

# Renewable Natural Gas from Dairy in California:

Achieving Methane Reductions and Providing Low Carbon  
Fuel

Sam Wade  
Coalition for Renewable Natural Gas  
Director of Public Policy  
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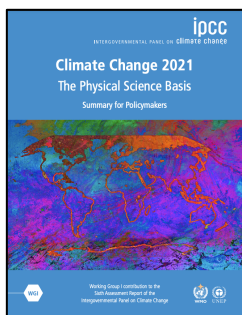
# About the RNG Coalition

- The leading advocacy and education voice for RNG in North America
- We advocate for the sustainable development, deployment and utilization of renewable natural gas so that present and future generations will have access to domestic, renewable, clean fuel and energy
- 350+ members including: RNG developers, marketers, financiers, technology providers, consultants, utilities and labor coming together
- 98%+ of the RNG supply in North America

## What is RNG?

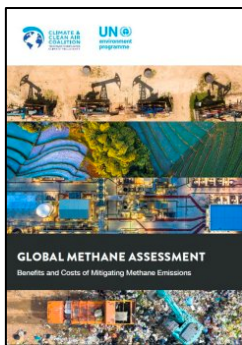


## Abating Methane from Organic Wastes Remains a Critical Climate Strategy, both in Globally and in the US



“Sustained methane mitigation, wherever it occurs, stands out as an option that combines near- and long-term gains on surface temperature and leads to air quality benefits by reducing surface ozone levels globally.

For example, some short-term ‘win-win’ policies that simultaneously improve air quality and limit climate change include the implementation of...methane capture and recovery from solid waste management...”



“Reducing human-caused methane emissions is one of the most cost-effective strategies to rapidly reduce the rate of warming and contribute significantly to global efforts to limit temperature rise to 1.5°C.”

“Countries joining the Global Methane Pledge commit to a collective goal of reducing global methane emissions by at least 30 percent from 2020 levels by 2030 and moving towards using best available inventory methodologies to quantify methane emissions, with a particular focus on high emission sources.

“Rapidly reducing methane emissions is complementary to action on carbon dioxide and other greenhouse gases, and is regarded as the single most effective strategy to reduce global warming in the near term and keep the goal of limiting warming to 1.5 degrees Celsius within reach.”

Joint US-EU Press Release on the  
Global Methane Pledge

SEPTEMBER 18, 2021 - STATEMENTS AND RELEASES

## According to the US EPA, Anaerobic Digestion at Farms Can:

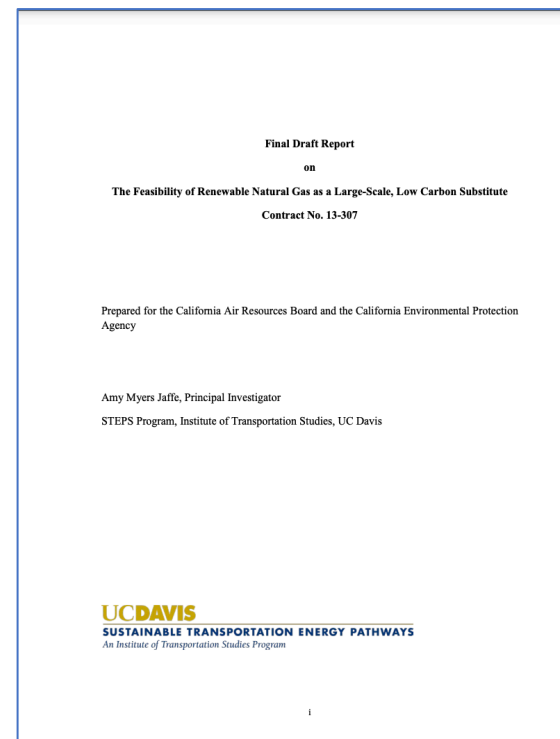
- Protect animal and human health by reducing pathogens
- Convert nutrients in manure into a form that is more accessible for plants to use compared to raw manure. This can increase crop productivity and yield.
- Recycle nutrients on the farm, creating an economically and environmentally sustainable food production system
- Produce heat, electricity, or fuel
- Accept food waste from places like restaurants and grocery stores. This means less food waste is sent to landfills. Food waste has the added benefit of increasing the efficiency of farm digesters.



