Greenhouse Gas Reduction Projects 2013 Progress Report

September 29, 2014

U.S. DAIRY SUSTAINABILITY COMMITMENT | INNOVATION CENTER FOR U.S. DAIRY
HEALTHY PEOPLE • HEALTHY PRODUCTS • HEALTHY PLANET

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 through Dairy Management Inc.™, the nonprofit organization that manages the checkoff program. It is the first of its kind to bring together milk 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

The *Greenhouse Gas Reduction Projects 2013 Progress Report* is a companion document to the *2013 U.S. Dairy Sustainability Report* available at USDairy.com. This progress report focuses solely on the Innovation Center-led greenhouse gas (GHG) reduction projects and provides a 2013 review of each project's progress along with next steps.

Visit USDairy.com/Sustainability to learn more about the dairy industry's sustainability commitment. 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 the dairy industry could reduce a significant amount of its GHG emissions by focusing on a few key areas.

The GHG reduction projects aim to address the key GHG reduction opportunities identified in the LCA. 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 an estimated $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. The projects deliver tools and resources that help dairy farmers and businesses provide 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™** is an integrated online sustainability resource that gives dairy farmers science-based decision support tools to assess and improve their environmental footprint, and track and communicate their positive improvements with neighbors, customers and consumers.
- **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 by helping to put 1,300 methane digesters on dairy farms by 2020.
- **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 a suite of 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 evolve in tandem with 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.

Progress

In 2013, the Innovation Center for U.S. Dairy worked with several retail brands and their dairy suppliers to pilot test the integrated capabilities of the Smart Tools in measuring dairy's environmental footprint from cow to consumer. The pilot tests provided important feedback from dairy farmers, cooperatives, processors, manufacturers, and retailers. The feedback is being incorporated into new Farm Smart features that will provide financial and environmental value to dairy farmers.

Also in 2013, the Innovation Center developed aggregation capabilities to consolidate the data that cooperatives, processors and transporters collect in the Smart Tools. These capabilities help dairy suppliers create customized reports to meet retailer requests about the sustainability of their milk supply.

What's Next

Over time, the Smart Tools will continue to expand, adopting the latest technology and meeting the evolving needs of dairy farms and businesses that want to measure, manage and communicate their sustainability commitment. Continuous, industrywide adoption and implementation of these tools and resources will help drive meaningful change that delivers environmental and community benefits and positive returns to operations across the dairy value chain.

On the Farm

Farm Smart™

> *"Farm Smart gives the dairy industry a shared set of metrics that show customers and consumers what producers are doing and where the industry is moving."*

Tai Ullmann, Sustainability Project Specialist
Land O'Lakes, Inc.

2020 Goals

Reduce the use of nitrogen fertilizer by 10 percent.

Reduce greenhouse gas emissions for fluid milk by 230,000 metric tons.

Save $8 million in input costs through reduced use of nitrogen fertilizer.

Farm Smart has expanded well beyond its original focus on GHG emission reductions to become an integrated online management system that supports continuous environmental, social and economic improvement for dairy farmers. Farm Smart offers an easy-to-use online tool that helps dairy farmers assess their farm's footprint and – ultimately – explore the potential financial and environmental value of practice alternatives. Farm Smart's footprint feature enables farmers to voluntarily share their sustainability efforts with their communities, customers and other key stakeholders.

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

Progress

The 2013 release of Farm Smart provided dairy farmers a means to measure their farm's environmental footprint using the environmental indicators in the Guide. It also allowed farmers to compare energy use, GHG emissions and water use against regional and national averages compiled by the U.S. dairy industry's Comprehensive Life Cycle Assessment for Fluid Milk.

Farm Smart can be used solely for on-farm performance measurements, or it can be linked to Dairy Plant Smart and Dairy Fleet Smart to measure sustainability with milk processors and co-ops and with product transportation.

In 2013, the Innovation Center Sustainability team team worked with several retail brands and their dairy suppliers on a far-reaching pilot test of the tools' environmental footprint capabilities, testing the tool across the country. The pilot tests provided valueable feedback from independent farms, cooperatives and retailers. The feedback will be incorporated into the next release of Farm Smart.

What's Next

Working in collaboration with industry stakeholders, governmental agencies, academia and others, the team will integrate additional features into each release. These expanding capabilities will help farmers enhance business value, assess and reduce fuel and electricity use, and improve water quality and quantity. Over time, feed and herd management, nutrient management and field production practices also will be incorporated into the tool.

In late 2014, the Farm Smart team plans to release new features that will provide robust decision support capabilities to help farmers improve their environmental performance and enhance the business value of their operations. Unlike other tools, Farm Smart's new features will give dairy farmers easier access 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 farm's ongoing stewardship, currently in four areas – energy, feed, nutrient, and herd management.

Farm Energy Efficiency

2020 Goals

Conduct 7,200 energy audits by 2020.

Improve energy efficiency by 10 to 35 percent per farm, for annual savings of $400 to $42,000 per farm.

Reduce greenhouse gas emissions for fluid milk by more than 50,000 metric tons.

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.

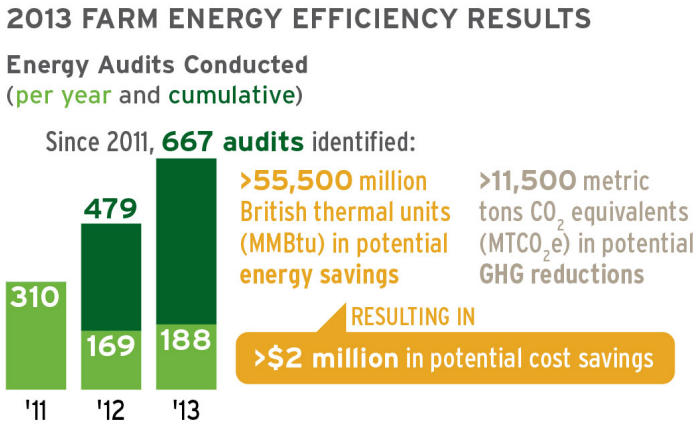
The Farm Energy Efficiency team works with state-level energy efficiency champions to promote on-farm energy audits and equipment upgrades that reduce emissions and energy costs.

