DAIRY DIGESTER RESEARCH AND DEVELOPMENT PROGRAM


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.

![Scaling Up Digesters and Leveraging Climate Investments](image)

**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 emissions\(^1\). These projects having a cumulative estimated GHG reduction of 19.9 MMTCO\(_2\)e over ten years, or approximately 1.99 MMTCO\(_2\)e 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.

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\(^1\) CARB. California Greenhouse Gas Inventory Program. [https://ww2.arb.ca.gov/our-work/programs/ghg-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**

<table>
<thead>
<tr>
<th>Year</th>
<th>Dollar Allocation (millions)</th>
<th>Dairy Methane Reduction Grant Funds Awarded (millions)</th>
<th>Administrative Cost not to Exceed 5% (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-15</td>
<td>$12</td>
<td>$11.09</td>
<td>$0.2</td>
</tr>
<tr>
<td>2016-17</td>
<td>$50</td>
<td>$35.25</td>
<td>Not applicable</td>
</tr>
<tr>
<td>2017-18</td>
<td>$99</td>
<td>$72.41</td>
<td>Not applicable</td>
</tr>
<tr>
<td>2018-19</td>
<td>$99</td>
<td>$61-75</td>
<td>Not applicable</td>
</tr>
<tr>
<td>2019-20</td>
<td>$34</td>
<td>$20-25*</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

* Anticipated release of Request for Grant Applications in February 2020.

CDFA has awarded a total of $183.4 million for 108 dairy digester projects starting in 2014 through 2019. These projects, collectively, have an estimated greenhouse gas (GHG) reduction of 19.9 million metric tons of carbon dioxide equivalents (MMTCO$_2$e) over ten years. Dairy digesters remain one of the most efficient GHG programs in terms of cost of each ton of GHG reduced.

- 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.

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 2. Number of DDRDP funded projects that are complete and under progress since 2015.](image)

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\(_2\)e over five years, or approximately 211,760 MTCO\(_2\)e 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>
<thead>
<tr>
<th>Criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digester Project Plan and Long-term Viability</td>
<td>20</td>
</tr>
<tr>
<td>Budget Work Sheet and Financials</td>
<td>10</td>
</tr>
<tr>
<td>Estimated Greenhouse Gas Emissions Reduction</td>
<td>35</td>
</tr>
<tr>
<td>Project Readiness</td>
<td>10</td>
</tr>
<tr>
<td>Environmental Performance</td>
<td>15</td>
</tr>
<tr>
<td>Community Impact</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Program Development Outreach Public Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meeting</strong></td>
</tr>
<tr>
<td>2015 Digester Grant Development - Stakeholder Input</td>
</tr>
<tr>
<td>2015 Digester Grant Development - Stakeholder Input</td>
</tr>
<tr>
<td>2015 Digester Grant Development - Stakeholder Input</td>
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<tr>
<td>2015 Digester Research Development - Stakeholder Input</td>
</tr>
<tr>
<td>2016 Environmental Justice Listening Session</td>
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<tr>
<td>2017 Digester Grant Development - Stakeholder Input</td>
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<td>2017 Digester Grant Development - Stakeholder Input</td>
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<td>2017 Digester Grant Development - Stakeholder Input</td>
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<td>2017 Digester Grant Development - Stakeholder Input</td>
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<tr>
<td>2017 Digester Grant Development - Stakeholder Input on Draft Solicitation</td>
</tr>
<tr>
<td>2019 Digester Grant Development – Expanding Access and Enhancing Competitiveness</td>
</tr>
<tr>
<td>2019 Digester Grant Development – Expanding Access and Enhancing Competitiveness</td>
</tr>
<tr>
<td>2019 Digester Grant Development – Expanding Access and Enhancing Competitiveness</td>
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<tr>
<td>2019 Digester Grant Development – Stakeholder Input</td>
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<td>2020 Digester Grant Development – Stakeholder Input</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Application Assistance Outreach Public Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meeting</strong></td>
</tr>
<tr>
<td>2015 Digester Grant - Application Workshop</td>
</tr>
<tr>
<td>2015 Digester Grant - Application Workshop</td>
</tr>
</tbody>
</table>
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 MTCO₂e over 10 years, and the approximate cost to achieve one MTCO₂e (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, 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 NOx (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), NOx, 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.

