Greenhouse Gas Reduction Projects
2014 Progress Report
July 15, 2015
About the Innovation Center for U.S. Dairy®
The Innovation Center for U.S. Dairy (Innovation Center) provides a forum for the dairy industry to work pre-competitively to address barriers to and opportunities for innovation and sales growth. The Innovation Center aligns the collective resources of the industry to offer consumers nutritious dairy products and ingredients, and promote the health of people, communities, the planet and the industry.

The Innovation Center was established in 2008 under the leadership of America's dairy farmers and importers through Dairy Management Inc.™, the nonprofit organization that manages the checkoff program. It is the first of its kind to bring together dairy farmers, processors and manufacturers, to offer consumers the products they want – when and where they want them. Learn more at USDairy.com.

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Introduction

About This Report


Visit USDairy.com/Sustainability to learn more about U.S. dairy’s sustainability commitment from farm to table. The site includes the most recent U.S. dairy industry sustainability reports, research findings and GHG reduction project updates.

About the GHG Reduction Projects

The projects originated in 2009, when key findings from the 2008 Greenhouse Gas Life Cycle Assessment (LCA) for Fluid Milk helped identify opportunities to reduce GHG emissions and other environmental impacts along the dairy value chain. The LCA found that U.S. dairy community could reduce a significant amount of its GHG emissions by focusing on a few key areas.

Collectively, the projects are expected to meet nearly half of the industry’s voluntary GHG emissions goal to reduce emissions by 25 percent by 2020, while delivering at least $238 million in business value across the dairy value chain.

Since their 2009 launch, the projects have continuously evolved, informed by subsequent dairy LCA research and stakeholder input. The projects deliver tools and resources that help dairy farmers and businesses “to advance their sustainability, which is defined as providing consumers with the nutritious dairy products they want, in a way that makes the industry, people and the Earth economically, environmentally and socially better – now and for future generations.”

The projects are divided into two categories: on-the-farm and beyond-the-farm.

On-the-farm projects:

- **Farm Smart™** gives dairy cooperatives and milk marketing organizations the ability to address customers’ sustainability inquiries and provide aggregated GHG footprint data for a regional milk supply. Dairy producers are using the tool to initially establish a baseline footprint. They can then explore the potential financial and environmental value of practical alternatives, and prioritize opportunities for improvement.

- **Farm Energy Efficiency™** promotes energy conservation, efficiency, cost savings and GHG reductions through outreach efforts that link dairy farmers to programs and funds that can help farmers with energy audits and technology upgrades.

- **Dairy Power™/Biogas Capture and Transport** is focused on harnessing the significant value of manure and realizing the potential of anaerobic methane digester systems for U.S. dairy farmers and communities.

- **Cow of the Future®** seeks scientifically sound, economically viable and socially responsible ways of reducing enteric methane emissions from cows through improvements in dairy cow nutrition, genetics and health.
Beyond-the-farm projects:

- **Dairy Plant Smart™** provides benchmarking and plant simulation data for plant managers who want to set goals and identify opportunities to reduce GHG emissions, energy use and costs. The project also promotes participation in the U.S. Environmental Protection Agency (EPA) ENERGY STAR Challenge for Industry program.

- **Dairy Fleet Smart™** provides fleet managers the tools and information they need to measure their fleet’s emissions and develop an action plan to reduce fuel consumption, costs and GHG emissions associated with milk transportation and distribution. Dairy Fleet Smart complements the EPA’s SmartWay program, which helps long-haul fleets and professional drivers reduce their fuel consumption, GHG emissions and air pollution.

**About the Smart Tools**

On-the-farm and beyond-the-farm projects include the “Smart Tools” – Farm Smart, Dairy Plant Smart and Dairy Fleet Smart. Beginning in 2010, these project teams focused on developing measurement and decision support software applications collectively called the Smart Tools. The tools are designed to foster continuous improvement on farms, in milk processing plants and through the transport of milk and dairy products.

Measuring and reporting sustainability performance

The Smart Tools are designed to complement the *Stewardship and Sustainability Guide for U.S. Dairy* (the Guide). The Guide is a voluntary framework for dairy farmers and companies that choose to track and communicate their sustainability progress to retailers, customers and other dairy stakeholders.

When used together, the Guide and Smart Tools can enable dairy professionals to measure and report sustainability performance based on a shared set of the sustainability performance indicators that matter most to the industry and its stakeholders.

To learn more about the Guide, visit USDairy.com/Sustainability/Reporting.

**What’s Next**

Enhancements to Farm Smart will give dairy farmers more and easier ways to improve their environmental performance and their bottom line.

