Dairy Operations and Manure Management in California

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The California dairy sector provides milk and milk products like cheese that are highly nutritious, safe, and affordable food sources for children and adults. The dairy sector plays an important role in local, national, and international food security.

Consumption of dairy and products continue to rise across the country

**US Per Capita Dairy Consumption**

**US Per Capita Butter Consumption**

Pounds per capita on milk equivalent, milkfat basis: USDA ERS
Dairy Herd Size vs. Milk Production in CA

Source: USDA National Agricultural Statistics Service (for California) – 2021
GHG Emissions From Agriculture In California

Source: California Greenhouse Gas Inventory – 2021 Edition
https://ww2.arb.ca.gov/ghg-inventory-data

- Manure Management: 11.63 (37%)
- Enteric Fermentation: 10.97 (35%)
- Ag Soil Management: 5.57 (18%)
- Ag Energy Use: 2.53 (8%)
- Rice Cultivation: 0.80 (2%)
- Histosol Cultivation: 0.15 (0%)
- Ag Residue Burning: 0.10 (0%)

Total Ag & Forestry: 31.7 MMTCO₂e

2019 TOTAL CA EMISSIONS
418.2 MMT CO₂e
California’s Approach To Methane Reduction

Legislative and Regulatory Measures

- AB 32 and SB 32
- SB 1383 (Lara, 2016)
  - Reduction in emission of manure management methane from dairy and livestock sector to 40% below 2013 levels by 2030.
  - Regulation for methane reduction on or after 2024.
- California’s Short-Lived Climate Pollutant Strategy (SB 605, Lara, 2014).

Voluntary Measures

- Incentive Programs at CDFA
  - Anerobic digesters for renewable energy (DDRDP)
  - Non-digester based approaches (AMMP)
- Enteric Fermentation
  - Research to determine cost-effective and feasible approaches
Methane Reduction Programs at CDFA

**Dairy Digester Research and Development Program (DDRDP)**
- Incentives for anaerobic digester on California dairy operations
- Since 2014
- 117 projects

**Alternative Manure Management Program (AMMP)**
- Incentives for non-digester manure management practices on California dairy and livestock operations
- Since 2017
- 116 projects

**FUNDING**
- Past – Greenhouse Gas Reduction Fund, as part of CA Climate Investments
- Current – State Budget General Fund; FY 2021-22, $32 million for Livestock Methane Reduction with priority given to AMMP, FY 2022-23, $48 million
Dairy Digester Research and Development Program

2014 - 21: $195.25 million awarded
Up to $1.6 million grants

1. Process stabilizes the digestate and reduces odors
2. Nutrients are preserved and can still be used as fertilizer
3. Higher availability of nutrients after the digestion process
4. Currently supported by LCFS and RIN markets
5. Renewable and storage of biogas that will replace fossil fuels
6. Maximizes the GHG and odor reduction for dairies
7. Represents a long-term commitment to GHG reduction
8. Creates many local temporary and permanent jobs
9. Protects water quality by ensuring double-lined lagoon or above ground tanks for anaerobic digestion

117
Digesters on CA Dairy Operations

2.1 M
Metric Tons of CO2e reduced/year

$392 M
In matching funds
DDRDP Projects to Date

12 RNG Clusters +
12 Independent Projects

- 2015 projects
  6 electricity generating projects

- 2017 projects
  16 biogas/transportation fuel digester projects

- 2018 projects
  40 biogas/transportation fuel and electricity generation digester projects

- 2019 projects
  42 biogas/transportation fuel and electricity generation digester projects +
  1 Demonstration project

- 2020 projects
  12 biogas/transportation fuel digester projects
Alternative Manure Management Program

2017 - 21: $68.3 million awarded
Up to $750,000 grants, Technical Assistance Providers

Non-digester practices include:
- Pasture-based management
- Compost bedded pack barn, slatted floor pit storage
- Solid separation and flush-to-scrape conversion in conjunction with treatment or drying practice

Environmental Co-Benefits:
1. Production of compost for soil amendment, fertilizer, or cow bedding
2. This compost can create a source of revenue for farmers
3. It is easily implementable and at a lower cost/investment to the farmer
AMMP Projects to Date

- 2017 Projects: 18 funded for $9.9 million
- 2018 Projects: 35 funded for $18.25 million
- 2019 Projects: 48 funded for $30 million
- 2019 Demo Projects: 2 funded for $1.25 million
- 2020 Projects: 13 awarded for $8.9 million
GHG Emissions from Dairy and Livestock Operations in California

Dairy digesters and non-digester practices implemented with grant funding from CDFA are estimated to reduce 20% of CA manure management methane emissions (2.32 MMTCO$_2$e annually)

Total CA Ag and Forestry: 31.7 MMTCO$_2$e

Source: California Greenhouse Gas Inventory – 2021 Edition (for 2019 Data)
https://ww2.arb.ca.gov/ghg-inventory-data
Thank you!

CDFA Office of Environmental Farming and Innovation
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Dairy Digester Research and Development Program
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