U.S. Dairy Sustainability Commitment
About the U.S. Dairy Industry

Milk production occurs in all 50 states. The top 5 dairy states in 2011 produced ~53% of all milk in the U.S.

- 21.1% CA
- 6.8% NY
- 6.5% IL
- 5.4% WI
- 46.9% Remaining States

~95% FAMILY-OWNED

51,481 LICENSED DAIRY FARMS

9.2 million DAIRY COWS

1,278 DAIRY PLANTS PRODUCED

HOW ALL THAT MILK WAS USED

- 43.2% Cheese
- 21.6% Fluid Milk
- 35.3% Other Products: butter, nonfat dry milk, frozen products and more

199.4 billion POUNDS OF DAIRY PRODUCTS.

AVERAGE NUMBER OF MILES FROM FARM TO PROCESSING PLANT IS 275 miles.

Milk and dairy products are distributed to schools and retail outlets ranging from small neighborhood stores to warehouse outlets.

Americans spent ~6% of their 2011 food budgets on dairy products at home.


Milk and dairy foods supply 70% of the calcium and 18% of the protein of the average American diet.
### Dairy Industry at a Glance

#### Economic
- 200.3B pounds of milk\(^1\)
- $31.4 B at farm\(^2\)
- Farm Economic multiplier of $2.50 to local economy\(^3\)
- 9.4% of agriculture\(^1\)
- $140 billion value of, 1,200 processing plants\(^4\)
- 11.5% export\(^5\)

#### Environmental
- Compared with 1944, the U.S. dairy industry now produces a gallon of milk using: \(^6\)
  - 90% less land,
  - 65% less water,
  - 76% less manure,
  - 63% small carbon footprint
- GHG: 2% of total U.S. GHG emissions
  - Voluntary goal to reduce 25% by 2020

#### Nutritious
**Milk** is the No. 1 food source of **calcium**, vitamin D and potassium*.

<table>
<thead>
<tr>
<th>% Daily Values</th>
<th>Vitamin A – 10%</th>
<th>Protein – 16%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Riboflavin – 20%</td>
<td>Phosphorus – 20%</td>
</tr>
<tr>
<td></td>
<td>Niacin – 10%</td>
<td>Vitamin D – 25%</td>
</tr>
<tr>
<td></td>
<td>Potassium – 11%</td>
<td>Calcium – 30%</td>
</tr>
<tr>
<td></td>
<td>Vitamin B12 – 13%</td>
<td></td>
</tr>
</tbody>
</table>

#### Social
- 49,300 dairy farmers in 50 states\(^1\)
- 95% of US Dairy farms are family owned\(^7\)
- 86% of all milk managed through cooperatives\(^8\)

---

1. National Milk Producers Federation 2013
5. National Milk Producers Federation, "2013 Dairy Data Highlights," Table 46 on page 42
8. USDA Rural Development, "Cooperative Information Report 1 Section 16: Cooperatives in the Dairy Industry" (September 2005).
Heritage of doing more with less

Producing 1 billion kg of milk: 1944 vs. 2007

- **Animals**: 21%
- **Water**: 35%
- **Land**: 10%
- **Carbon Footprint**: 37%

Source: Capper et al., 2009, *Journal of Animal Science*
Innovation Center for U.S. Dairy

- 32 CEOs or Chairmen of companies representing 80% of Milk
- Focused on advancing pre-competitive science, strategy and insights
- 800+ professionals working on sustainability
Innovation Center for U.S Dairy

32 CEOs and Chairmen of leading dairy companies and cooperatives
+800 professionals from dairy industry and beyond

Health and Wellness  Sustainability  Globalization  Food Safety  Research and Insights  Consumer Confidence

Pre-competitive Science, Strategy and Insights

Companies and brands incorporate into their business plans

Consumer Marketplace
U.S. Dairy Sustainability Council

We commit to being leaders in sustainability, ensuring the health and well-being of our planet, communities, consumers and the industry.

112 companies & 150 professionals in the Sustainability Council
Leading 8 project teams with over 800 industry members contributing over $6M
Guiding Principles align on a vision for the industry

- The U.S. Dairy Industry supports socially responsible, economically viable and environmentally sound dairy food systems that promote the current and future health and well being of:
  - **Our consumers** – through access to safe, nutritious, high-quality products.
  - **Our communities** – through contributing, participating, and investing where we live and operate.
  - **Our cows** – through animal stewardship.
  - **Our employees** – through ensuring a safe and respectful workplace.
  - **Our planet** – through the stewardship and responsible use of natural resources.
  - **Our businesses** – through a focus on long-term economic vitality.