<table>
<thead>
<tr>
<th>Year of Award</th>
<th>Applicant Organization</th>
<th>Project Title</th>
<th>Submitting Organization</th>
<th>Project Location</th>
<th>Cluster</th>
<th>Project Type</th>
<th>Biogas End-Use</th>
<th>Estimated 10 year GHG reductions (MTCO$_2$e)*</th>
<th>Grant Funds</th>
<th>Matching Funds</th>
<th>Total Project Cost</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Philip Verwey Farms</td>
<td>Verwey- Hanford Dairy Digester</td>
<td>Maas Energy Works Inc</td>
<td>Hanford, Kings Co.</td>
<td>NA</td>
<td>New covered lagoon digester</td>
<td>Electrical power generation</td>
<td>535,770</td>
<td>$3,000,000</td>
<td>$3,011,595</td>
<td>Complete</td>
<td></td>
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<tr>
<td>2015</td>
<td>Open Sky Ranch Inc.</td>
<td>Open Sky Ranch Dairy Digester</td>
<td>Maas Energy Works Inc</td>
<td>Riverdale, Fresno Co.</td>
<td>NA</td>
<td>Retrofit covered lagoon digester</td>
<td>Electrical power generation</td>
<td>258,911</td>
<td>$973,430</td>
<td>$990,486</td>
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<td>2015</td>
<td>Philip Verwey Farms</td>
<td>Verwey- Madera Dairy Digester</td>
<td>Maas Energy Works Inc</td>
<td>Madera, Madera Co.</td>
<td>NA</td>
<td>New covered lagoon digester</td>
<td>Electrical power generation</td>
<td>240,000</td>
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<td>$2,331,935</td>
<td>Complete</td>
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<td>2015</td>
<td>ABEC #2 LLC dba West-Star North Dairy Biogas</td>
<td>West-Star North Dairy Digester</td>
<td>California Bioenergy LLC</td>
<td>Buttonwillow, Kern Co.</td>
<td>NA</td>
<td>New covered lagoon digester</td>
<td>Electrical power generation</td>
<td>158,700</td>
<td>$1,837,005</td>
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<td>Complete</td>
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*GHG: Greenhouse Gas, RCNG: Renewable Chemical Natural Gas
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**Totals**

$183,394,392 $370,123,077 $553,517,468

*Estimated reductions calculated using the CARB Quantification Methodology and calculator tool. MTCO₂e: 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.

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<th>Year Awarded</th>
<th>Project Title</th>
<th>Total cost of 1 MTCO$_2$e GHG reduction ($)</th>
<th>GGRF cost of 1 MTCO$_2$e GHG reduction ($)</th>
<th>Percent of 1 MTCO$_2$e GHG reduction cost supported cost by GGRF</th>
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<td>Maya Dairy Biogas</td>
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<td>2019</td>
<td>McMoo Farms Dairy Biogas</td>
<td>23.85</td>
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<td>Melo Dairy Digester Pipeline Project</td>
<td>21.35</td>
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<td>Flint Dairy Biogas Project (DDRDP Demonstration Project)</td>
<td>40.36</td>
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VI. Individual Project Information
Information on individual projects funded through the CDFA DDRDP from 2014-2019.

