


**Monetizing Manure Projects**  
High Plains Dairy Conference  
March 6, 2024



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REPRESENTING NEARLY ALL U.S. DAIRY FARMERS



**NEWTRIENT'S MISSION**  
*To reduce the environmental footprint of U.S. dairy and make it economically viable to do so*



January 13, 2024

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SUSTAINABILITY IS NOW TABLE STAKES



**TABLE STAKES**


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How is the Value Determined?



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## Current Manure Value as Fertilizer



**Fertilizer Value Per Ton as Excreted**

- 2,000 lbs in a ton
- 49,077 lbs manure/cow/year<sup>1</sup>
- 24.54 Wet Tons/Cow/Year
- \$10.82 Fertilizer value per wet ton**
- 4 X Concentration in drying to >80% DM
- \$43.29 Raw manure value of dry manure
- 27% Reduction for loss of Volatile Nitrogen<sup>2</sup>
- \$31.46 Fertilizer value per dry ton**


\* Calculations based on ASABE Standards for 75 lbs./day milk production (305 day lactating & 60 days dry)

<sup>1</sup>ASABE values based on for 305 days lactating, 40 days dry cow, 20 days heifer before first calving.

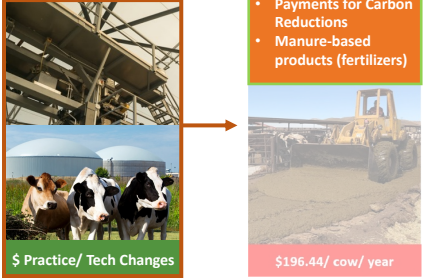
<sup>2</sup>Assumes 100% loss of volatile nitrogen as NH<sub>3</sub>

January 13, 2024 Data Updated November 03, 2022

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## Potential Revenue from Avoided Costs



- LCFS Credits
- Payments for Carbon Reductions
- Manure-based products (fertilizers)

← New Profit Stream


→ Reducing Annual Costs of Manure Management

\$ Practice/ Tech Changes

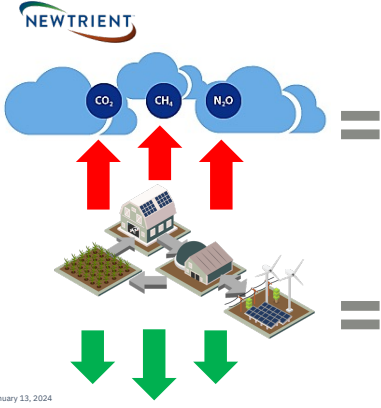
\$196.44/ cow/ year

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## CARBON CREDITS




releasing GHG's  
created emissions

capturing carbon  
avoided emissions

CO<sub>2</sub>e Before + CO<sub>2</sub>e Project - CO<sub>2</sub>e After = Credited CO<sub>2</sub>e


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## TWO PATHS TO DETERMINE VALUE

1 Carbon INSETS  
reducing emissions within the supply chain and offering farmers incentives to reduce emissions



Dairy Supply Chain

GHG Reduction

November 12, 2023

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**2 Carbon OFFSETS**  
selling carbon offsets outside the dairy supply chain

**TWO PATHS TO DETERMINE VALUE**

**Dairy Supply Chain**

**EXTERNAL COMPANIES**

**Carbon Credits**

**No GHG Reduction**

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**ec engineers**

**Carbon Markets Snapshot**  
February 16, 2024

US\$ per RIN (Renewable Fuel Standard) 2024	
D3	\$2.990
D4	\$0.460
D5	\$0.450
D6	\$0.450

US\$ per Metric Ton of CO2e (State LCFS Program)	
Oregon Clean Fuels Program (CFP) Credit	\$93.00
California Low Carbon Fuel Standard (LCFS) Credit	\$63.35

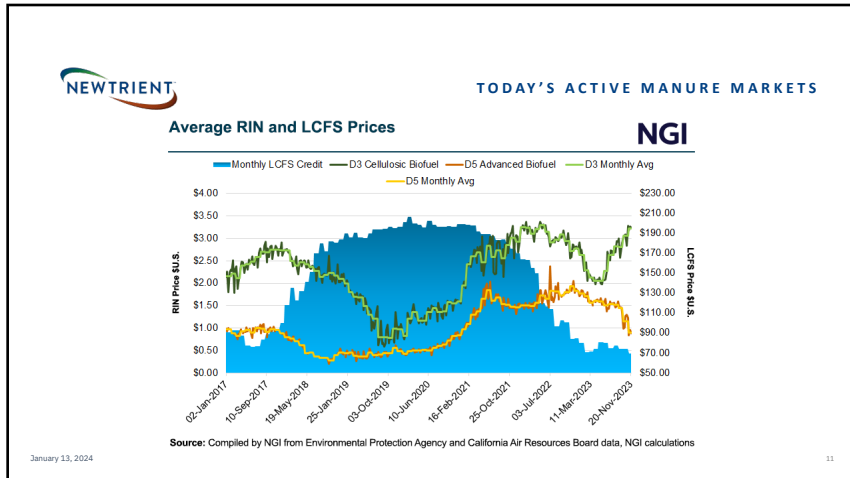
**TODAY'S ACTIVE MANURE MARKETS**

US\$ per Metric Ton of CO2e (Voluntary Carbon Offsets)	
Agriculture	\$17.01
Biochar	\$217.98
Chemical Processes	3.12
Energy Efficiency	\$3.43
Forestry	\$6.37
Household Devices	\$7.67
Renewable Energy	\$2.31
Transportation	\$3.03
Waste Disposal	\$4.16
Carbon Removal	\$0 - \$3,700