Farm Smart will continue to expand, adopting the latest technology and meeting the evolving needs of dairy farms that want to measure, manage and communicate their sustainability commitment. Continuous, industrywide adoption and implementation of Innovation Center for U.S. Dairy tools and resources will help dairy professionals deliver environmental and community benefits and create positive returns at operations across the dairy value chain.
On-the-Farm

Farm Smart™

Farm Smart™ is expanding beyond its original focus on GHG emission reporting to become an online system that supports both sustainability reporting for dairy cooperatives and milk marketing organizations, and continuous improvement for dairy farmers.

Farm Smart helps farmers:

- Learn their farm’s environmental footprint and understand how it is inter-related with the farm’s financial performance and efficiency
- Explore the estimated financial and environmental value that different practice options could have on their farms
- Innovate by identifying areas for potential improvement
- Track year-over-year progress in a secure, confidential platform

The goal of Farm Smart is to integrate scientific analysis with farm-specific data in a powerful yet easy-to-use tool.

The Farm Smart footprint calculations are estimates based on research compiled by the Innovation Center-led Life Cycle Assessment (LCA) of Fluid Milk. This information allows farmers to benchmark their operation against national and regional averages and establish a baseline for year-to-year comparisons. Farm Smart’s footprint feature enables dairy cooperatives and milk marketing organizations to voluntarily share their sustainability progress with their communities, customers and other key stakeholders.

Learn more about Farm Smart at USDairy.com/FarmSmart.

Progress

Farm Smart is being piloted and tested every step of the way by farmers, cooperatives, processors and retailers to ensure it helps advance sustainability goals and delivers business value to farmers.

Farm Smart is designed to give dairy farmers easier access to and better use of the latest dairy research, data and innovation. Powered by comprehensive dairy research, Farm Smart is being developed by farmers to measure, explore, innovate and communicate their farms’ ongoing stewardship. The tool works for dairy farms because it has been tested and refined through the use of on-the-ground trials with actual data.

Farm Smart provides dairy farmers a means to measure their farms’ environmental footprints using the environmental indicators in the Guide. It also allows farmers to compare energy use and GHG emissions against regional and national averages compiled by the U.S. dairy industry’s Comprehensive Life Cycle Assessment for Fluid Milk.

From 2013–2014, the Innovation Center and the dairy industry tested Farm Smart with farms and companies representing 1.6% of total U.S. milk production. Using feedback from these tests, the team developed two modules:

- **Feed management**: The new feed module will help farmers make economically sound decisions on the harvest and storage of feed. Dairy farmers can use the module to cut feed losses, saving money and reducing their environmental impacts at the same time.
- **Energy**: The energy module provides farmers a detailed understanding of their energy use and alternative practices to lower energy operating costs.

**2020 Goals**

Reduce GHG emissions by 1.8M metric tons of carbon dioxide equivalent (mtCO₂e).

Increase business value by $38M.

Increase the number of anaerobic methane digesters by 1,300.

Learn more about Farm Smart at USDairy.com/FarmSmart.
Farm Smart can be used solely for on-farm performance measurements or aggregated with other farms’ data to get a milkshed assessment. Farmers have complete control and security of their own farm data.

Also in 2014, the National Institute of Food and Agriculture (NIFA) Climate Mitigation and Adaptation grant project team continued its work to compare, evaluate and understand on-farm data models for future integration and use with the Farm Smart tool. To learn more about the project, refer to page 28 of the 2013 Sustainability Report for U.S. Dairy, available at USDairy.com/Reporting.

Thanks to these Sustainability Council member organizations that contributed to the Farm Smart pilot and tool development between 2013 and 2014:

- Agri-Mark
- Cabot Creamery Cooperative
- Dairy Farmers of America, Inc.
- General Mills
- Land O’Lakes, Inc.
- Maryland & Virginia Milk Producers Cooperative Association, Inc.
- McDonald’s Corporation
- Michigan Milk Producers Association
- Prairie Farms Dairy
- Starbucks Coffee
- United Dairymen of Arizona

**What’s Next**
The Farm Smart team will continue refining the tool and incorporating expanded capabilities to meet the evolving needs of dairy buyers, dairy cooperatives and U.S. dairy farmers.