- We commit to these principles through our shared values of honesty, integrity, inclusiveness, and transparency.
Enhancing consumer trust

Credibly Enhance Consumer Trust

Stewardship & Sustainability Guide to track and communicate progress

Share Best Practices and case studies to optimize performance

Use Smart Tools to measure what matters

Science to establish the baseline
Grounded in science

- Life cycle science establishes baseline environmental footprint for U.S. Dairy
- Peer-reviewed, published, and contributed to open-source National Agricultural Library
- National Institute on Food and Agriculture grant will fund additional science to inform Smart Tool creation
- Communications material designed to widely distribute accessible science to decision makers
Science is the foundation for owning impact

Global Livestock is 18% of global emissions

Global Livestock is 14.5% of global emissions

Global Dairy is 2.7% of global emissions

U.S. Dairy is ~2% of U.S. emissions

Livestock’s Long Shadow

Tackling Climate Change Through Livestock

Greenhouse Gas Emissions from the Dairy Sector

International Dairy Journal

Innovation Center for U.S. Dairy
Dairy LCA: Understanding Dairy’s Impact from Grass to Glass

**Processing**
There are more than 1,000 U.S. processing plants that turn milk into cheese, yogurt, ice cream, powdered milk and other products.

**Milk Transport**
Milk is transported from farm to processing company in insulated tanker trucks. The average truck carries 5800 gallons of milk and travels approximately 500 miles round trip.

**Milk production**
Dairy cows are housed, fed and milked on dairy farms across the country. On average, a cow in the United States gave about 21,345 pounds of milk in 2012.

**Production of feed for cows**
The dairy supply chain begins with growing crops such as corn, alfalfa hay and soybeans to feed dairy cows. About 35 percent of feed is grown on the farm by dairy farmers; the rest is purchased from other farmers.

**Packaging**
Packaging is typically done by the dairy processor. Both paperboard and plastic containers are designed to keep dairy products fresh, clean and wholesome.

**Distribution**
Distribution companies deliver dairy products from the processor to retailers, schools, and other outlets in refrigerated trucks.

**Retail**
Milk and dairy products are available at 178,000 retail outlets of all shapes and sizes—from convenience stores and neighborhood groceries, to large discount stores and warehouse outlets.

**Consumer**
Milk and milk products deliver many essential nutrients to the diet of Americans.

---

The Dairy Supply Chain

---

**INNOVATION CENTER FOR U.S. DAIRY**

HEALTHY PEOPLE • HEALTHY PRODUCTS • HEALTHY PLANET
LCA is Foundation of Dairy Sector Sustainability

2008
Scan Level GHG Footprint

2009
Peer Reviewed GHG LCA

2010
Scan Level Comprehensive LCA

2011
Fluid Milk

2012
Cheese

Dairy Delivery System

Peer Reviewed Comprehensive LCA
U.S. Dairy Carbon Footprint — All Products

Total emissions = 137 MMT (2% of total U.S. GHG emissions)

**Fluid Milk**
- 26% of total GHG emissions
- 35 MMT CO₂e
- 0.5% of US Total

**Cheese & Whey**
- 39% of total dairy GHG emissions
- 54 MMT CO₂e
- 0.75% of US Total

**Other Dairy** (estimates)
- 35% of total dairy GHG emissions
- 48 MMT CO₂e
- 0.67% of US Total

Milk/Cheese carbon footprint from farm to table

The carbon footprint of cheese = 8.3 kg CO₂e per kg of cheese
What we learned: opportunities for efficiency and innovation across the value chain

Carbon footprint of 1 gallon of milk = 17.6 lbs CO\textsubscript{2}e/gallon fluid milk consumed\textsuperscript{2}

2.05 CO\textsubscript{2}e kg/kg fluid milk consumed

1 Does not include sources related to waste.
2 “Greenhouse Gas Emissions of Fluid Milk in the U.S.” University of Arkansas, 2010. Based on environmental and consumption data from 2007-2008. Natural variability in data ranges from 15.3 to 20.7 lbs. CO\textsubscript{2}e. The total fluid milk carbon footprint is approximately 35 million metric tons, with a 95% confidence range from 30 to 45 million metric tons.
What we learned: 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.
American dairy producers’ leadership position

- One of the largest producers of milk in the world
  - U.S. produced 192 billion lbs. of milk in 2010