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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$_2$e.
- **GHG reductions per CDFA grant dollar** - 0.18 MTCO$_2$e
- **GHG reductions per total project dollars** - 0.09 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $11.22

![Image 1. View of the covered lagoon digester at Verwey-Hanford Dairy.](image-url)
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** - $1,963,916
- **Estimated 10-year GHG reductions** - 258,911 MTCO$_2$e
- **GHG reductions per CDFA grant dollars** – 0.27 MTCO$_2$e
- **GHG reductions per total projects dollars** 0.13 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $7.59

![Image 2](image_url)  

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\textsubscript{2}e
- GHG reductions per CDFA grant dollar - 0.11 MTCO\textsubscript{2}e
- GHG reductions per total project dollars - 0.05 MTCO\textsubscript{2}e
- Total cost per MTCO\textsubscript{2}e - $19.22


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 - $8,218,114
- Estimated 10-year GHG reductions - 158,370 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.09 MTCO$_2$e
- GHG reductions per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $7,128,324
- Estimated 10-year GHG reductions - 144,090 MTCO$_2$e
- GHG reductions per grant dollar - 0.07 MTCO$_2$e
- GHG reductions per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $6,560,375
- Estimated 10-year GHG reductions - 201,200 MTCO$_2$e
- GHG reductions per CDFA grant dollars - 0.2 MTCO$_2$e
- GHG reductions per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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** - $2,479,744
- **Estimated 10-year GHG reductions** - 138,745 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.13 MTCO$_2$e
- **GHG reductions per total project dollars** - 0.06 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $17.87

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**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 - $2,604,440
- Estimated 10-year GHG reductions - 132,586 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.13 MTCO$_2$e
- GHG reductions per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.13 MTCO₂e
- GHG reductions per total project dollars - 0.06 MTCO₂e
- Total cost per MTCO₂e - $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 - $2,541,716
- Estimated 10-year GHG reductions – 185,238 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.15 MTCO$_2$e
- GHG reduction per total project dollars - 0.07 MTCO$_2$e
- Total cost per MTCO$_2$e - $13.72

Image 9. Biogas conditioning equipment (foreground) and covered lagoon digester (background) at Cornerstone Dairy.
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 - $3,402,047
- Estimated 10-year GHG reductions - 203,416 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.14 MTCO$_2$e
- GHG reductions per total dollars - 0.06 MTCO$_2$e
- Total cost per MTCO$_2$e - $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\textsubscript{2}e
- GHG reductions per CDFA grant dollar - 0.08 MTCO\textsubscript{2}e
- GHG reduction per total project dollars - 0.04 MTCO\textsubscript{2}e
- Total cost per MTCO\textsubscript{2}e - $25.91

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 - $4,194,558
- Estimated 10-year GHG reductions – 290,060 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.15 MTCO$_2$e
- GHG reduction per total project dollars - 0.07 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.13 MTCO₂e
- GHG reductions per total project dollars - 0.05 MTCO₂e
- Total cost per MTCO₂e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.11 MTCO₂e
- GHG reductions per total project dollars - 0.04 MTCO₂e
- Total cost per MTCO₂e - $25.34

Cloverdale Dairy Biogas
Funded: 2017
Status: In Progress
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 - $7,836,793
- Estimated 10-year GHG reductions - 360,851 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reductions per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $21.72

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**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 - $7,295,759
- Estimated 10-year GHG reductions - 294,892 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.11 MTCO$_2$e
- GHG reductions per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $24.73

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**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.

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**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.

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**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 - $8,331,773
- Estimated 10-year GHG reductions - 348,171 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reductions per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $23.93
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 MTCO2e
- GHG reductions per CDFA grant dollar - 0.1 MTCO2e
- GHG reductions per total project dollars - 0.03 MTCO2e
- Total cost per MTCO2e - $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 MTCO2e
- GHG reductions per CDFA grant dollar - 0.13 MTCO2e
- GHG reductions per total project dollars - 0.06 MTCO2e
- Total cost per MTCO2e - $16.21

Moonlight Dairy Biogas
Funded: 2017
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** - $6,355,146
- **Estimated 10-year GHG reductions** - 154,834 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.1 MTCO$_2$e
- **GHG reductions per total project dollars** - 0.02 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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** - $12,834,030
- **Estimated 10-year GHG reductions** - 168,398 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.11 MTCO$_2$e
- **GHG reductions per total project dollars** - 0.01 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $76.21

**Hamstra Dairy Biogas**
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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.1 MTCO₂e
- GHG reductions per total project dollars - 0.03 MTCO₂e
- Total cost per MTCO₂e - $32.08

