
U.S. Dairy Life Cycle Assessment

From Grass to Glass

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The U.S. dairy LCA

- U.S. dairy from grass to glass
- Life Cycle Assessment
 - What are the guiding principles?
 - What makes a good LCA?
 - What are the challenges for LCA?
- Commitment to U.S. LCA Digital Commons database

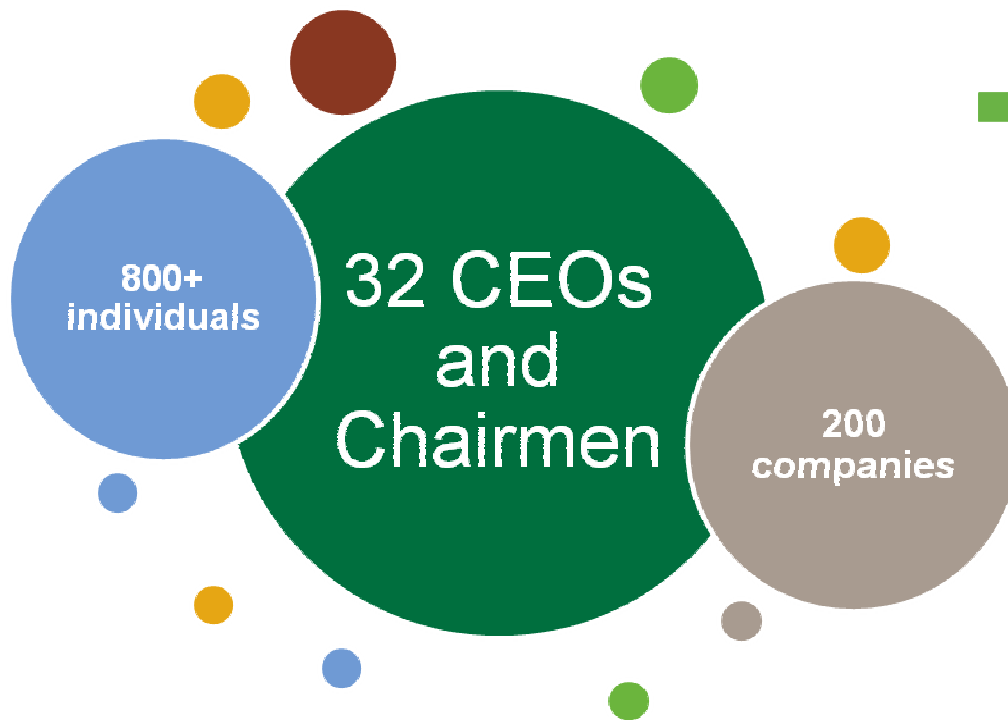
Diversity of U.S. dairy farms

- 4th largest agricultural commodity
- 54,000 dairy farms
- 98% family owned
- Average herd size – 170
- Diverse operations
- In all 50 states



Innovation Center for U.S. Dairy

- Established by dairy producers
- Forum for the value chain to work together
- Sustainability: A top priority



Sustainability Council

Producers

Alliance Dairies
 Clauss Dairy Farms
 Fair Oaks Farms
 Fiscalini Farms
 Foster Brothers Farm
 Gar-Lin Dairy Farm
 Graywood Farm
 Haubenschild Farms Inc.
 Maddox Dairy
 Medeiros & Sons Dairy
 Prairieland Dairy
 Si-Ellen Farms
 Spruce Haven Farm
 Stauffacher Highway Dairy
 Werkhoven Dairy

