - \$1,917,757
- Matching funds - \$1,917,757
- Total Projects costs - \$3,835,514
- Estimated 10-year GHG reductions – 159,758 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}

- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.01

*Bar 20 Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Bar 20 Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. An on-dairy biogas conditioning station will remove hydrogen sulfide and meter and move the clean biogas directly into a co-located, ultra-clean, high efficiency 2.0 MW Bloom Energy fuel cell interconnected to PG&E. CalBio will generate LCFS credits by directly matching generation and supplying the renewable energy credits to in-state electric vehicle re-charging load.

- Location – Kerman, California (Fresno County)
- CDFA DDRDP Funding - \$3,000,000
- Matching funds - \$13,989,069
- Total Projects costs - \$16,989,069
- Estimated 10-year GHG reductions – 374,390 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$45.38

*Charles Ahlem Ranch Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Charles Ahlem Ranch Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting PG&E specifications, will be injected into the nearby point of receipt.

- Location – Hilmar, California (Merced County)
- CDFA DDRDP Funding - \$1,373,697
- Matching funds - \$5,758,275
- Total Projects costs - \$7,131,972
- Estimated 10-year GHG reductions – 136,018 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}

- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$52.43

Clauss and Sunwest Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Clauss and Sunwest Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Hilmar, California (Merced County)
- CDFA DDRDP Funding - \$1,572,301
- Matching funds - \$4,780,296
- Total Projects costs - \$6,352,597
- Estimated 10-year GHG reductions – 155,682 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$40.80

Curtimade Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Curtimade Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$1,747,336
- Matching funds - \$3,025,858
- Total Projects costs - \$4,773,194
- Estimated 10-year GHG reductions – 174,734 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$27.32

*Dairyland Farms Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Dairyland Farms Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$1,760,347
- Matching funds - \$3,140,466
- Total Projects costs - \$4,900,813
- Estimated 10-year GHG reductions – 177,475 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$27.61

*Dixie Creek Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Dixie Creek Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near River Ranch dairy. There, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas utility pipeline for delivery to contracted CNG fueling stations around the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$2,436,030
- Matching funds - \$2,436,030
- Total Projects costs - \$4,872,060
- Estimated 10-year GHG reductions – 271,176 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reduction per total project dollars - 0.06 MTCO_{2e}
- Total cost per MTCO_{2e} - \$17.97

Double Diamond Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Double Diamond Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipe to the cluster's hub near Vander Woude Dairy. Once there, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be conditioned and injected into the PG&E utility pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – El Nido, California (Merced County)
- CDFA DDRDP Funding - \$2,037,766
- Matching funds - \$2,037,766
- Total Projects costs - \$4,075,532
- Estimated 10-year GHG reductions – 290,633 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.14 MTCO_{2e}
- GHG reduction per total project dollars - 0.07 MTCO_{2e}
- Total cost per MTCO_{2e} - \$14.02

Elk Creek Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Elk Creek Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$512,706
- Matching funds - \$3,596,502
- Total Projects costs - \$4,109,208
- Estimated 10-year GHG reductions – 59.555 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$69.00

*Elkhorn Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Elkhorn Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Dinuba, California (Tulare County)
- CDFA DDRDP Funding - \$2,125,882
- Matching funds - \$4,520,035
- Total Projects costs - \$6,645,917
- Estimated 10-year GHG reductions – 211,940 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$31.36

*Fern Oaks Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Fern Oaks Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The biogas from this new digester will be transported via the Cluster's private, low-pressure pipeline to the cluster's hub near the Calgren ethanol refinery. Once there, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Porterville, California (Tulare County)
- CDFA DDRDP Funding - \$1,688,894
- Matching funds - \$1,688,894
- Total Projects costs - \$3,377,788
- Estimated 10-year GHG reductions – 169,370 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$19.94

Friesian Farms Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Friesian Farms Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$639,602
- Matching funds - \$3,175,183
- Total Projects costs - \$3,814,785
- Estimated 10-year GHG reductions – 63,145 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$60.41

Gerben Leyendekker Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Gerben Leyendekker Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$845,589
- Matching funds - \$2,902,768
- Total Projects costs - \$3,748,357
- Estimated 10-year GHG reductions – 85,419 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$43.88

*GP Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

GP Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the nearby point of receipt.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - \$502,554
- Matching funds - \$2,915,623
- Total Projects costs - \$3,418,177
- Estimated 10-year GHG reductions – 50,722 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$67.39