**Farm Energy Efficiency™**

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<th>2020 Goals</th>
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<td>Reduce GHG emissions by 500K mtCO₂e.</td>
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<tr>
<td>Complete 7,200 energy audits.</td>
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<tr>
<td>Reduce energy use by 10% to 35% for annual per-farm savings of $400 to $42,000.</td>
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The Farm Energy Efficiency project promotes the use of energy audits to help dairy farmers achieve significant reductions in on-farm energy use, operating costs and GHG emissions. The project’s success relies on a variety of outreach strategies that connect farmers with the information, tools, resources and funding they need to reduce their energy consumption and lower costs.

The Farm Energy Efficiency team works with state-level energy efficiency champions to promote on-farm energy audits and equipment upgrades that reduce emissions and energy costs.

Once farmers are aware of the energy efficiency information, resources and funding opportunities available through the USDairy.com/SaveEnergy website, they can take advantage of on-farm energy audits, then use the audit results to implement energy-saving initiatives.

If you are a dairy farmer or an organization that works directly with farmers, we encourage you to visit USDairy.com/SaveEnergy for more information and materials.

**Progress**
In 2014, the team updated the Farm Energy Efficiency website, providing dairy farmers with additional easy-to-access program materials and tools.

In addition, the program continued its outreach efforts with dairy farmers, urging them to apply for funding for equipment upgrades through the USDA NRCS’s Environmental Quality Incentives Program.
Since 2011, the Farm Energy Efficiency program has helped promote nearly 900 on-farm energy audits, resulting in more than $2M in potential cost savings.

**What's Next**
The Farm Energy Efficiency project is shifting focus from the use of energy audits to promotion of lighting retrofits. Replacing old light bulbs with new, energy-efficient bulbs offers dairy farmers the most financial and environmental benefit for their investments.

**Dairy Power™/Biogas Capture and Transport**

Cow manure provides much-needed nutrients for crop production. Anaerobic manure digester systems convert manure and organic waste into one of the most dependable sources of renewable energy while reducing methane emissions, the second-largest source of on-farm greenhouse gas emissions in the fluid milk value chain. When commercial, retail and industrial food processors add their food waste to the mix, digester gas production can increase by up to 300 percent. These digester systems also produce nutrient-rich fertilizer and fiber, a highly valued byproduct.

The Dairy Power project is focused on realizing the significant potential of anaerobic digester systems that can produce energy and value-added products, generate revenue for farmers and create jobs.

Learn more at USDairy.com/DairyPower.

**Progress**

When research conducted for the Innovation Center showed there was a $3 billion potential market for digesters on 2,647 dairy operations across the country in its 2013 *National Market Value of Anaerobic Digester Products* study, the White House interest in digesters grew.

In 2014, the U.S. Department of Agriculture (USDA), U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE) worked in conjunction with the dairy industry to produce the *Biogas Opportunities Roadmap*. The roadmap recognizes the environmental and economic benefits of biogas systems to bring in revenues grow jobs and boost economic development for communities.

The roadmap spells out voluntary measures and strategies for the agriculture sector to reduce methane emissions and overcome barriers to developing a robust biogas industry. The recognition of the dairy industry’s role in reducing methane emissions and support of the industry’s goal to reduce its greenhouse gas emissions by 25 percent by 2020 gives dairy farmers standing as part of the broader biogas industry.

In the report, the federal government commits to taking several steps to increase the use of biogas and reduce methane emissions through existing agency programs, leveraging $10 million in research funding, fostering investment in biogas and strengthening markets for biogas systems and products.

To learn more, download the *Biogas Opportunities Roadmap* at Energy.gov/downloads/biogas-opportunities-roadmap.

Since 2011, dairy digesters have generated more than 11.7M British thermal units of renewable energy. In 2014, the number of operating anaerobic digesters reached a record total of 247 on-farm systems with 82% located on dairy farms.
Biogas Opportunities Roadmap Timeline

- 2013: National Market Value of Anaerobic Digester Products study is released.
- 2013-14: Economic potential of biogas draws White House attention.
- 2014: Biogas Opportunities Roadmap developed collaboratively by federal agencies and the dairy industry is released. Benefits of anaerobic digesters on dairy farms recognized.
- 2014-15: Federal commitment helps accelerate the biogas industry.

What’s Next
The Dairy Power team will build on the progress made by the Biogas Opportunities Roadmap by helping to accelerate momentum for building on-farm methane digesters and by increasing the interest of financial investors generated by the report. The team will also explore new opportunities for the use of the electricity generated by dairy industry digesters in 2015.

The dairy industry also will participate in a Biogas Opportunities Roadmap Working Group being formed by USDA to implement the strategies outlined in the report. The Working Group plans to identify and prioritize policies and technology opportunities to expand the biogas industry and reduce greenhouse gas emissions. The group expects to release findings in the fall of 2015.