Associations/ Government



Retailers



Co-ops



Milk Production



Crop Production

Milk Production

Transport

Processing

Packaging

Distribution

Retail

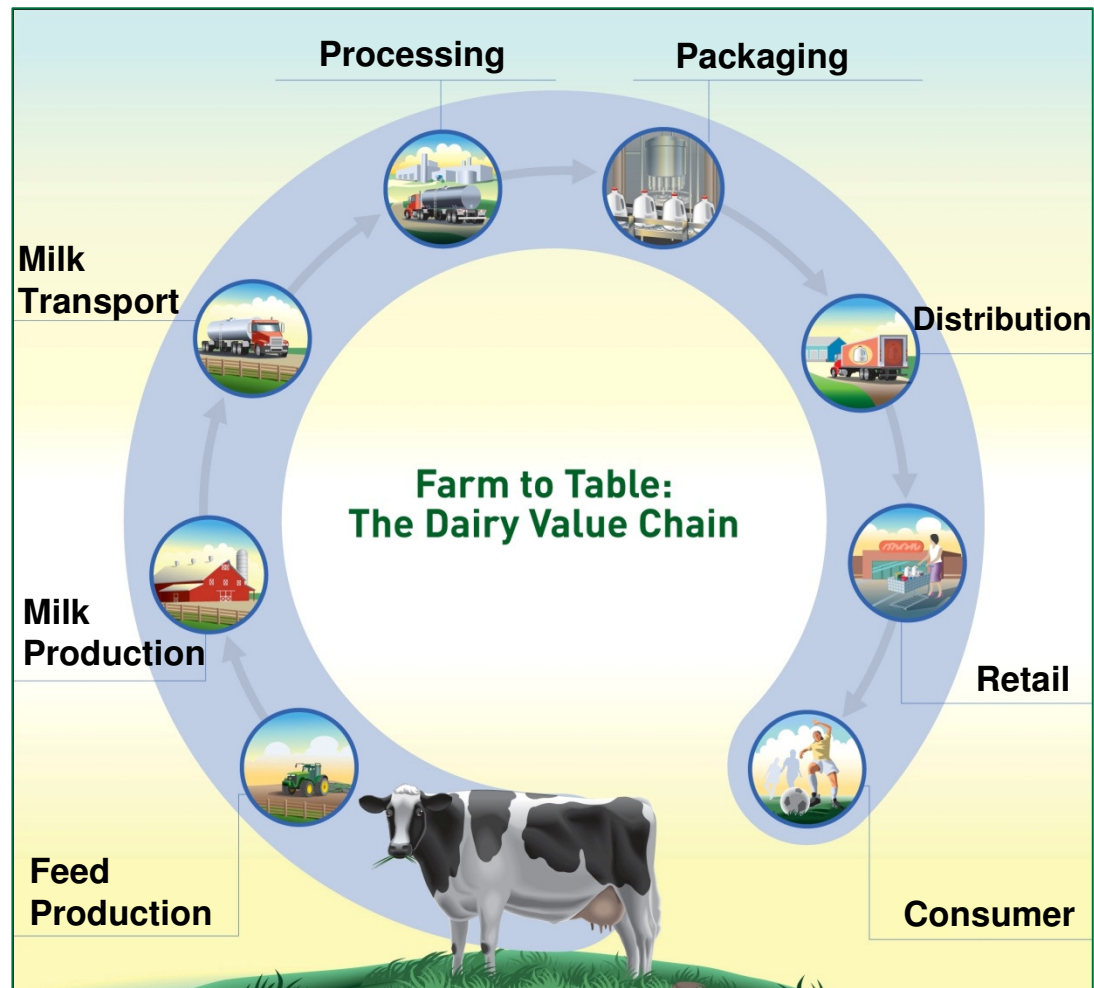
Consumer/Academic
NGO



Why do we care about sustainability?