	Current	Units	MMBTU	Cumulative
Base Gas Price	\$3.168	MMBTU	\$ 3.17	\$ 3.17
D3 RIN Value*	\$2.990	EGE	\$ 38.83	\$ 42.00 <sup>13,6</sup>
LCFS Credit*	\$63.35	Credit	\$ 19.96	\$ 61.96 <sup>19,6</sup>

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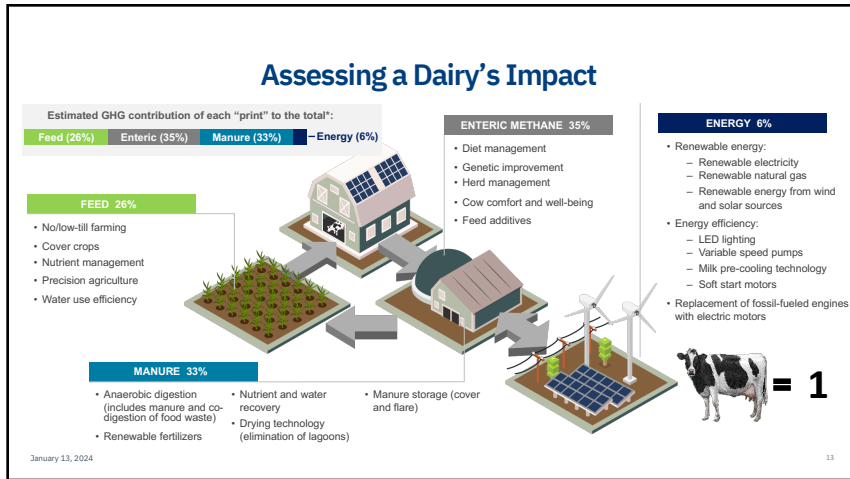
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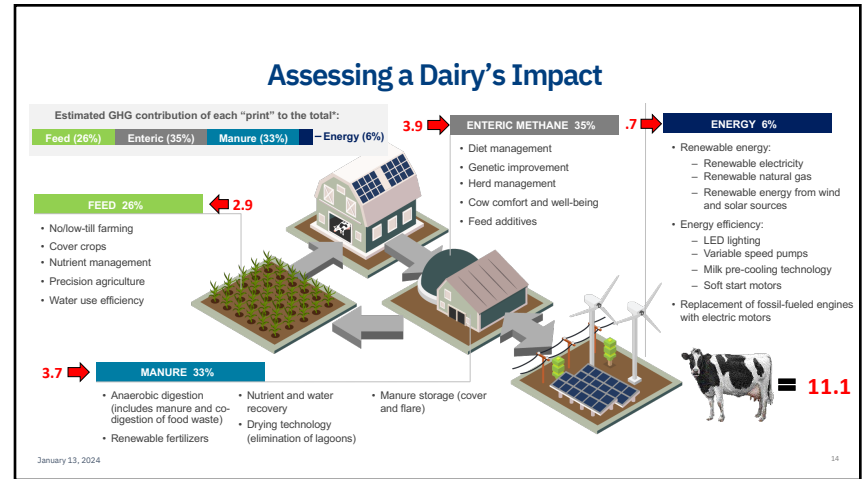
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**Assessing Dairy's Impact**