*Hettinga Centralized Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Hettinga Centralized Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The biogas from this new digester will be transported via the Cluster's private, low-pressure pipeline to the cluster's hub near the Calgren ethanol refinery. Once there, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Pixley, California (Tulare County)
- CDFA DDRDP Funding - \$2,352,909
- Matching funds - \$2,352,909
- Total Projects costs - \$4,705,818
- Estimated 10-year GHG reductions – 167,339 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$28.12

High Roller Dairy Digester Pipeline Project

Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

High Roller Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near River Ranch dairy. There, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas utility pipeline for delivery to contracted CNG fueling stations around the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,412,136
- Matching funds - \$1,412,136
- Total Projects costs - \$2,824,272
- Estimated 10-year GHG reductions – 105,257 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.83

Homen Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Homen Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipe to the cluster's central hub near Vander Woude Dairy. Once there, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be conditioned and injected into the PG&E utility pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$1,640,419
- Matching funds - \$1,640,420
- Total Projects costs - \$3,280,839
- Estimated 10-year GHG reductions – 124,000 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.46

*James Ahlem Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

James Ahlem Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting PG&E specifications, will be injected into the nearby point of receipt.

- Location – Hilmar, California (Merced County)
- CDFA DDRDP Funding - \$830,349
- Matching funds - \$4,861,351
- Total Projects costs - \$5,691,700
- Estimated 10-year GHG reductions – 82,216 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$69.23

*Lakeside Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Lakeside Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near River Ranch dairy. There, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas utility pipeline for delivery to contracted CNG fueling stations around the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$2,213,063
- Matching funds - \$2,21,063
- Total Projects costs - \$4,426,126
- Estimated 10-year GHG reductions – 218,679 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$20.24

Maya Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Maya Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Buttonwillow, California (Kern County)
- CDFA DDRDP Funding - \$2,015,393
- Matching funds - \$6,954,582
- Total Projects costs - \$8,969,975
- Estimated 10-year GHG reductions – 250,090 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$35.87

McMoo Farms Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

McMoo Farms Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$1,598,893
- Matching funds - \$2,321,639
- Total Projects costs - \$3,920,532
- Estimated 10-year GHG reductions – 164,384 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$23.85

Melo Dairy Digester Pipeline Project
Funded: 2019

Status: In Progress
Expected Completion Date: November 2021

Melo Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near Vander Woude Dairy. Once there, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be conditioned and injected into the PG&E utility pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Merced, California (Merced County)
- CDFA DDRDP Funding - \$2,910,554
- Matching funds - \$2,910,555
- Total Projects costs - \$5,821,109
- Estimated 10-year GHG reductions – 272,690 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$21.35

Newhouse Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Newhouse Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Bakersfield, California (Kern County)
- CDFA DDRDP Funding - \$1,665,037
- Matching funds - \$2,945,573
- Total Projects costs - \$4,610,610
- Estimated 10-year GHG reductions – 171,098 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.95

Northstar Dairy Digester Pipeline Project
Funded: 2019

Status: In Progress
Expected Completion Date: November 2021

Northstar Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The biogas from this new digester will be transported via the Cluster's private, low-pressure pipeline to the cluster's hub near the Calgren ethanol refinery. Once there, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$1,576,438
- Matching funds - \$1,576,438
- Total Projects costs - \$3,152,876
- Estimated 10-year GHG reductions – 170,658 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.11 MTCO_{2e}
- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$18.47

Nyman Brothers Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Nyman Brothers Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Hilmar, California (Merced County)
- CDFA DDRDP Funding - \$687,006
- Matching funds - \$4,654,902
- Total Projects costs - \$5,341,908
- Estimated 10-year GHG reductions – 68,026 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
- GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$78.53

Poplar Lane Dairy Digester Pipeline Project
Funded: 2019

Status: In Progress
Expected Completion Date: November 2021

Poplar Lane Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipe to the cluster's central hub near River Ranch dairy. There, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas utility pipeline for delivery to contracted CNG fueling stations around the state.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Funding - \$1,756,966
- Matching funds - \$1,756,966
- Total Projects costs - \$3,513,932
- Estimated 10-year GHG reductions – 131,195 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$26.78

Rib-Arrow Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Rib-Arrow Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Tulare, California (Tulare County)
- CDFA DDRDP Funding - \$657,231
- Matching funds - \$3,517,919
- Total Projects costs - \$4,175,150
- Estimated 10-year GHG reductions – 76,343 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$54.69