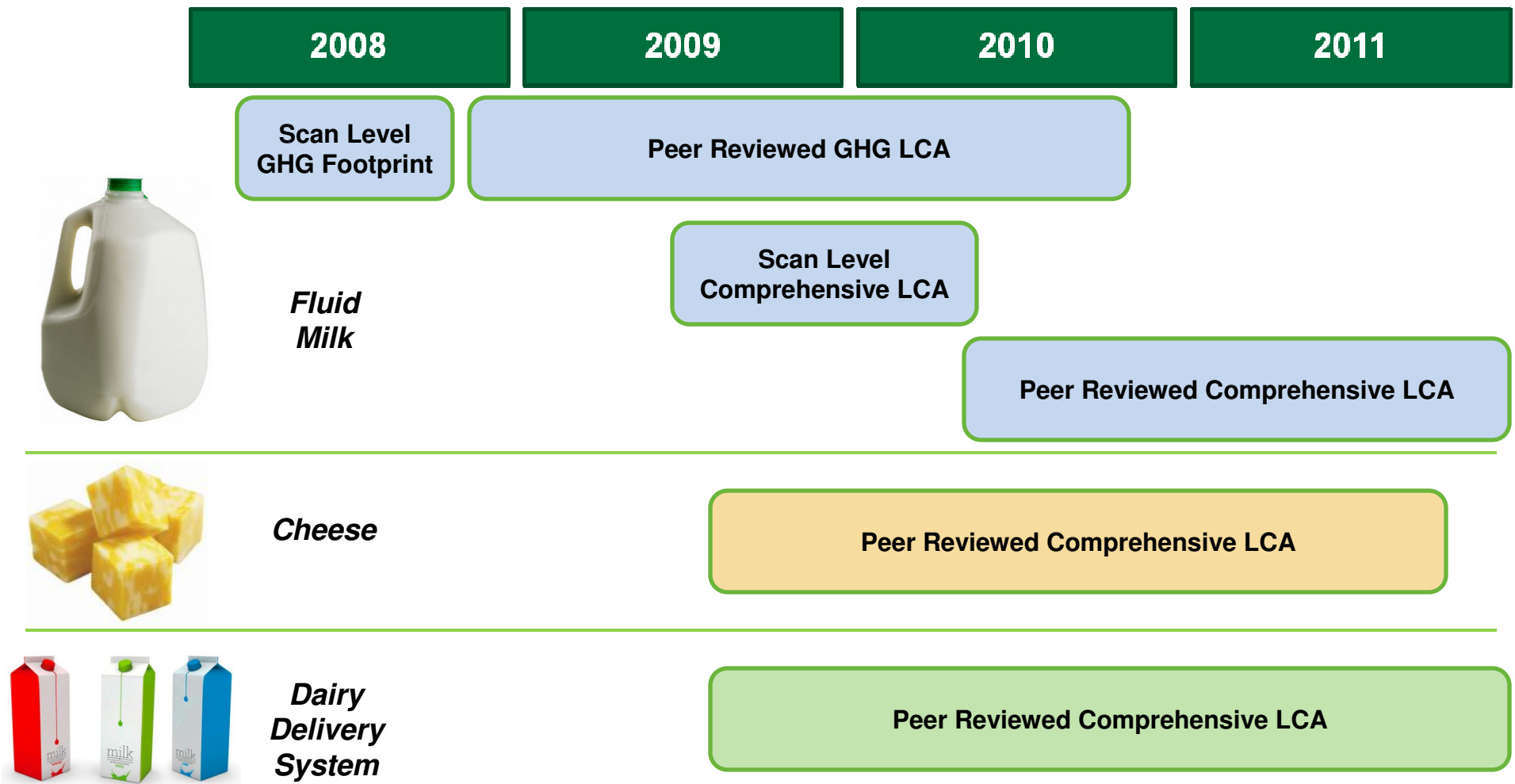
Life Cycle thinking



Guiding principles for dairy industry research

- Follow ISO 14040, 14044 standards
- Focus on decisions
- Choose an appropriate starting point
- Avoid shifting burdens
- Create transparent and open-source access to data
- Benefit all industry stakeholders
- Share lessons learned with other stakeholders

Life Cycle Assessment research



Challenges – 18 months of data collection!