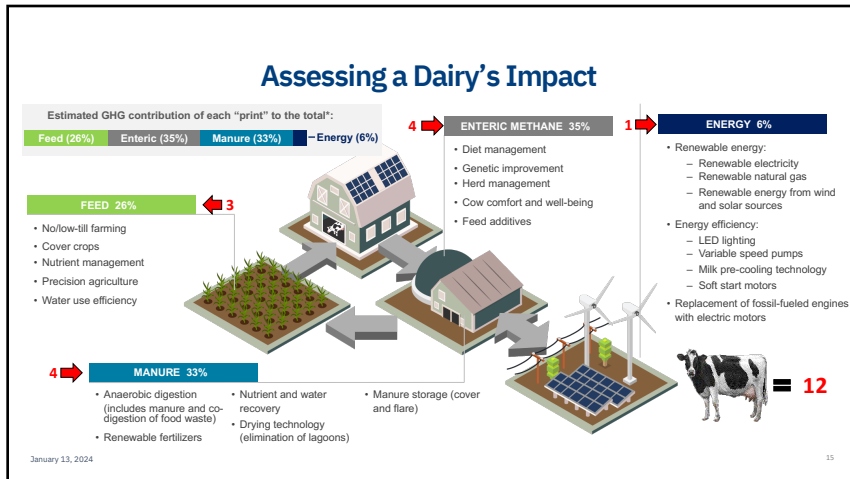
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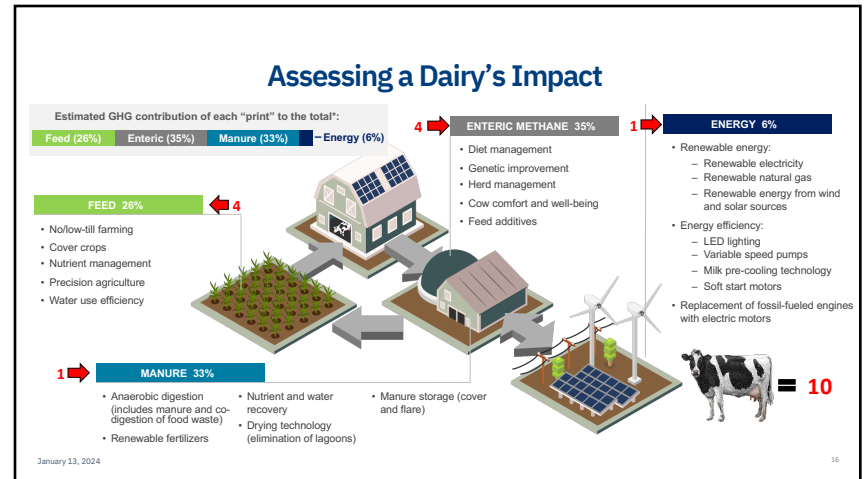
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### Transforming the Use of Manure

**Current State**  
 Manure is being generated and reapplied in its raw form in pursuit of nutrient balance and for an expected crop yield.

All manure application rates are adjusted for "normal" fugitive nutrient losses to achieve these yields.

Without proof of that nutrient balance, there is always a tension between nutrient needs and the need to manage the ever-growing supply of manure.

This creates an increased use of commercial fertilizer, an uncertain regulatory environment, it undermines consumer and community trust and places a potential burden on the environment.

**We have the technology to improve this situation and solve these problems**

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### Transforming the Use of Manure

**Simplest Internally Balanced System**

- No loss of valuable nutrients
- Regulatory certainty
- Enhance the reputation of dairy and dairy farming
- Grow consumer and community trust
- Enhance the natural environment

Healthy soils  
 Water management benefits  
 Less commercial fertilizer  
 No external discharge

**Improved yield**

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## Finding New Markets

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### MARKET DRIVERS

- Companies setting **aggressive carbon reduction goals** or seeking to green their portfolio
- **Increased regulations** on certain sectors (i.e. transportation)
- **Increased support from government programs** for the adoption of climate-smart practices (Inflation Reduction Act, Climate-Smart Commodities, etc.)

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**NEWTRIENT** AGGRESSIVE CARBON REDUCTION GOALS

**BRIEF: Microsoft to purchase up to \$2m in carbon credits from Land O'Lakes**  
February 6, 2024 - Jack Kline

**Booming Airline Traffic Could Force Carriers to Buy Carbon Offsets as Early as 2024**





Nestle moves closer to GHG emission reduction goal

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**NEWTRIENT** INCREASED SUPPORT FROM GOV PROGRAMS

**U.S. GOVERNMENT PASSES INFLATION REDUCTION ACT**




**USDA** United States Department of Agriculture

**PARTNERSHIPS FOR CLIMATE-SMART COMMODITIES**

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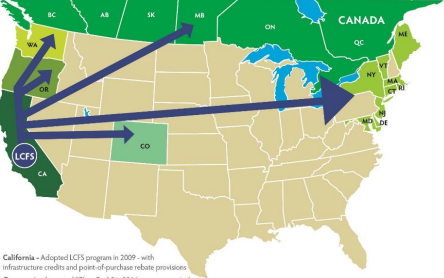
**NEWTRIENT** INCREASED REGULATION

**BIOMASS**

**Dominion Energy, Vanguard Renewables partner on dairy RNG**

By Dominion Energy | December 11, 2019

Dominion Energy and Vanguard Renewables announced today a more than \$200 million, nationwide strategic partnership to convert methane from U.S. dairy farms into clean, renewable natural gas (RNG) that can heat homes, power businesses and fuel vehicles. Multiple projects are under development in Georgia, Hawaii, Colorado, New Mexico, and Utah with additional projects planned.

**The Washington Post**  
**Turning manure into money**  
Farmers and utilities are burning methane for energy – and curtailing a powerful greenhouse gas in the process.

- California - Adopted LCFS program in 2009 - with infrastructure credits and point-of-purchase rebate provisions
- Oregon - Implemented "Clean Fuel" in 2016 - a program similar to LCFS, without infrastructure credits and point-of-purchase rebate provisions
- Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont - Adopted ZEV mandate
- Canada - Environment Canada released the regulatory design paper for a national "Clean Fuel" program in late 2018
- Washington - Considering implementing program similar to Oregon's "Clean Fuel"
- Colorado - Considering adopting ZEV mandate

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