Hollandia Farms Dairy Biogas

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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.12 MTCO₂e
- GHG reductions per total project dollars - 0.02 MTCO₂e
- Total cost per MTCO₂e - $41.00

Rancho Teresita Dairy Biogas
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 - $12,500,558
- Estimated 10-year GHG reductions - 236,251 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.11 MTCO$_2$e
- GHG reduction per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $52.91

4K Dairy Digester Pipeline Project

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 - $3,561,176
- Estimated 10-year GHG reductions – 192.143 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.11 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $2,662,582
- Estimated 10-year GHG reductions – 89,574 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.07 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,998,508
- Estimated 10-year GHG reductions – 207,701 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $24.07
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 MTCO2e
- GHG reductions per CDFA grant dollar - 0.12 MTCO2e
- GHG reduction per total project dollars - 0.04 MTCO2e
- Total cost per MTCO2e - $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 MTCO2e
- GHG reductions per CDFA grant dollar - 0.12 MTCO2e
- GHG reduction per total project dollars - 0.05 MTCO2e
- Total cost per MTCO2e - $18.63

De Groot North Dairy Biogas
Funded: 2018
Status: In Progress
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** - $3,844,218
- **Estimated 10-year GHG reductions** – 169,699 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.12 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.04 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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** - $3,301,643
- **Estimated 10-year GHG reductions** – 181,494 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.12 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.05 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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** - $3,547,174
- **Estimated 10-year GHG reductions** – 192,558 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.11 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.05 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $18.42

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**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** - $3,621,051
- **Estimated 10-year GHG reductions** – 150,175 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.08 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.04 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $24.11

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**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** - $3,645,336
- **Estimated 10-year GHG reductions** – 189,850 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.10 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.05 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $19.20

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**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** - $6,716,522
- **Estimated 10-year GHG reductions** – 285,496 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.12 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.04 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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 - $3,524,694
- Estimated 10-year GHG reductions – 136,148 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $5,696,457
- Estimated 10-year GHG reductions – 265,936 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,132,977
- Estimated 10-year GHG reductions – 118,903 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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. Biogas 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 - $3,702,594
- Estimated 10-year GHG reductions – 122,183 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.07 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,021,494
- Estimated 10-year GHG reductions – 161,960 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,618,905
- Estimated 10-year GHG reductions – 142,354 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e

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• Total cost per MTCO$_2$e - $25.42

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**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 - $6,985,835
- Estimated 10-year GHG reductions – 335,398 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $20.83

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**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 - $3,381,424
- Estimated 10-year GHG reductions – 61,616 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,193,156
- Estimated 10-year GHG reductions – 146,839 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.07 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,738,538
- Estimated 10-year GHG reductions – 247,703 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.13 MTCO$_2$e
- GHG reduction per total project dollars - 0.07 MTCO$_2$e
• Total cost per MTCO$_2$e - $15.09

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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. Biogas 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 - $3,664,715
- Estimated 10-year GHG reductions – 147,352 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $24.87

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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 - $5,213,701
- Estimated 10-year GHG reductions – 152,057 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
• Total cost per MTCO$_2$e - $34.29

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**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 - $7,198,161
- Estimated 10-year GHG reductions – 347,462 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $20.72

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**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 - $5,071,032
- Estimated 10-year GHG reductions – 194,751 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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** - $4,944,161
- **Estimated 10-year GHG reductions** – 172,958 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.12 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.03 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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** - $4,062,252
- **Estimated 10-year GHG reductions** – 156,242 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.08 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.04 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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** - $3,989,721
- **Estimated 10-year GHG reductions** – 187,884 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.09 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.05 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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** - $4,822,385
- **Estimated 10-year GHG reductions** – 245,930 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.12 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.05 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $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 - $2,664,140
- Estimated 10-year GHG reductions – 90,093 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.07 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,945,654
- Estimated 10-year GHG reductions – 140,442 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,697,629
- Estimated 10-year GHG reductions – 119,540 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,358,186
- Estimated 10-year GHG reductions – 124,664 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.07 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $5,469,911
- Estimated 10-year GHG reductions – 220,360 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,202,804
- Estimated 10-year GHG reductions – 135,701 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $23.60