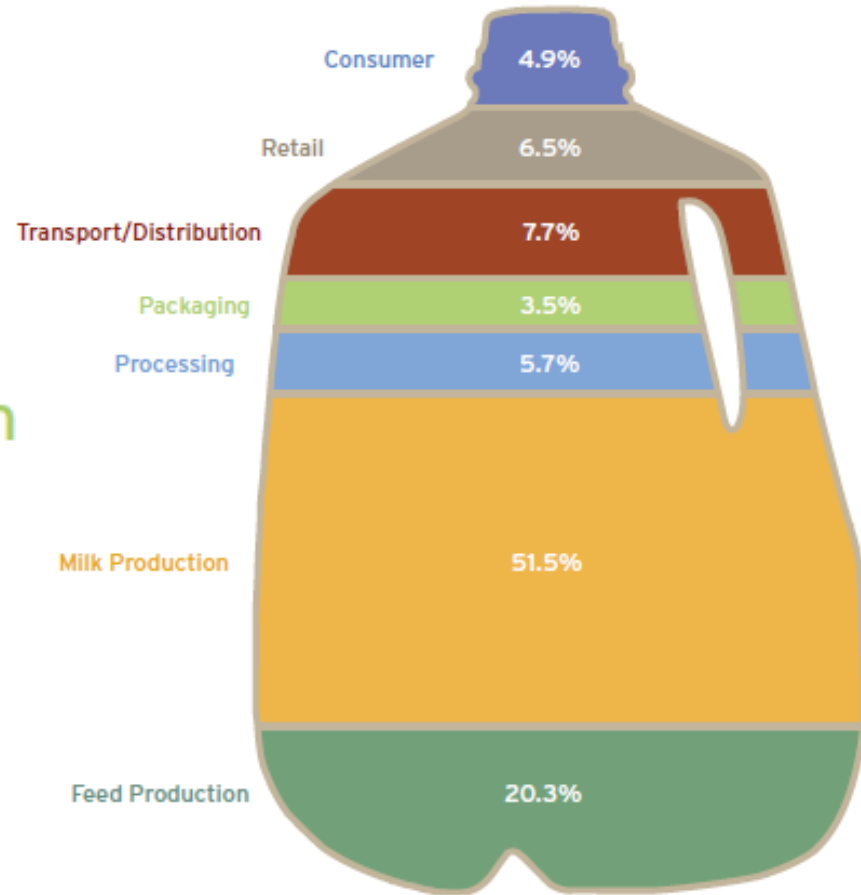
Challenges	Solutions
<ul style="list-style-type: none"> Data collection traditionally used for compliance Benefits of the study difficult to explain 	<ul style="list-style-type: none"> Industry and producer advisory group Engaged: <ul style="list-style-type: none"> 40 dairy producer cooperatives communities response rate
<ul style="list-style-type: none"> No existing data No data collection protocol 	<ul style="list-style-type: none"> Dairy academics designed survey User guide, webinars and 24/7 help line Piloted with processing plants