# CARB Has Funded Multiple Studies Examining the Costs of California Dairy Manure Methane Mitigation, Including Detailed Evaluation of Digester and RNG Project Costs

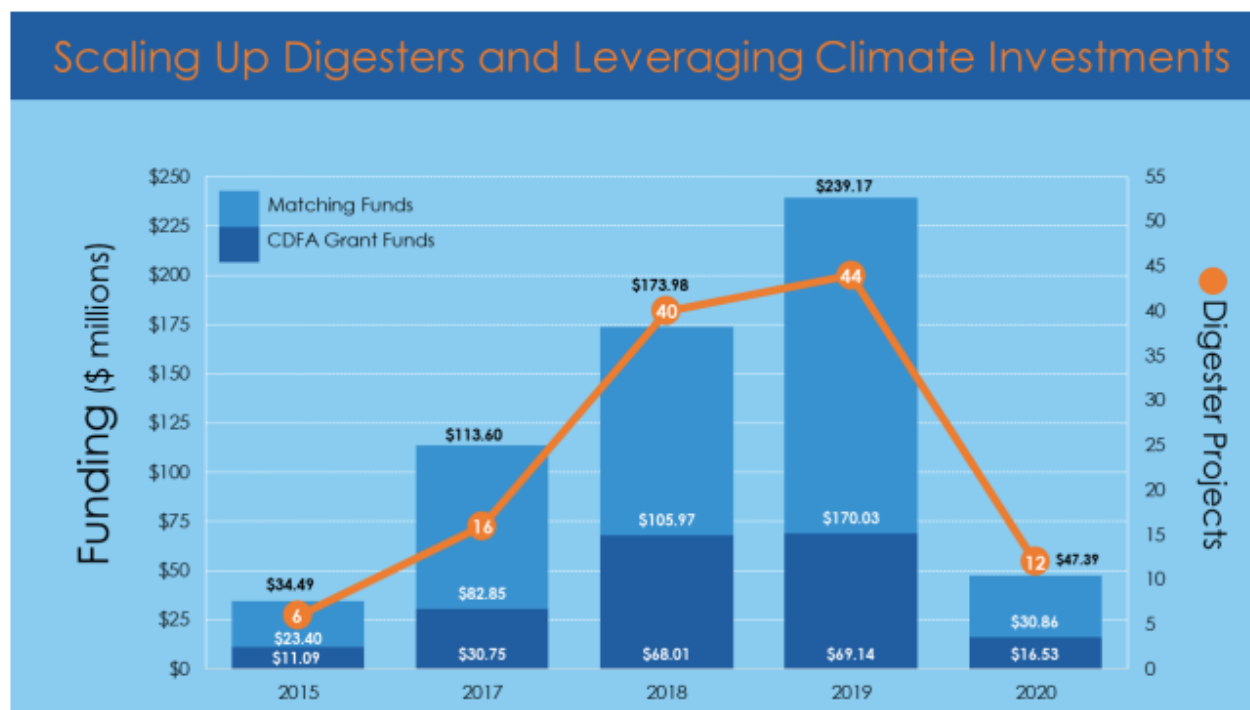


Kaffka et al. (2016) *Evaluation of Dairy Manure Management Practices for Greenhouse Gas Emissions Mitigation in California*



Jaffe et al. (2016) *The Feasibility of Renewable Natural Gas as a Large-Scale, Low Carbon Substitute*