Valadao Dairy Biogas
Funded: 2018
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 MTCO₂e
- **GHG reductions per CDFA grant dollar** - 0.12 MTCO₂e
- **GHG reduction per total project dollars** - 0.04 MTCO₂e
- **Total cost per MTCO₂e** - $24.02

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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 MTCO₂e
- **GHG reductions per CDFA grant dollar** - 0.10 MTCO₂e
- **GHG reduction per total project dollars** - 0.05 MTCO₂e
- **Total cost per MTCO₂e** - $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. Biogas 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 - $3,188,217
- Estimated 10-year GHG reductions – 140,653 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.09 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $5,722,951
- Estimated 10-year GHG reductions – 352,595 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.06 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $6,104,242
- Estimated 10-year GHG reductions – 153,151 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $39.86

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

Albert Goyenetche 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 - $8,602,883
- Estimated 10-year GHG reductions – 199,706 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 collocated point of receipt.

- Location – Visalia, California (Tulare County)
- CDFA DDRDP Funding - $769,784
- Matching funds - $2,915,284
- Total Projects costs - $3,685,068
- Estimated 10-year GHG reductions – 77,697 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 the 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 - $3,835,514
- Estimated 10-year GHG reductions – 159,758 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $24.01

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**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 - $16,989,069
- Estimated 10-year GHG reductions – 374,390 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $45.38

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**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 - $7,131,972
- Estimated 10-year GHG reductions – 136,018 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
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 - $6,352,597
- Estimated 10-year GHG reductions – 155,682 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.02 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,773,194
- Estimated 10-year GHG reductions – 174,734 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,900,813
- Estimated 10-year GHG reductions – 177,475 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $27.61

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**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 - $4,872,060
- Estimated 10-year GHG reductions – 271,176 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.11 MTCO$_2$e
- GHG reduction per total project dollars - 0.06 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $6,645,917
- Estimated 10-year GHG reductions – 211,940 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,377,788
- Estimated 10-year GHG reductions – 169,370 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $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\textsubscript{2}e
- GHG reductions per CDFA grant dollar – 0.10 MTCO\textsubscript{2}e
- GHG reduction per total project dollars - 0.02 MTCO\textsubscript{2}e
- Total cost per MTCO\textsubscript{2}e - $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\textsubscript{2}e
- GHG reductions per CDFA grant dollar – 0.10 MTCO\textsubscript{2}e
- GHG reduction per total project dollars - 0.02 MTCO\textsubscript{2}e
- Total cost per MTCO\textsubscript{2}e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar – 0.10 MTCO₂e
- GHG reduction per total project dollars - 0.01 MTCO₂e
- Total cost per MTCO₂e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.07 MTCO₂e
- GHG reduction per total project dollars - 0.04 MTCO₂e
- Total cost per MTCO₂e - $28.12

High Roller Dairy Digester Pipeline Project
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 - $2,824,272
- Estimated 10-year GHG reductions – 105,257 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.07 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $26.83

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 - $3,280,839
- Estimated 10-year GHG reductions – 124,000 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar – 0.10 MTCO₂e
- GHG reduction per total project dollars - 0.01 MTCO₂e
- Total cost per MTCO₂e - $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 MTCO₂e
- GHG reductions per CDFA grant dollar - 0.10 MTCO₂e
- GHG reduction per total project dollars - 0.05 MTCO₂e
- Total cost per MTCO₂e - $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 - $8,969,975
- Estimated 10-year GHG reductions – 250,090 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,920,532
- Estimated 10-year GHG reductions – 164,384 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $23.85

Melo Dairy Digester Pipeline Project
Funded: 2019
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 - $5,821,109
- Estimated 10-year GHG reductions – 272,690 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.09 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,610,610
- Estimated 10-year GHG reductions – 171,098 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $26.95