- One of the highest producers of milk per cow per year in the world
  - U.S. dairy cows produce 4 times more milk than the world’s average cow

- The smallest GHG emissions per 1 gallon of milk produced

North American farmers have the smallest impact

GHG footprint for World Dairy Farms

- U.S. Dairy Farm*: 10.6 lbs CO2e/gal milk
- North America: 10.6 lbs CO2e/gal milk
- Eastern Europe: 12.2 lbs CO2e/gal milk
- Western Europe: 12.6 lbs CO2e/gal milk
- Oceania: 12.8 lbs CO2e/gal milk
- Russian Federation: 13.5 lbs CO2e/gal milk
- East Asia: 17.2 lbs CO2e/gal milk
- Central & South America: 28.9 lbs CO2e/gal milk
- West Asia & Northern Africa: 31.9 lbs CO2e/gal milk
- South Asia: 39.8 lbs CO2e/gal milk
- Sub-Saharan Africa: 64.5 lbs CO2e/gal milk

World average = 20.4 lbs CO2e/gal milk
Voluntary reduction goals

32 Dairy industry CEOs and chairpersons committed to...

25% by 2020
GHG reduction for fluid milk

$238 million
Estimated business value across industry
Industrywide leadership from farm to table

U.S. Fluid Milk Carbon Footprint: Supply Chain Emissions

- Transport/Distribution: 7.7%
- Milk Production: 51.5%
- Feed Production: 20.3%
- Packaging: 3.5%
- Processing: 5.7%
- Retail: 6.5%
- Consumer: 4.9%

- 72% energy
- 28% refrigerant
- 100% diesel
- 65% raw materials
- 35% container formation
- 75% electricity
- 23% fuel
- 2% refrigerant
- 59% enteric methane
- 35% manure methane
- 6% electricity
- 6.4% soil NO₂
- 24% fertilizer
- 12% fuel use

Carbon footprint = 17.6 lbs. CO₂e per gallon of fluid milk consumed

2020 Voluntary Goals for Greenhouse Gas Reduction for U.S. Fluid Milk

- Transport/Distribution
- Packaging
- Processing
- Milk Production
- Feed Production

Roadmap to 2020 Goals

Overall goal: 25% CO₂e reduction per gallon
Innovation projects create value across the supply chain while reducing dairy’s environmental footprint

**Farm Smart™**
Goal: Provide farmers with a robust real-time, on-field decision support tool for better environmental farm management.

**Dairy Fleet Smart™**
Goal: Reduce fuel consumption, costs and GHG emissions in the transport and distribution of milk.

**Dairy Plant Smart™**
Goal: Reduce GHG emissions and energy costs at fluid milk and cheese processing plants.

**Cow of the Future™**
Goal: Reduce enteric emissions through feed efficiency, herd health and breeding.

**Farm Energy Efficiency™**
Goal: Reduce on-farm energy use and costs.

**Dairy Power™**
Goal: Put 1,300 methane digesters on dairy farms by 2020.
Measure and communicate sustainability through the value chain

Farm Smart™
An innovative, integrated online management system that empowers continuous environmental, social and economic improvement for dairy producers.

Fleet Smart™
A tool to reduce fuel consumption, costs and GHG emissions in the transport and distribution of milk.

Plant Smart™
A tool that allows fluid milk processing plants to reduce GHG emissions and energy costs.
Farm Smart™

Soil, Climate, Crop and Water Information

Forecasting and Modeling Tool

Management Practice Improvements
- Cost savings
- Compliance
- New revenue

Decision Making

Measurable Results

Consumer Communications

Smart Tools
Tools co-created with farmers, for farmers
Tested by the Innovation Center, Coops and Brands

Innovation Center Testing
- Over 60,000 cows
- Over 60,000 acres of land
- 11 States
- 150 million gallons of milk produced annually

Coop and Brand Testing
- Over 72,000 cows
- Over 67,000 acres of land
- 7 states
- 220 million gallons of milk produced annually

Together the IC and Industry have tested the tools on 1.6% of total US milk production and 1.4% of cows!
How one cow contributes to a sustainable food system

NUTRITION & HEALTH BENEFITS
Few foods deliver dairy’s powerhouse of nutrients in such an affordable, delicious and readily available way.