## California Has Motivated More than Half a Billion Dollars of Investment in California Dairy Digesters

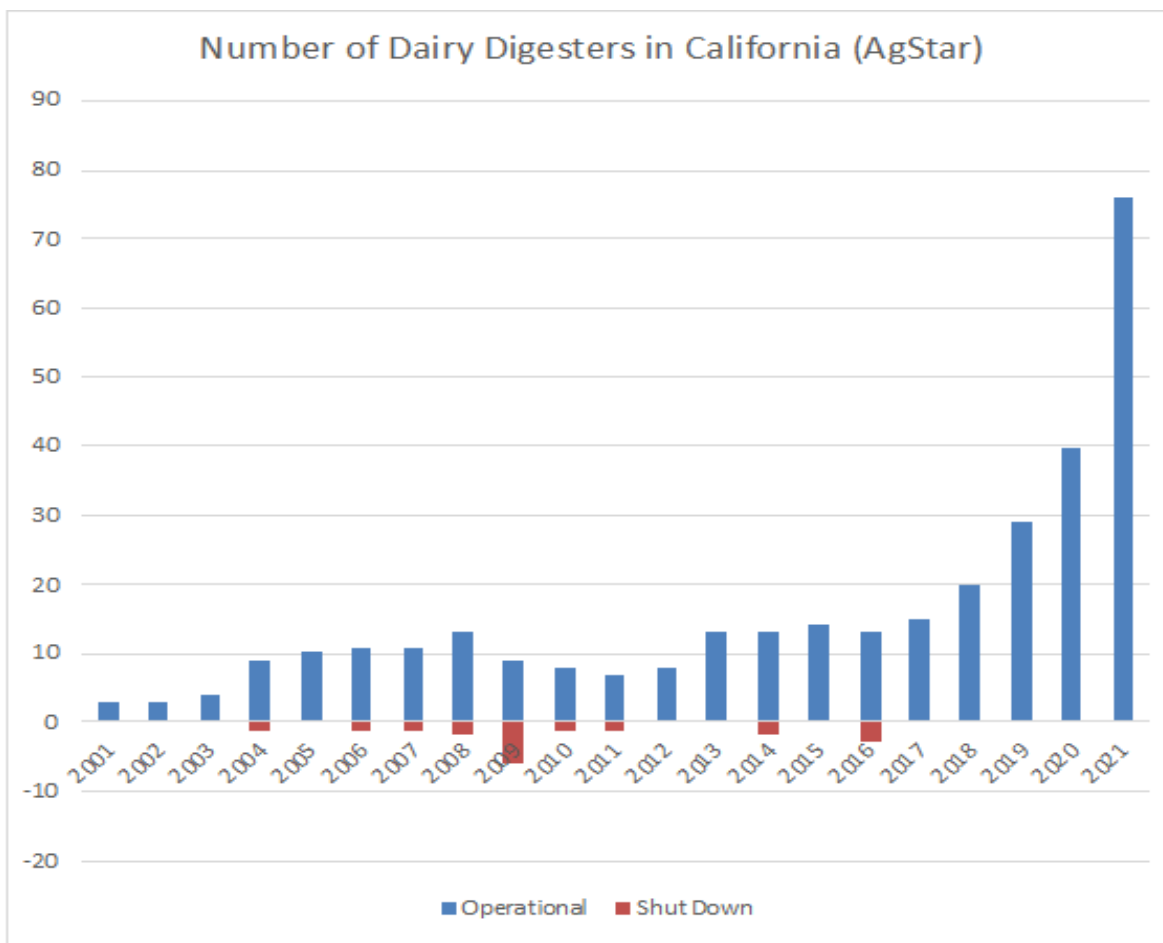


**Figure 1.** Number of funded digester projects by year, with total investments from CDFA grants and matching funds for each grant cycle.

- CDFA Grants are primarily designed to reduce up front capital costs
- Grants have averaged ~32% of total capital expenditures needed
- Significant ongoing operating revenue (to payback remaining capital outlay and cover O&M) must come from the Low Carbon Fuel Standard and the federal Renewable Fuel Standard (RINs), or these projects are not financeable



# History of California Growth in Dairy Digesters



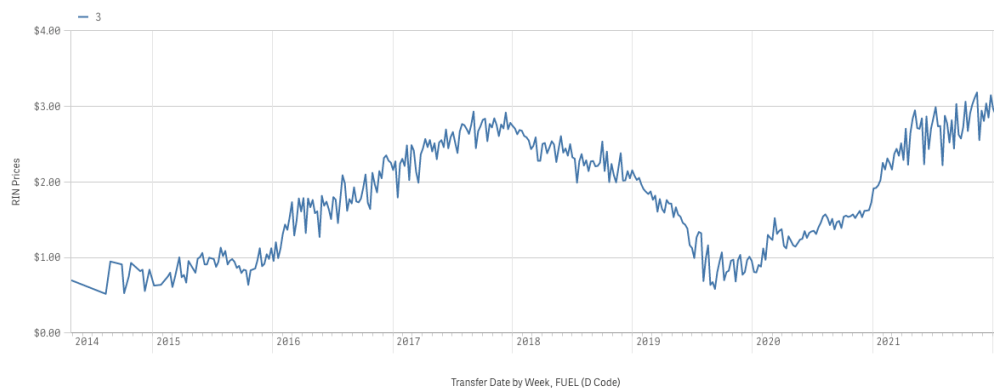
- California Energy Commission grants, through the Dairy Power Production Program in the early 2000s, were not sufficient to keep digesters operating
- Since the LCFS market became strong, no digesters have shut down, buildout has significantly increased
- Dependency on environmental credit revenue is challenging, as explained by *Lee and Sumner (2018)*, but project developers have taken this risk because of clear historical signals from CARB