540 producer surveys
25% milk processing in 2007
11% milk transportation in 2007

U.S. fluid milk carbon footprint

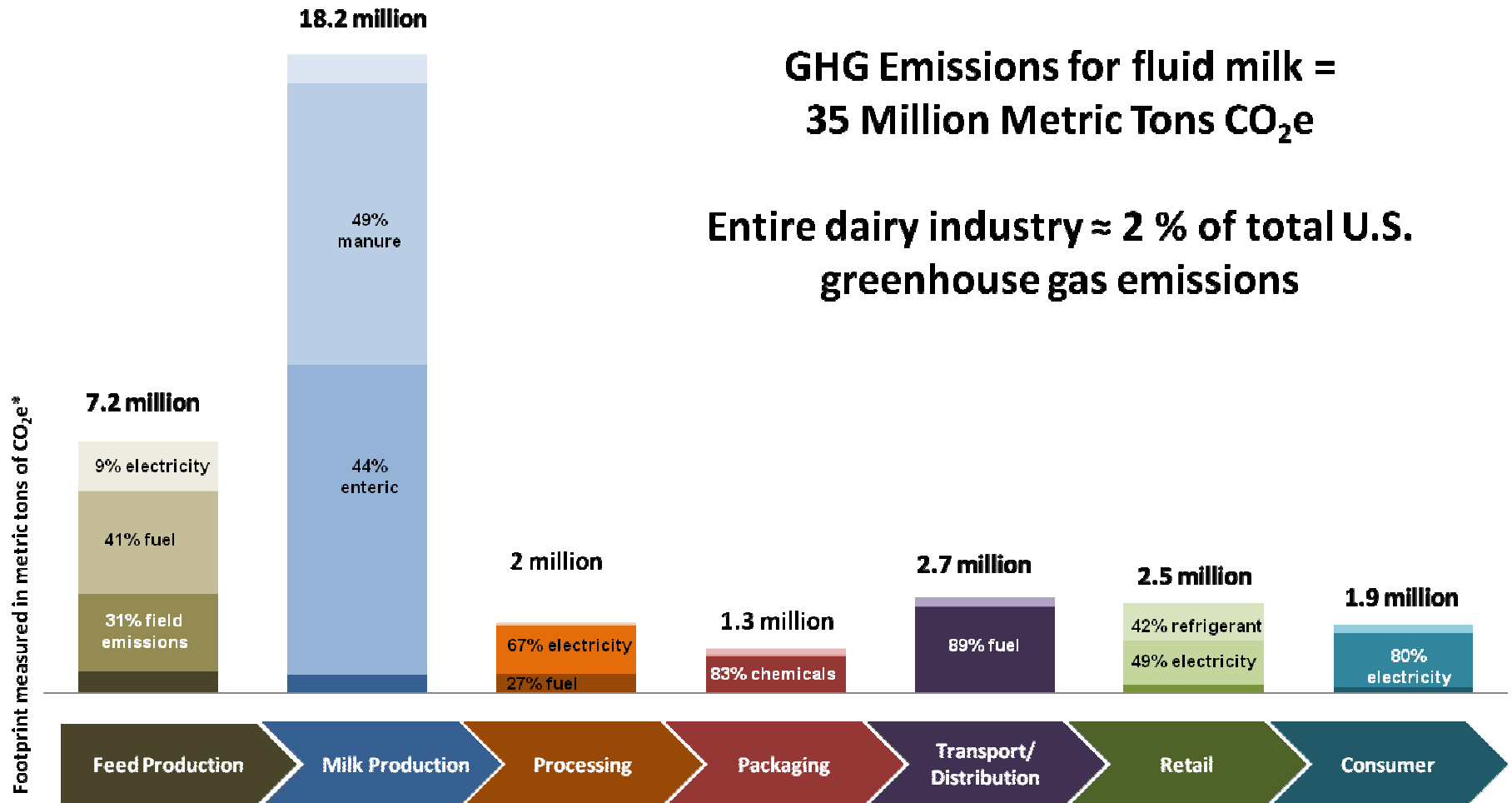
Greenhouse Gas Emissions for U.S. Fluid Milk: Contributions by Supply Chain

Total CO₂e emissions of fluid milk = 17.6 lbs. per gallon of milk¹

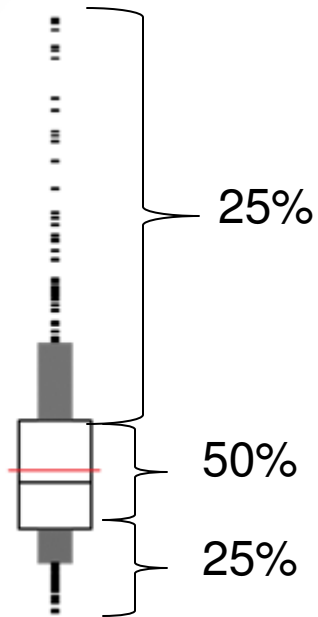


¹2010. "Greenhouse Gas Emissions of Fluid Milk in the U.S." University of Arkansas. Based on environment and consumption data from 2007-2008, the total fluid milk carbon footprint is approximately 35 million metric tons, with a 95% confidence range from 30 to 45 million metric tons. Natural variability in data ranges from 15.3 to 20.7 lbs. CO₂e per gallon.

