OVERVIEW OF CURRENT OPPORTUNITIES
IN COMPLIANCE CARBON MARKETS &
VOLUNTARY MARKETS
FOR IDAHO AND UTAH DAIRY & LIVESTOCK INDUSTRY

Nina Gibson
Washington State University
School of Economic Sciences
Center for Sustaining Agriculture and Natural Resources

Image courtesy Dairy Cares
Presentation Overview
Opportunities for ID & UT Dairy

1. Compliance Markets
   • State Clean Fuel Programs (in CA, OR, WA)
   • Federal Renewable Fuel Standard Program
   • State Cap-and-Trade Programs for “offset” projects (CA-Quebec, WA)

2. Voluntary Market Practices
   • Alternative Manure Management (AMM) practices with established protocols for voluntary markets
NEEDED FOR PARTICIPATION IN COMPLIANCE MARKETS
Biogas Control System (Anaerobic Digester)

Biogas to Biomethane (RNG)
Crediting for projects at **State and Federal Levels**

![Diagram of Biogas to Biomethane process]

Biogas to Electricity
Crediting for projects **State Level Only**

![Diagram of Biogas to Electricity process]

Images from Lauer et al. 2018
### Revenue Opportunities Associated with Biogas End-Uses for Compliance Fuel Markets

#### Scenario A: Biogas to Renewable Natural Gas (RNG)

1. **State Low Carbon Fuel Program Credit ($)**
2. **Federal RIN Credit ($)**
3. Commodity Gas Price ($)

\[ ($) \text{ Revenue} = 1 + 2 + 3 \]

#### Scenario B: Biogas to Electricity

1. **State Low Carbon Fuel Program Credit ($)**
2. Power Purchase Agreement/Net Metering Price ($)

\[ ($) \text{ Revenue} = 1 + 2 + ? \]
State Clean Fuel Standard Programs

States with Clean Fuel Programs:
- California
- Oregon
- Washington

State compliance programs require fuel suppliers to reduce the Carbon Intensity (CI) of their fuels by a target date

- CI score determines crediting volume

- CI score for dairy RNG projects generally fall between -100 and -300

Image Source: American Biogas Council
State Cap-and-Trade Programs
(CA & WA)

• Separate from State and Federal low carbon fuel programs

• ID and UT dairies can be considered “offset” credit generators under cap-and-trade programs

• Only a few livestock offset projects in these programs – not very widespread

• Livestock Offset Protocols for Dairy and Swine projects, created by California Air Resources Board
MANURE MANAGEMENT PRACTICES FOR VOLUNTARY MARKETS
VOLUNTARY MARKET PRACTICES

1) Advanced Solids Separation
   - 2 known projects in Washington

2) Enteric Fermentation
   - At least one underway in the U.S.

3) Nitrogen Management
   - In process of establishing in U.S.

Image Courtesy of The Dairy Farmers of Washington: Showing BioFiltro Technology (i.e., vermilification/worm beds) used as part of ‘Advanced Solids Separation’ practice at Royal Dairy in Washington state, and earns credits under voluntary market (Nestle).
Looking ahead...

- System costs; capital and ongoing operations and maintenance remain a challenge
- Price Uncertainty
- Risk
- Federal eRINs for biogas to electricity projects
Thank you!

Tune into the Carbon and Cow$ Podcast with me, brought to you by Washington State University and University of Idaho!

~More Details to Follow

Kristina.Gibson@wsu.edu