CDFA Dairy Methane Reduction Programs

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GHG Emissions from Dairies in California

Agriculture contributes to approx. 8% of the State’s total GHG emissions.

Source: California Greenhouse Gas Inventory – 2017 Edition
https://www.arb.ca.gov/cc/inventory/data/data.htm
# Approaches for Methane Reduction

## Legislation
- SB 1383 (Lara, 2016): Dairy and livestock methane emissions 40% below 2013 levels by 2030.
- Regulation of methane emissions on or after 2024.

## Voluntary Reduction
- Incentive programs administered by CDFA:
  - Dairy Digesters.
  - Non-digester manure management practices.
- Enteric fermentation
  - Research to determine cost-effective and feasible approaches.
METHANE REDUCTION EFFORTS AT CDFA

Dairy Digester Research and Development Program (DDRDP)
Since 2014: $47.1 million awarded for development of digester projects on CA dairies.

Alternative Manure Management Program (AMMP)
Since 2017: $9.9 million awarded for implementation of non-digester based manure management practices on CA dairies.

Research Projects

Dairy Digester Research & Development Program

Eligibility:

- Existing milk producers, dairy digester developers.
- Cluster projects.
- Eligible bio-methane uses: On-site use or into electrical grid/pipeline (electricity generation or transportation fuel/RCNG), utilization of thermal energy on site or at neighboring facility.

Environmental Quality Requirements:

- Water Quality Protection: Double-lined ponds consistent with the Tier 1 specification of the Dairy General Order Central Valley Regional Water Quality Control Board, or, above-ground tank, or, below-ground concrete lined tank.
- Air Quality Protection: Total NOx emissions no greater than 0.50 lb/MW-hr.

Grant size

- A maximum of 50% of the total cost of project, up to $3 million.
- 2-year project term.
2015: $11.1 million awarded to 6 projects completed in 2016-18, 28.1 million in matching funds

2017: $35.3 million awarded to 18 projects currently ongoing, $79.6 million in matching funds

2018: $61-75 million available for funding. Grant applications submitted from 12/15/2017 – 2/23/2018

74 applications requesting $143.1 million under review
Alternative Manure Management Program

FINANCIAL ASSISTANCE FOR THE IMPLEMENTATION OF NON-DIGESTER MANURE MANAGEMENT PRACTICES, SUCH AS:

- Pasture based management
- Solid separation, followed by drying, spreading or composting.
- Conversion from a flush to a scrape manure collection system, followed by drying, spreading or composting.
- $9.9 million awarded to 18 projects in 2018
- $19-$33 million currently available for funding.
AMMP PROGRAM REQUIREMENTS

**GHG Reductions**

Methane and equivalent Greenhouse Gas reductions from alternative (non-digester) manure management practices on California dairy and livestock operations must be permanent, annual and measurable.

**Matching Funds**

Matching funds, although not required, are highly encouraged. CDFA will fund up to 100% of the total project costs with a maximum grant award not to exceed $750,000 per project.

**CEQA Compliance**

Compliance with the California Environmental Quality Act (CEQA) and all applicable permitting within six months of the execution of the grant agreement.

**Technological Viability**

Use commercially available technology with proven operating history.

**ARB Quantification Methodology**

Must use Air Resources Board's Quantification Methodology for FY 2016-17 and Estimated GHG Reduction Calculator.

The calculator assists applicants in estimating avoided methane emissions from anaerobic manure decomposition.
Program Timelines:
- 12/15/17: CDFA released request for Grant Application
- 1/2018: Application Workshops
- 1/26/18: Grant Applications due
- 2/18 - 6/18: Application Review Period
- 7/18: Award announcement

AMMP Timeline:
- January 2018: Award announcement
- March 27, 2018: Release of Request for Grant Applications
- May 22, 2018: Applications Due
- May - July 2018: Review Process
- August 2018: Announcement of Awards

AMMP Workshops:
Program Impacts

**DDRDP**

- Average GHG reduction per year: 23,750 MTCO2e per project.
- Average project herd: approximately 9,000
- Average Cost of Project:
  - Grant funds: $1.93 million
  - Total cost: $4.5 million
- Average Cost per ton CO2e reduced: approx. $8 (GGRF) or $28 (total cost) for 10 year project life.

**AMMP**

- Average GHG reduction per year: 3,648 MTCO2e per project.
- Average project herd: approximately 1,900
- Average Cost of Project:
  - Grant funds: $0.5 million
  - Total cost: $0.7 million
- Average Cost per ton CO2e reduced: approx. $30 (GGRF) or $37 (total cost) for 5 year project life.
5.6% of manure management GHG emissions addressed by 2015-17 DDRDP and AMMP funded projects

633,643 MTCO$_2$e annually

Greenhouse gas emissions from

- Manure Management (including non-cattle livestock): 11.71
- Enteric Fermentation: 11.54
- Ag Soil Management: 5.86
- Ag Energy Use: 4.39
- Rice Cultivation: 0.91
- Histosol Cultivation: 0.15
- Ag Residue Burning: 0.08

All values in MMTCO$_2$e

GHG Emissions from Agriculture - 2015
Total: 34.7 million metric tonnes of CO$_2$e (MMTCO$_2$e)
Program Impacts

DDRDP Project Types by Biomethane End Use
- 1 million MMBtu/year
  - Electricity: 75%
  - RCNG: 25%
- 40 million kWh/year

AMMP Project Types by Manure Management Practices
- Flush-to-Scrape: 56%
- Solid Separation: 33%
- Pasture-Based: 6%
- Combination: 6%

Greenhouse gas emissions from
- 11,353 passenger vehicles driven for one year

CO₂ emissions from
- 5,966,045 gallons of gasoline consumed
Ongoing Manure Management Research

Benchmarking of pre-Alternative Manure Management Program Dairy Emissions: 2017-2019: Dr. Frank Mitloehner, UC Davis

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THANK YOU!

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