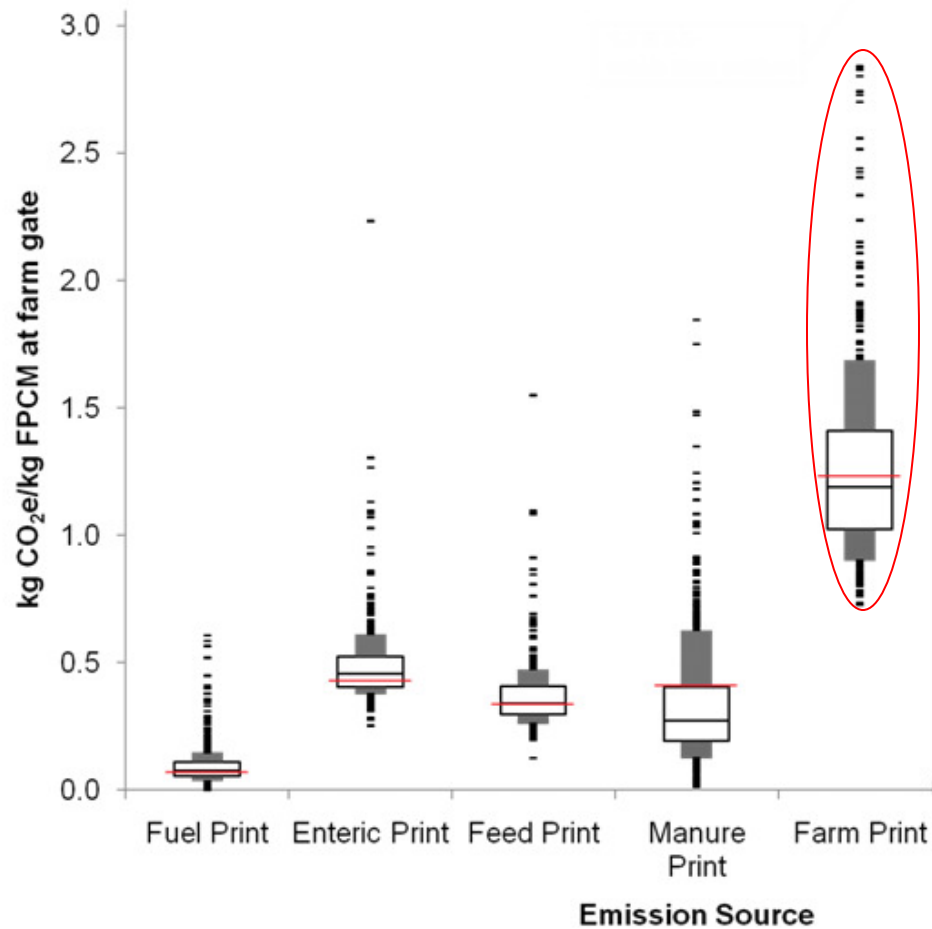
U.S. fluid milk carbon footprint



Dairy farm: Variability presents opportunities



National Farm Survey Summary





540 farms plotted


Key farm management practices matter the most


- Milk production
- Milk fat and protein content
- Animal demographics / numbers
- Animal sold to beef (beef / milk allocation)
- Dry matter intake ratio
- Percentage of time on pasture
- Manure management practices
- Percentage of dry manure goes into each manure management system
- On farm energy use


Decision Support: Carbon Calculator Tool for Producers







 General

 Production

 Feeding

 Energy

 Manure management

WELCOME!


This tool allows you to calculate the CO₂-equivalent emissions of your dairy production. Please provide all the required data by answering all the questions of the different categories shown above. The question mark icons next to some questions give you access to an explanation.

Once you have answered all the questions, your final impact will be displayed in green next to the regional and the U.S. average.
You can also save your results as a PDF file by clicking on the button on the top right of the screen.

Alaska (AK)

?