Northstar Dairy Digester Pipeline Project
Funded: 2019
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 - $3,152,876
- Estimated 10-year GHG reductions – 170,658 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.11 MTCO$_2$e
- GHG reduction per total project dollars - 0.05 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $5,341,908
- Estimated 10-year GHG reductions – 68,026 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.10 MTCO$_2$e
- GHG reduction per total project dollars - 0.01 MTCO$_2$e
- Total cost per MTCO$_2$e - $78.53

Poplar Lane Dairy Digester Pipeline Project
Funded: 2019
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** - $3,513,932
- **Estimated 10-year GHG reductions** – 131,195 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** - 0.07 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.04 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $26.78

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**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** - $4,175,150
- **Estimated 10-year GHG reductions** – 76,343 MTCO$_2$e
- **GHG reductions per CDFA grant dollar** – 0.12 MTCO$_2$e
- **GHG reduction per total project dollars** - 0.02 MTCO$_2$e
- **Total cost per MTCO$_2$e** - $54.69
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\textsubscript{2}e
- GHG reductions per CDFA grant dollar – 0.12 MTCO\textsubscript{2}e
- GHG reduction per total project dollars - 0.03 MTCO\textsubscript{2}e
- Total cost per MTCO\textsubscript{2}e - $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\textsubscript{2}e
- GHG reductions per CDFA grant dollar – 0.10 MTCO\textsubscript{2}e
- GHG reduction per total project dollars - 0.03 MTCO\textsubscript{2}e
- Total cost per MTCO\textsubscript{2}e - $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 - $2,889,184
- Estimated 10-year GHG reductions – 129,082 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.09 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,072,920
- Estimated 10-year GHG reductions – 161,275 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $25.25

Skyview Dairy Biogas
Funded: 2019
Status: In Progress
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 - $8,372,792
- Estimated 10-year GHG reductions – 85,174 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.01 MTCO$_2$e
- Total cost per MTCO$_2$e - $98.30

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 - $9,091,188
- Estimated 10-year GHG reductions – 125,872 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.12 MTCO$_2$e
- GHG reduction per total project dollars - 0.01 MTCO$_2$e
- Total cost per MTCO$_2$e - $72.23
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 - $16,642,393
- Estimated 10-year GHG reductions – 484,999 MTCO$_2$e
- GHG reductions per CDFA grant dollar – 0.16 MTCO$_2$e
- GHG reduction per total project dollars - 0.03 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $4,123,936
- Estimated 10-year GHG reductions – 168,447 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.08 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,794,876
- Estimated 10-year GHG reductions – 170,089 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.09 MTCO$_2$e
- GHG reduction per total project dollars - 0.04 MTCO$_2$e
- Total cost per MTCO$_2$e - $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 - $3,969,902
- Estimated 10-year GHG reductions – 186,037 MTCO$_2$e
- GHG reductions per CDFA grant dollar - 0.09 MTCO$_2$e
• GHG reduction per total project dollars - 0.05 MTCO$_2$e
• Total cost per MTCO$_2$e - $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 - $8,150,245
• Estimated 10-year GHG reductions – 119,137 MTCO$_2$e
• GHG reductions per CDFA grant dollar – 0.12 MTCO$_2$e
• GHG reduction per total project dollars - 0.01 MTCO$_2$e
• Total cost per MTCO$_2$e - $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 - $5,124,782
• Estimated 10-year GHG reductions – 126,988 MTCO$_2$e
• GHG reductions per CDFA grant dollar – 0.07 MTCO$_2$e
• GHG reduction per total project dollars - 0.02 MTCO$_2$e
• Total cost per MTCO$_2$e - $40.36

Prof. William Horwath, University of California Davis
Funded: 2016 Status: Canceled.

The UC Davis Manure Conversion Research Project was funded with $225,909 through the 2014-15 DDRDP. The Project Leaders was designed to evaluate a new method capable of converting large amounts of manure and/or urine from dairy operations into a more stable sterile soil amendment with a predictable nitrogen mineralization response that reduces greenhouse gas (GHG) emissions. This project targets a 25 percent GHG reduction in overall CO$_2$e 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 N$_2$O, CH$_4$ and CO$_2$ 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.