Session 10: Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target

Dr. Qian Mitloehner, Air Pollution Specialist
California Air Resources Board

SB 1383 Requirement to Analyze Progress toward 2030 Dairy and Livestock Sector Target

- SB 1383 required CARB, in consultation with CDFA, to evaluate progress toward:
  - Achieving the 2030 dairy and livestock sector methane emissions reduction target
  - Overcoming technical and market barriers to dairy and livestock methane emissions reduction projects
- CARB staff initiated work on the Analysis in 2019

Analysis Outreach Efforts

cdfa

Public Utilities Commission · Eureka · State of California

North Coast Unified Air Quality Management District · Del Norte · Humboldt · Trinity

San Joaquin Valley Air Pollution Control District

South Coast AQMD

State of California Energy Commission

Sustainable Conservation

Yolo-Solano Air Quality Management District

Bay Area Air Quality Management District

Sacramento Metropolitan Air Quality Management District

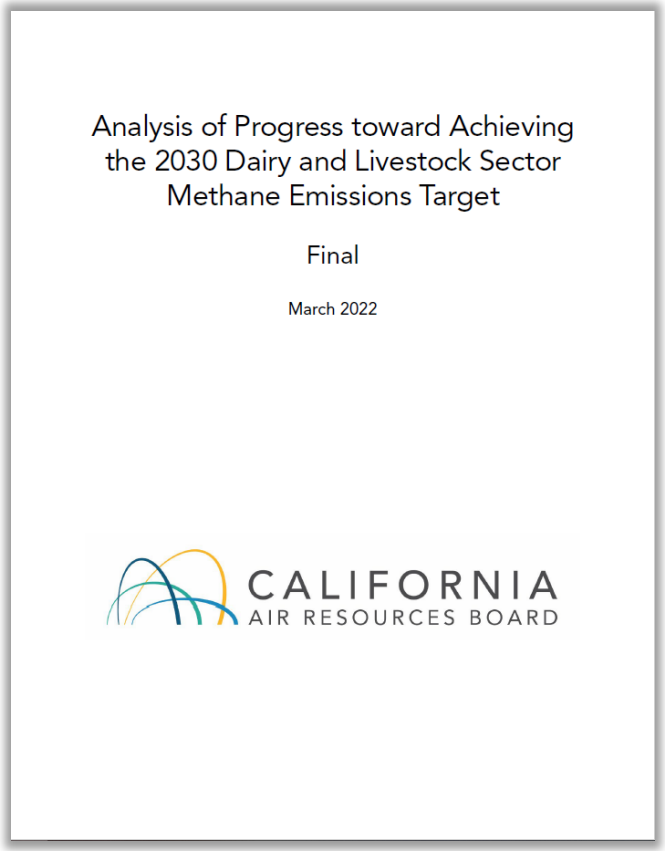
Dairy Cares

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

CalCAN
California Climate & Agriculture Network

Public Process for the Analysis

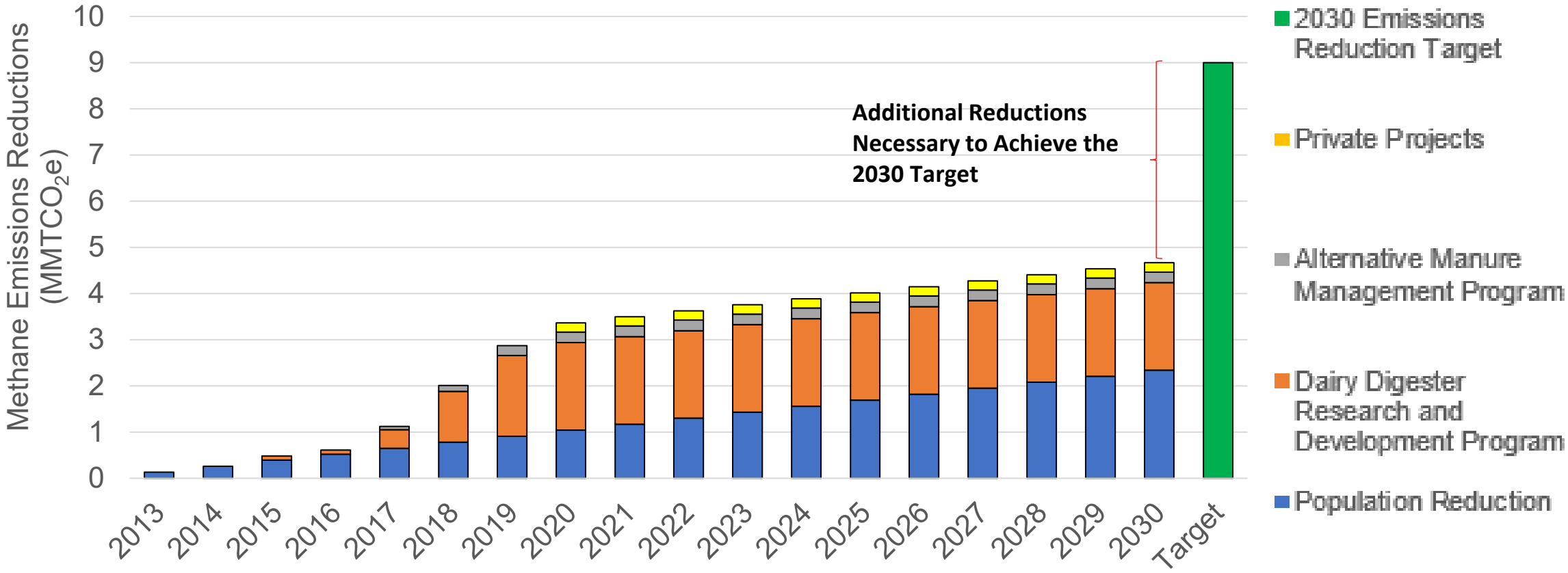
- May 2020 webinar
- Draft Analysis released June 2021, followed by a 30-day public comment period
- Staff incorporated comments into the Final Analysis where appropriate
- Final Analysis posted March 28, 2022



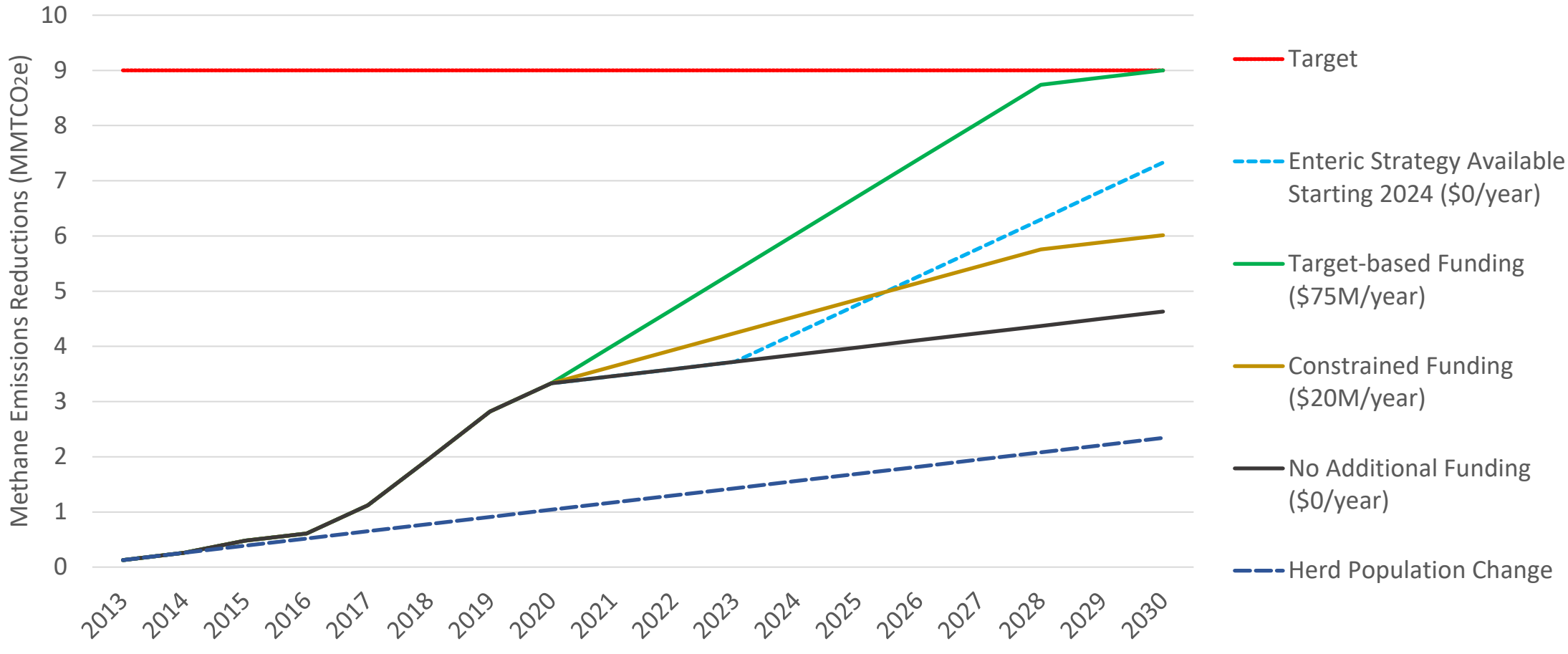
Benefits and Limitations of Dairy and Livestock Methane Emissions Reduction Strategies