[Production >](#)



Carbon footprint

emissions for 1 kg of milk (FPCM) 🖨️

Your footprint

Region average

U.S. average

S.I. (Metric) ▼

Feed print [\(view breakdown\)](#)

	kg CO ₂ -eq	% of total footprint
<div style="width: 100%; height: 10px; background-color: #4CAF50;"></div>	0.00	0
<div style="width: 100%; height: 10px; background-color: #333;"></div>	0.36	30
<div style="width: 100%; height: 10px; background-color: #999;"></div>	0.33	27

Enteric print ?

<div style="width: 100%; height: 10px; background-color: #4CAF50;"></div>	0.00	0
<div style="width: 100%; height: 10px; background-color: #333;"></div>	0.43	36
<div style="width: 100%; height: 10px; background-color: #999;"></div>	0.43	35

Manure print


<div style="width: 100%; height: 10px; background-color: #4CAF50;"></div>	0.00	0
<div style="width: 100%; height: 10px; background-color: #333;"></div>	0.38	31
<div style="width: 100%; height: 10px; background-color: #999;"></div>	0.41	33

Fuel print [\(view breakdown\)](#)

<div style="width: 100%; height: 10px; background-color: #4CAF50;"></div>	0.00	0
<div style="width: 100%; height: 10px; background-color: #333;"></div>	0.03	3
<div style="width: 100%; height: 10px; background-color: #999;"></div>	0.06	5

TOTAL

<div style="width: 100%; height: 10px; background-color: #4CAF50;"></div>	0.00	0
<div style="width: 100%; height: 10px; background-color: #333;"></div>	1.21	100
<div style="width: 100%; height: 10px; background-color: #999;"></div>	1.22	100