Ribeiro Dairy Biogas
Funded: 2019

Status: In Progress
Expected Completion Date: November 2021

Ribeiro Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Tulare, California (Tulare County)
 - CDFA DDRDP Funding - \$1,124,962
 - Matching funds - \$2,689,080
 - Total Projects costs - \$3,814,042
 - Estimated 10-year GHG reductions – 132,348 MTCO_{2e}
 - GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
 - GHG reduction per total project dollars - 0.03 MTCO_{2e}
 - Total cost per MTCO_{2e} - \$28.82
-

Rio Blanco Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Rio Blanco Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Tulare, California (Tulare County)
 - CDFA DDRDP Funding - \$1,002,797
 - Matching funds - \$2,556,018
 - Total Projects costs - \$3,558,815
 - Estimated 10-year GHG reductions – 100,886 MTCO_{2e}
 - GHG reductions per CDFA grant dollar – 0.10 MTCO_{2e}
 - GHG reduction per total project dollars - 0.03 MTCO_{2e}
 - Total cost per MTCO_{2e} - \$35.28
-

Schott Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Schott Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The biogas from this new digester will be transported via the Cluster's private, low-pressure pipeline to the cluster's hub near the Calgren ethanol refinery. Once there, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$1,444,592
- Matching funds - \$1,444,592
- Total Projects costs - \$2,889,184
- Estimated 10-year GHG reductions – 129,082 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$22.38

Simoes Centralized Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Simoes Centralized Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The biogas from this new digester will be transported via the Cluster's private, low-pressure pipeline to the cluster's hub near the Calgren ethanol refinery. Once there, it will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the SoCalGas pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Tipton, California (Tulare County)
- CDFA DDRDP Funding - \$2,036,460
- Matching funds - \$2,036,460
- Total Projects costs - \$4,072,920
- Estimated 10-year GHG reductions – 161,275 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$25.25

Skyview Dairy Biogas
Funded: 2019
Status: In Progress

Expected Completion Date: November 2021

Skyview Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Shafter, California (Kern County)
 - CDFA DDRDP Funding - \$686,620
 - Matching funds - \$7,686,172
 - Total Projects costs - \$8,372,792
 - Estimated 10-year GHG reductions – 85,174 MTCO_{2e}
 - GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
 - GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$98.30

Southern Cross Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Southern Cross Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Buttonwillow, California (Kern County)
- CDFA DDRDP Funding - \$1,019,121
- Matching funds - \$8,072,067
- Total Projects costs - \$9,091,188
- Estimated 10-year GHG reductions – 125,872 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$72.23

Southpoint Ranch Dairy Biogas
Funded: 2019
Status: In Progress

Expected Completion Date: November 2021

Southpoint Ranch Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. An on-dairy biogas conditioning station will remove hydrogen sulfide and meter and move the clean biogas directly into a co-located, ultra-clean, high efficiency 2.0 MW Bloom Energy fuel cell interconnected to PG&E. CalBio will generate LCFS credits by directly matching generation and supplying the renewable energy credits to in-state electric vehicle re-charging load.

- Location – Madera, California (Madera County)
- CDFA DDRDP Funding - \$3,000,000
- Matching funds - \$13,642,393
- Total Projects costs - \$16,642,393
- Estimated 10-year GHG reductions – 484,999 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.16 MTCO_{2e}
- GHG reduction per total project dollars - 0.03 MTCO_{2e}
- Total cost per MTCO_{2e} - \$34.31

*Van Der Hoek Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Van Der Hoek Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near the operational Open Sky Ranch digester. Once at the hub, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Helm, California (Fresno County)
- CDFA DDRDP Funding - \$2,061,968
- Matching funds - \$2,061,968
- Total Projects costs - \$4,123,936
- Estimated 10-year GHG reductions – 168,447 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.08 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$24.48

Van Der Kooi Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Van Der Kooi Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near the operational Open Sky Ranch digester. Once at the hub, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Riverdale, California (Fresno County)
- CDFA DDRDP Funding - \$1,897,438
- Matching funds - \$1,897,438
- Total Projects costs - \$3,794,876
- Estimated 10-year GHG reductions – 170,089 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}
- GHG reduction per total project dollars - 0.04 MTCO_{2e}
- Total cost per MTCO_{2e} - \$22.31

Vanderham Dairy Digester Pipeline Project
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021

Vanderham Dairy Digester Pipeline Project will build a new covered lagoon digester processing dairy manure. The methane-rich biogas from the digester will be transported via private, low-pressure pipeline to the cluster's central hub near the operational Open Sky Ranch digester. Once at the hub, the biogas will be used to fuel partner and public trucks at an on-site compressed natural gas fueling station. The remainder of the gas will be injected into the adjacent PG&E utility pipeline for delivery to contracted CNG fueling stations around the Central Valley and the state.