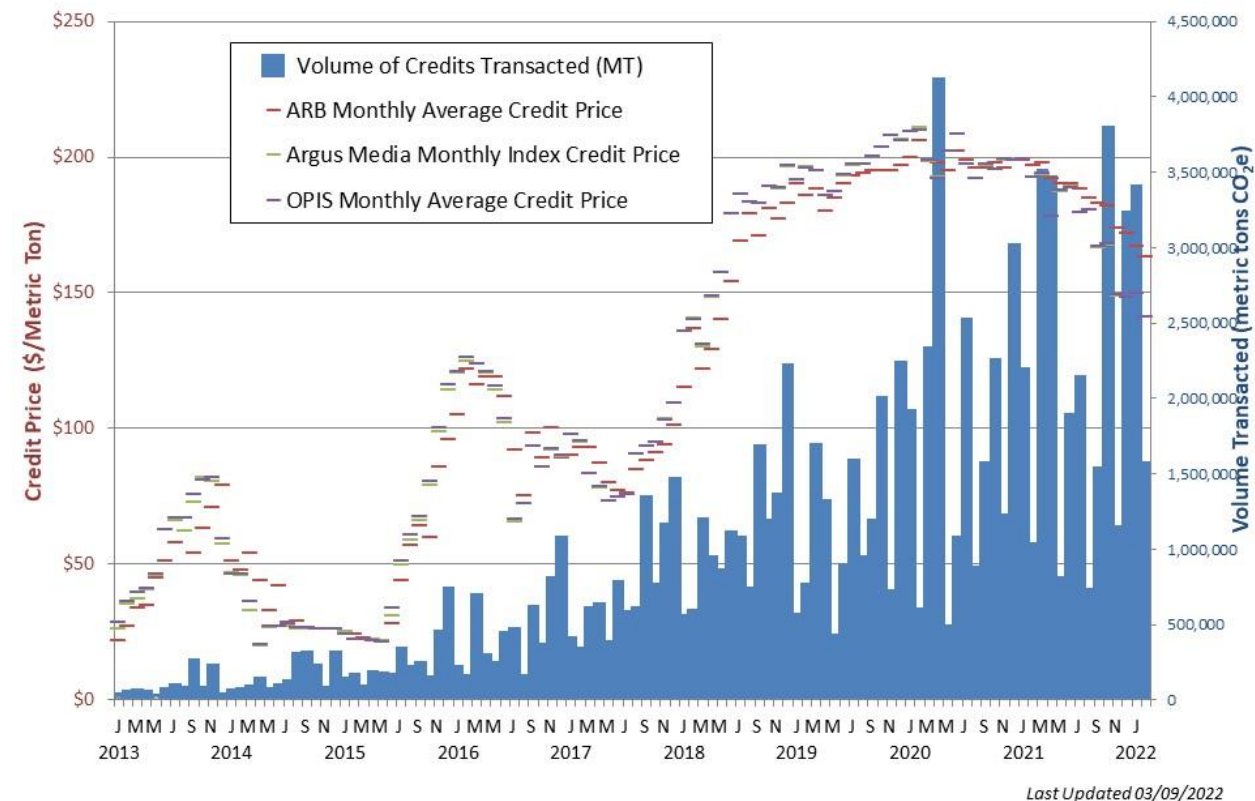


# Support from LCFS and RIN Credits Are Volatile

## D3 RIN Prices



## Monthly LCFS Credit Price and Transaction Volume



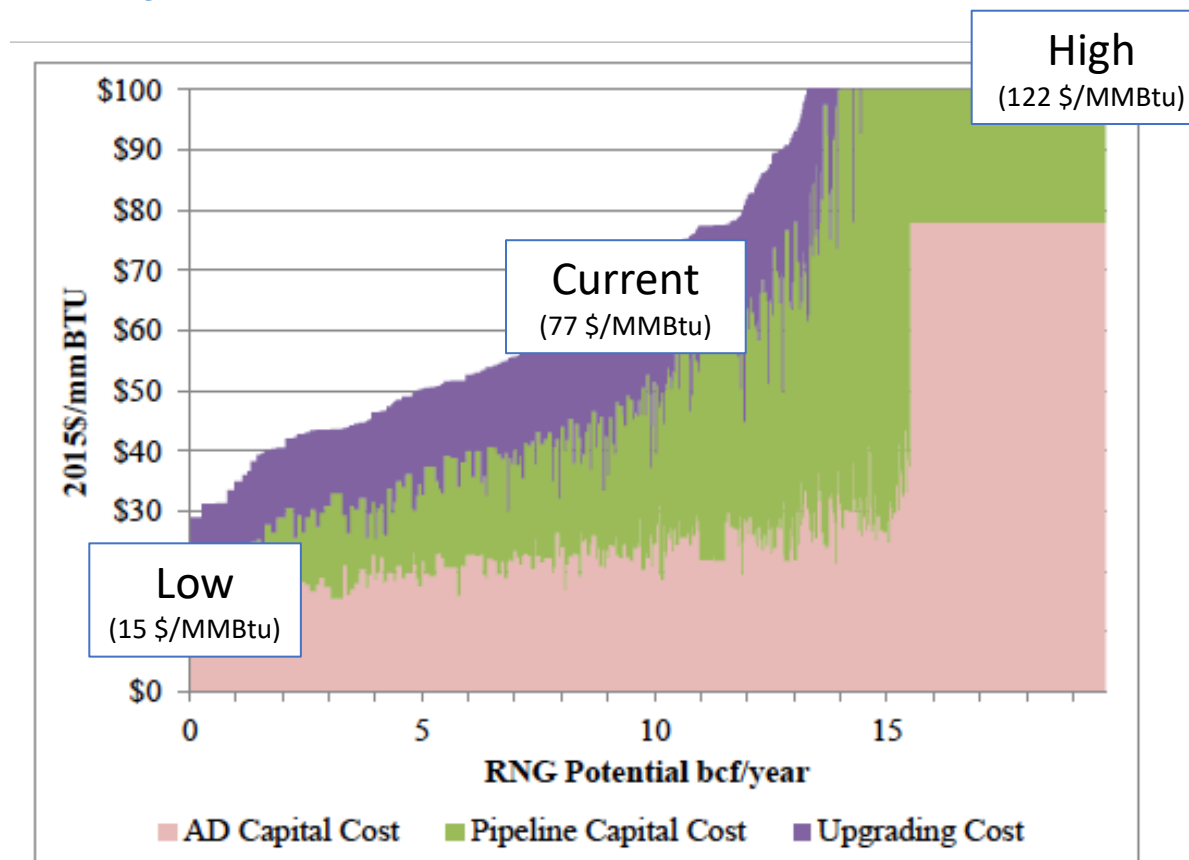
Last Updated 03/09/2022

This chart tracks credit prices and transaction volumes over time. Monthly average credit prices reported by Argus Media and OPIS [used with permission] are shown along with CARB monthly average price.

	High	Current	Low	
LCFS		206	118	22\$/credit
D3 RIN		3.5	2.87	0.46\$/RIN
Developer Share of LCFS*		69	40	7\$/MMBtu
Developer Share of D3 RIN*		33	27	4\$/MMBtu
Energy Value		5	4	3\$/MMBtu
Grant Value		15	6	0\$/MMBtu
Total Value		122	77	15\$/MMBtu

\* Accounts for 20% revenue sharing with fleet partner

## Total Stack of Incentives Currently Provided by Government Programs are Within the Range of Project Costs from CARB-funded Studies



Cost figure from (Jaffe et al. 2016) *The Feasibility of Renewable Natural Gas as a Large-Scale, Low Carbon Substitute*. Boxes compare costs to high, current, low revenue estimates from prior slide.

## Summary

- Dairy digester projects have been studied by California for 20+ years, by US EPA for 25+ years
  - Digesters, with productive energy generation, have been proven to be best system of manure methane emission controls for many California dairies
  - Costs are well studied by CARB/CDFR
- Only recently has the mix of federal and state incentives been successful at promoting significant methane reductions from digester project development in California
  - Diminishing LCFS incentives will slow progress and risk nonachievement of methane reduction goals
  - Removal of all LCFS incentives could cause existing digesters to shut down
  - Mandating only non-digester practices in California would not be equally effective at both reducing in-state greenhouse gas emissions and preventing emissions leakage to other jurisdictions
- CARB should not abandon a working tool that is driving major reductions in a critical short lived climate pollutant

## Speaker Info

Sam Wade  
RNG Coalition, Director of Public Policy  
sam@rngcoalition.com  
(916) 588-3033  
RNGCoalition.com