Designed & Powered by


Across the supply chain: Management practices matter



Increasing feed efficiency

Reducing enteric methane

Improving manure management



Reducing electricity usage

Consolidating distribution network

Considering alternative packaging materials



Good truck maintenance

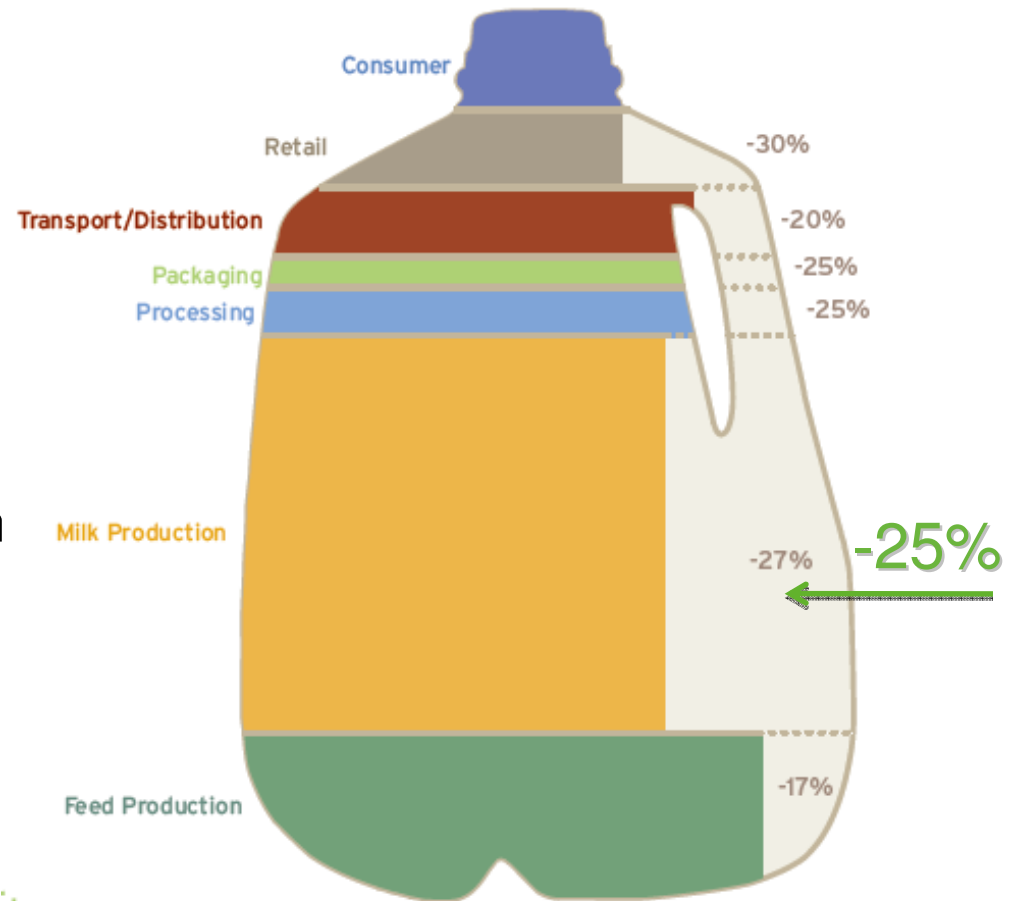
Better route design

Reducing long distance milk hauling

The basis for differences is best management practices – not size, region or age.

Action plan validated

- GHG Goal: 25% by 2020
- Portfolio: 12 Projects
- Business Value: \$238 million



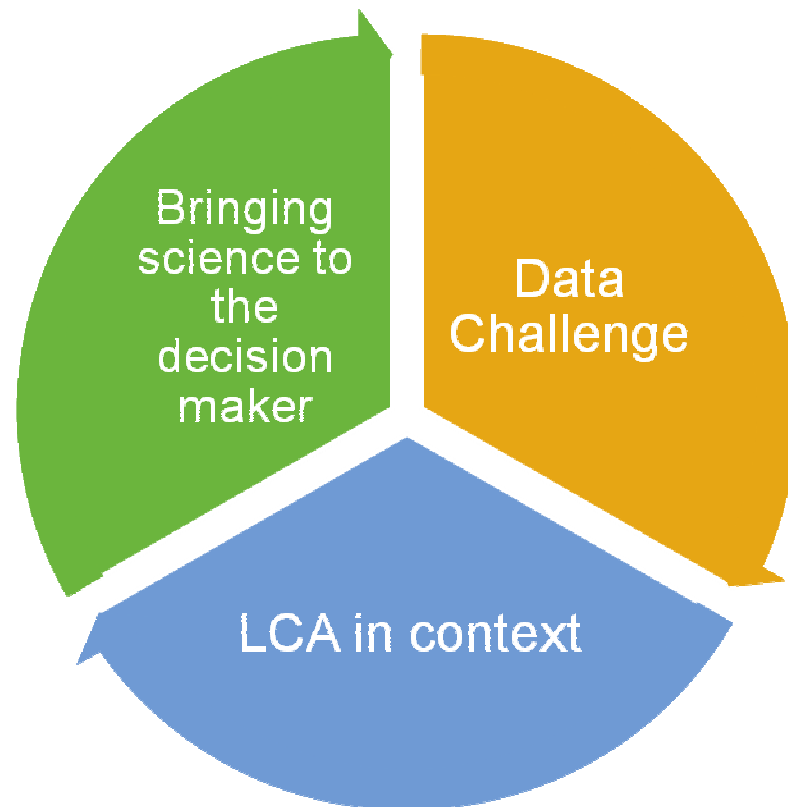
7 steps to conduct a good LCA

1. Clear definition of goals
2. Careful selection of the functional unit
3. Close attention to data sources
4. Work with the subject matter experts
5. Assess impacts appropriately
6. Peer review
7. Documentation and transparency

LCA key lessons learned

1. Inherently interdisciplinary and data hungry
2. LCA results are numbers only!
 - Shows where to focus
 - Facilitates goal setting and decision making
3. Process based models are also needed to account for the interdependencies of biological system
4. Bring science to the decision maker to create change

Industry-wide LCA challenges



Build the Life Cycle Inventory Database



Want more information? Sign up for Sustainability Newsletter at innovationcenter@usdairy.com