- 1 cow produces on average 144 servings of milk per day.
- That’s enough to provide 48 people with 3 daily servings of low-fat milk.
- And this would deliver:
  - 90% DV for calcium
  - 90% DV for vitamin D
  - 30% DV for potassium
  - 48% DV for protein
  - + additional nutrients essential for health

Dairy intake is associated with:
- Strong bones and teeth
- Reduced risk of cardiovascular disease and type 2 diabetes
- Lower blood pressure in adults

NUTRIENT MANAGEMENT
Rich in nutrients, cow manure fertilizes the land for growing more crops for people and animals.

- 1 cow produces 17 gallons of manure per day.
- That’s enough fertilizer to grow 56 pounds of corn or 84 pounds of tomatoes.

VALUE FROM BY-PRODUCTS
Having four stomachs means cows can recycle food that people can’t eat.

- 75% of a cow’s diet is not consumable by humans.
- By-products from the human food and fiber industries (e.g., citrus pulp and cottonseed) are converted to milk rather than sent to landfills.

TAKING IT FURTHER
Manure is also becoming a source of additional value. Anaerobic digester systems convert manure and commercial food waste into:

- Electricity
- Fuel for cars and trucks
- Fertilizer and fiber

$200 per cow per year in combined revenues and cost savings
Single approach from “Grass to Glass”

- **Credible, transparent and industry led.** Program that is equal to or exceeds the competition while satisfying the demands of retail customers and dairy consumers.

- **Demonstrate progress.**
  Buyers and sellers seek proof that dairy – “from grass to glass” – uses practices that protect natural resources and promote community well-being and economic vitality.

- **Mission: one approach.**
  Create a voluntary method to track and communicate stewardship and sustainability progress.
A voluntary framework for tracking and communicating progress

- Supports producers, cooperatives and processors who choose to track and communicate their story of continuous improvement
- Defines guiding principles and most relevant topics for assessing dairy sustainability

Stewardship & Sustainability Guide for U.S. Dairy
Guide development

- 3 year development
- 100+ studies reviewed
- 23 sustainability frameworks reviewed and compared
- 100+ sustainability indicators reviewed
- 18 sets of guiding principles reviewed
- 2500 public comments reviewed

Both available on USDairy.com
## Roll Out Timeline

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Producers</strong></td>
<td>GHG</td>
<td>Resource Recovery</td>
<td>Health and Nutrition</td>
</tr>
<tr>
<td></td>
<td>Energy</td>
<td>Soil Health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animal Care</td>
<td>Water</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social/Economic</td>
<td></td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>GHG</td>
<td>Resource Recovery</td>
<td>Health and Nutrition</td>
</tr>
<tr>
<td></td>
<td>Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social/Economic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Dairy Farm Indicators and Metrics

<table>
<thead>
<tr>
<th>Energy</th>
<th>Indicators</th>
<th>Metrics</th>
</tr>
</thead>
</table>
|        | Energy Intensity – primary farm energy | • Total direct energy use  
|        |          | • Total direct energy use/gallon |

<table>
<thead>
<tr>
<th>GHG</th>
<th>Indicators</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greenhouse gas intensity – primary farm GHG</td>
<td>• Total GHG emission (metric tons carbon dioxide/unit of milk production (FPCM or gallon of milk)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Animal Health</th>
<th>Indicators</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Animal Care Guidelines – primary farm animal care 1</td>
<td>• Participation in the F.A.R.M. Program or an equivalent animal care guideline Program</td>
</tr>
<tr>
<td></td>
<td>Veterinary care – primary farm animal care 2</td>
<td>• Established veterinary-client-patient relationship (VCPR)</td>
</tr>
<tr>
<td></td>
<td>Herd health – primary farm animal care 3</td>
<td>• Implementation of a Herd Health Plan with standard operating procedures</td>
</tr>
</tbody>
</table>
# Dairy Processor Indicators

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Planet** | • Energy intensity  
                • Greenhouse gas intensity  
                • Water use  
                • Water efficiency  
                • Water discharge and quality  
                • Water recycling and reuse |
Farm indicator development

- Farm indicator development in 2014 by national & regional teams
- National Teams: Review and refine previous work to develop indicators and aggregate regional team recommendations. Topics covered:
  - Work Force
  - Resource Recovery
  - Soil Health
  - Community Engagement
  - Water
  - Biodiversity

- Regional Teams: 6 Regional Teams to develop indicators and metrics that will cover water, resource recovery, and soil health
- **January 2015** - Present to Innovation Center Board
USDA Memorandum of Understanding

On December 15, 2009, Copenhagen, DK

USDA recognized the work of dairy producers and the entire industry with a Memorandum of Understanding (MOU)

Renewed April 24, 2013, Washington, DC

"This historic agreement, the first of its kind, will help us achieve the ambitious goal of drastically reducing greenhouse gas emissions while benefiting dairy farmers."