- Location – Riverdale, California (Fresno County)
- CDFA DDRDP Funding - \$1,984,951
- Matching funds - \$1,984,951
- Total Projects costs - \$3,969,902
- Estimated 10-year GHG reductions – 186,037 MTCO_{2e}
- GHG reductions per CDFA grant dollar - 0.09 MTCO_{2e}

- GHG reduction per total project dollars - 0.05 MTCO_{2e}
- Total cost per MTCO_{2e} - \$21.34

*Whiteside Dairy Biogas
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

Whiteside Dairy Biogas will install a Tier 1 designed manure-only covered lagoon digester with integrated gas storage and pre-treatment. The project's biomethane will be delivered as R-CNG to fleets and CNG fueling stations in California. Biomethane, meeting SoCalGas Rule 30, will be injected into the co-located point of receipt.

- Location – Wasco, California (Kern County)
- CDFA DDRDP Funding - \$960,043
- Matching funds - \$7,190,202
- Total Projects costs - \$8,150,245
- Estimated 10-year GHG reductions – 119,137 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.12 MTCO_{2e}
- GHG reduction per total project dollars - 0.01 MTCO_{2e}
- Total cost per MTCO_{2e} - \$68.41

*Flint Dairy Biogas Project
Dairy Digester Research and Development Program –
Demonstration Projects
Funded: 2019
Status: In Progress
Expected Completion Date: November 2021*

The Flint Dairy Biogas Project near Hanford, CA proposes to build a two-stage anaerobic digester system to treat manure effluent. The digester system includes four upflow anaerobic sludge blanket (UASB) reactors. The reactors allow for the conversion of approximately 80% of the organic material to biogas with methane concentrations of 80-85%. Biogas will be upgraded to renewable natural gas on-site and transported via virtual pipeline to an injection point. The system reduces the nitrogen levels in the effluent by approximately 30%, providing new tools for compliance with the Dairy General Order and SGMA. The project features a scalable and modular future second phase consisting of Moving Bed Biofilm Reactor (MBBR) aerobic tanks paired with algae raceways that can cost-effectively reduce total nitrogen levels in the water by up to 90%.

- Location – Hanford, California (Kings County)
- CDFA DDRDP Demo Funding - \$1,750,000
- Matching funds - \$3,374,782
- Total Projects costs - \$5,124,782
- Estimated 10-year GHG reductions – 126,988 MTCO_{2e}
- GHG reductions per CDFA grant dollar – 0.07 MTCO_{2e}
- GHG reduction per total project dollars - 0.02 MTCO_{2e}
- Total cost per MTCO_{2e} - \$40.36

Research Project: Converting Manure to Reduce Greenhouse Gas Emissions, Minimize Environmental Impacts, and Enhance the Economic Feasibility of Dairy Operations
Prof. William Horwath, University of California Davis
Funded: 2016 Status: Canceled.

The UC Davis Manure Conversion Research Project was funded with \$225,909 through the 2014-15 DDRDP. The Project Leaders was designed to evaluate a new method capable of converting large amounts of manure and/or urine from dairy operations into a more stable sterile soil amendment with a predictable nitrogen mineralization response that reduces greenhouse gas (GHG) emissions. This project targets a 25 percent GHG reduction in overall CO_{2e} emission rates from manure and subsequent amended soils, which can be scaled to intensive livestock operations throughout the state of California and beyond.

The objectives of the lab and field research were to measure the effects of 'converted' manure on N₂O, CH₄ and CO₂ emissions, as well as the effects of the converted manure on crop productivity, compared to conventionally handled manure and cropland fertility management. The 'conversion' process for manure involved the hydrodynamic cavitation of homogenized solid or liquid livestock waste slurry, which was pumped through attenuating tubules that suddenly opened. The over-arching goal of this research was to provide an alternative to business as usual waste management in dairy operations to reduce GHGs while maximizing economic and environmental benefits. The project was canceled due to substantial changes to project timeline.