Digesters	Alternative Manure Mgt.	Enteric Strategies
Significant reductions	Lower upfront cost	Pay as you go
Renewable energy	Wide applicability	Wide applicability
Cost-effective	Co-benefits	Cost-effective
High upfront cost	Small project-level reductions	Limited commercial availability
Not financially feasible on small farms	Variable reductions	Unknown consumer acceptance

Dairy and Livestock Methane Emissions – 2030 Outlook



Options to Achieve the 2030 Dairy and Livestock Methane Emissions Reduction Target



Comparison of Manure Methane Emissions Reduction Strategies

Category	Digesters	AMMPs
Number of Projects	118	115
Estimated Reductions ($MMTCO_2e$)	1.8*	0.2
State Investment ($/MTCO_2e$)	$9	$61
Private Investment ($/MTCO_2e$)	$20	$9
Total Investment ($/MTCO_2e$)	$29	$70

*Does not include Aliso Canyon Mitigation Projects – 0.3 $MMTCO_2e$

Status of Enteric Methane Emissions Reduction Strategies

- Staff evaluated information on potentially effective feed additives and their enteric methane emissions reduction potentials
- Estimated cost: ~$50/MMT$CO_2e$
- Few effective additives currently available; more under development

Status	Estimated Emissions Reduction Potential (%)
Commercially available	10 - 20%
Pending U.S. FDA approval (2 to 4 years)	Up to 40%
In research & development phase (>4 years)	Up to 50%

Barriers to Achieving 2030 Target

	Technical Barriers	Market Barriers
Manure Management	Alternative manure management projects ✗ Inconsistent reductions ✗ Difficulties quantifying reductions Anaerobic digesters ✓ Grid and pipeline interconnection ✓ Biomethane quality standards	✓ Project development costs and financing ✓ Environmental credit certainty ✗ Sector economics ✗ Insufficient public funds ✗ Undeveloped markets for value-added manure products
Enteric Fermentation	✗ Transient effect/rumen adaptation ✗ Potential animal health impacts Limited availability ✗ 3-5 years before commercial availability ✗ Seasonal products	? Consumer acceptance ? Cost-effectiveness

✓ = Progress made ✗ = Persistent barrier ? = Currently Unknown

SB 1383 Requirements for Dairy and Livestock Sector Methane Emissions Reductions/Regulations

Manure Management Regulation Must:

- Be technically feasible
- Be economically feasible
  - Consider electrical interconnection and access to natural gas pipelines
- Be cost effective
- Minimize emissions leakage
- Evaluate incentive-based achievements

Enteric Fermentation Emissions Reductions Must:

Be incentive-based *unless…*

- Cost effective
- Scientifically proven
- Do not damage animal productivity, animal and public health, and consumer acceptance