In addition, the Dairy Power project will continue to play an important role in raising awareness of the economic and environmental potential of anaerobic methane digesters, fostering partnerships and making training and educational materials available to dairy farmers.

Cow of the Future®

The Cow of the Future project seeks scientifically sound, economically viable and socially responsible ways of reducing enteric methane emissions – the largest source of GHG emissions associated with milk production.

The project focuses on collaboration and outreach, existing technologies and practices, and research into new opportunities for emissions reductions through improvements in dairy cow nutrition, genetics and health.

To learn more about Cow of the Future, visit usdairy.com/cowofthefuture.

Progress
In 2014, the Cow of the Future team contributed to research that concluded enteric methane can be more effectively reduced by improving livestock productivity than through the use of feed additives and helped provide a better understanding of the extent dairy contributes to the food supply.

Dairy farmers – as well as nutritionists, veterinarians and others who influence on-farm feed and herd management decisions – can use the free report for guidance on ration formulation and feeding, forage and concentrate management, and cow-calf care.

The report was developed by 40 independent industry experts, academic researchers and Innovation Center contributors with the support of the David and Lucile Packard Foundation.

Download the Considerations and Resources report at USDairy.com/CowOfTheFuture.

The Cow of the Future team also contributed to an invited review for the Journal of Dairy Science. This review article concludes that the use of additives in a cow’s diet have had little success in sustained enteric methane reductions without the risk of compromising milk production. In contrast, feed and animal management practices that improve livestock productivity, including genetic
selection, provide the most cost-effective means available today to reduce methane emissions per unit of energy corrected milk.

Also in 2014, the project team broadened its reach, addressing issues beyond enteric emissions with research that provides a better understanding of the extent to which dairy contributes to the current U.S. food supply. The research concludes the competition for crops between dairy feed and food for human consumption is negligible. Just 20 percent of a dairy cow’s diet is edible by humans based on composition, and only 0.9 percent of the cow’s diet is directly demanded by the U.S. human food industry.

Learn more about the cow’s role in a healthy dairy system at USDairy.com/CowOfTheFuture.

**What’s Next**

In 2015, the project team will focus on distribution of the *Considerations and Resources* report and its integration into Farm Smart’s feed management module. In addition, the team will continue to focus on enteric methane mitigation and improving the understanding of the net contribution of dairy cows to sustainable food systems.
Beyond-the-Farm

Dairy Plant Smart™

2020 Goals
Reduce GHG emissions by 160K mtCO2e.
Save $45M to $50M in energy costs.
Increase system reliability and cost control.

Dairy Plant Smart provides benchmarking and plant simulation data for plant managers who want to set goals and identify opportunities to reduce GHG emissions, energy use and costs.

Dairy Plant Smart also promotes dairy industry participation in the U.S. EPA ENERGY STAR program by promoting participation in the ENERGY STAR Challenge for Industry, a national call to action for commercial and industrial operations to improve energy efficiency by 10 percent or more. The challenge is a project of the Dairy Processing Focus, a partnership between the ENERGY STAR program and the International Dairy Foods Association. To encourage dairy companies to benchmark and improve their performance, the EPA provides ENERGY STAR certification to plants that perform in the top 25 percentile nationwide.

Learn more at USDairy.com/PlantSmart.

Progress
Dairy Plant Smart continues to be a valuable tool for plant managers.

Since the ENERGYSTAR Challenge for Industry began in 2010, participating dairy plants have reduced their energy intensity by 14 percent – enough energy to power almost 30,000 homes.

Learn more about the ENERGY STAR Challenge for Industry by visiting the ENERGY STAR Focus on Energy Efficiency in Dairy Processing page at EnergyStar.gov.

Dairy Fleet Smart™

2020 Goals
Reduce GHG emissions by 542K mtCO2e.
Save $58M in fuel costs.

The goal of Dairy Fleet Smart is to accelerate the adoption of transportation and distribution practices that reduce fuel consumption, costs and GHG emissions. The project builds upon scientific research and combines fact-based decision-making tools with education on better management practices to create a culture of continuous efficiency improvements among shippers and carriers.

The Dairy Fleet Smart tool builds on the EPA SmartWay program by providing recommended management practices and improvement strategies for dairy.

Learn more about Dairy Fleet Smart at USDairy.com/FleetSmart.

Progress
The team continues to promote participation in SmartWay, which helps long haul fleets and professional drivers reduce their fuel consumption, GHG emissions and air pollution.

Learn more about the SmartWay program at epa.gov/smartway.

End of report