-- Secretary Tom Vilsack
In 2009, the Innovation Center and the U.S. Department of Agriculture (USDA) signed a three-year Memorandum of Understanding as an expression of their joint commitment to improving dairy sustainability. In the first three years of the partnership, thousands of dairy farmers were able to make progress toward their conservation and sustainability goals.

**NRCS has helped farmers advance their goals and implement environmental improvement projects including:**
- 222 air quality projects
- 10,247 barn and manure nutrient management projects
- 13,920 soil quality and fertility projects (grazing, cropland and riparian buffers)

Received a total of $287 million to plan and implement conservation practices that improve the sustainability of their working lands.

**NRCS has helped farmers advance their goals and implement environmental improvement projects including:**

- Under the Rural Energy for America Program, 180 anaerobic digesters were installed with the help of $53+ million in funding
- In 2012 alone, 52 anaerobic digesters were funded - that is 1 per week!

The two organizations partnered to develop education efficiency programs and resources. As a result:
- 354 on-farm and in-plant energy audits were conducted
- $637,000 in cost share grants for energy efficiency equipment implementation resulted in
  - approximately 7,000 metric tons of CO₂e
  - or 1,500 cars off the road for 1 year

Learn more at USDairy.com/Sustainability

**LOOKING AHEAD**
These and thousands of other actions being taken every day - no matter how small - add up. It’s the power one step can have when multiplied by 50,000 dairy farms or 1,200 processing plants.

In April 2013, the Innovation Center for U.S. Dairy and USDA agreed to continue to work together to enable change, one operation at a time, to help the dairy industry achieve its sustainability goals.
Communicate progress to your stakeholders

Outstanding Dairy Farm Sustainability
Prairieiland Dairy
Firth, Neb.

View all of the 2013 winner videos at
www.worldwildlifefund.org/sustainabledairy
2014 Award winners

Outstanding Dairy Farm Sustainability
Maddox Dairy, Riverdale, Calif.
McCarty Family Farms, Rexford, Kan.

Outstanding Dairy Processing & Manufacturing Sustainability
Joseph Gallo Farms, Atwater, Calif.

Outstanding Achievement in Energy Efficiency
Marshik Dairy, Pierz, Minn.

Outstanding Achievement in Renewable Energy
Vander Haak Dairy, Lynden, Wash.
# 2015 Award Categories and Sponsors

<table>
<thead>
<tr>
<th>Award Category</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding Dairy Farm Sustainability Award</td>
<td>![Dairy Farm Image]</td>
</tr>
<tr>
<td>Outstanding Dairy Processing &amp; Manufacturing Sustainability Award</td>
<td>![Dairy Products Image]</td>
</tr>
<tr>
<td>Outstanding Achievement in Resource Stewardship</td>
<td>![Resource Stewardship Image]</td>
</tr>
<tr>
<td>Outstanding Achievement in Community Partnerships</td>
<td>![Community Partnerships Image]</td>
</tr>
</tbody>
</table>

Nominations open until Nov. 7, 2014 USDairy.com/Sustainability/Awards
2015 Sponsors

**GOLD**
- CAES
- DeLaval
- DVO
- ANAEROBIC DIGESTERS
- Elanco
- grind2energy
- PROTECTS WHAT'S GOOD
- Tetra Pak

**SILVER**
- Academy of Nutrition and Dietetics
- ChemTreat
- DSM
- HDR
- McDonald’s
- ORGANIC SOLUTION MANAGEMENT
- syngenta
- Innovation Center for U.S. Dairy
The Innovation Center and World Wildlife Fund are working together with the nation's dairy producers to develop, adopt and share science-based practices leading to a more sustainable dairy industry.

View all of the 2013 winner videos at [www.worldwildlifefund.org/sustainabledairy](http://www.worldwildlifefund.org/sustainabledairy)

2014 winner videos will be available in November 2014
Thank you!

Chad Frahm
Vice President, Business Development
Innovation Center for U.S. Dairy
10255 West Higgins Road, Suite 900
Rosemont, Illinois 60018
Office: +1 847-627-3377
Mobile: +1 630-294-5794
Email: chad.frahm@rosedmi.com

www.usdairy.com/sustainability