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. The Farm Energy Efficiency team and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) reaches out to state-level farmer organizations, state agencies responsible for energy-efficiency programs and local utilities to engage farmers and increase the number of on-farm energy efficiency projects.

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 2013, the Farm Energy Efficiency program continued its outreach efforts with dairy farmers, urging them to apply for funding for an energy audit and equipment upgrades through the USDA NRCS's Environmental Quality Incentives Program. The year ended with the completion of a three-year joint initiative with USDA NRCS to educate dairy farmers on the benefits of energy efficiency, build local partnerships that advance GHG reduction goals and train more than 50 dairy experts in 10 target states to help complete on-farm energy audits.



Estimated audit results are updated as historical program data becomes available. The 2011 and 2012 audit results are restated from the 2012 report, and 2013 audit results are expected to be revised in future reports.

Also in 2013, the Farm Energy Efficiency team began meeting with California utilities, electric cooperatives, California NRCS staff and others to work toward aligning California energy efficiency target goals with energy efficiency funding for farmers. In Colorado, the team partnered with the Colorado Energy Office, Colorado Department of Agriculture, Colorado Rural Electric Association, USDA NRCS and Western Dairy Association to design and develop a statewide energy efficiency pilot program for Colorado's dairy farmers.

What's Next

In 2014, the team plans to update the current program website and provide additional easy-to-access program materials and tools.

Dairy Power™/Biogas Capture and Transport

2020 Goals

Develop 1,300 methane digesters on U.S. dairy farms.

Reduce greenhouse gas emissions for fluid milk by 1,800,000 metric tons.

Increase business value to dairy farmers by $38 million.

Cow manure provides much-needed nutrients for crop production: It is also one of the most dependable sources of renewable energy. Anaerobic manure digester systems not only create energy but also reduce 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.

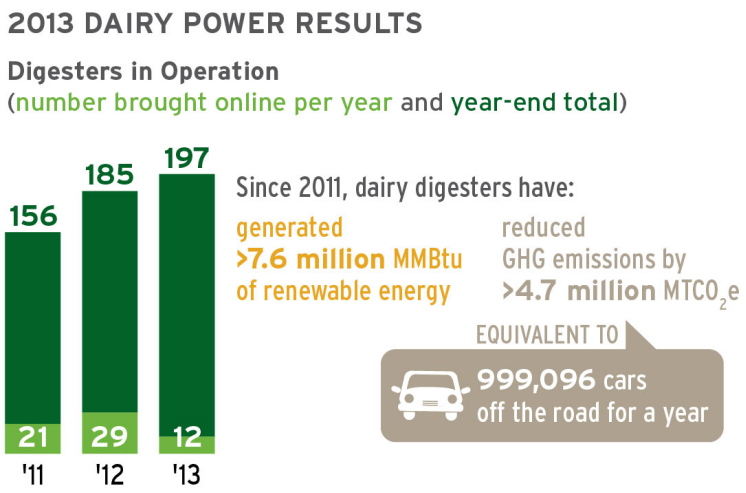
The Dairy Power project is focused on realizing the significant potential of anaerobic digester systems that can produce energy and value-added products, generate revenue for farmers and create jobs. Dairy Power can create a new paradigm for farmers – the sustainable advantage of high-efficiency, low-risk, profitable dairies.

Learn more at USDairy.com/DairyPower.

Progress

The 2013 *National Market Value of Anaerobic Digester Products* economic impact study, available for download at USDairy.com/DairyPower, estimates a $3 billion market potential for digesters on 2,647 dairy operations nationwide. In 2013, the Dairy Power team continued to raise awareness of the environmental and economic potential of anaerobic methane digesters through dialogue, collaboration and partnerships.

A highlight of the year was the private-public partnership with the National Football League (NFL) and other stakeholders. This partnership kicked off in Cleveland, with food waste from the FirstEnergy Stadium diverted from the landfill to nearby anaerobic digesters. The digesters convert the food waste along with cow manure from local dairy farms into sustainable energy and nutrient-rich fertilizer. The project is part of a larger effort that aims to work with NFL stadiums across the country.



Data consolidated and converted to gigawatt hours and MMBtu reporting units by Innovation Center for U.S. Dairy. Source: EPA Anaerobic Digester Database, last updated January 2014, retrieved from http://www.epa.gov/agstar/projects.

What's Next

The Dairy Power team will continue to foster partnerships between dairy farms, food processors and retailers with the aim of supporting nationwide adoption of anaerobic methane digester systems.

Cow of the Future™

2020 Goals

Reduce greenhouse gas emissions for fluid milk by 600,000 metric tons.

Increase business value by $20 million to $250 million, depending on rate of feed efficiency, yield improvements and adoption rates.

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.

To learn more about Cow of the Future, visit USDairy.com/Sustainability.

Progress

In 2013, the Cow of the Future team worked on the *Considerations and Resources on Feed and Animal Management: Cow of the Future™ Report to Improve Business Value and Reduce Greenhouse Gas Emissions.*

The report adds environmental and economic considerations to known feed and animal best management practices for on-farm decision-makers. Best animal management practices include the importance of identifying and providing the macro-and micro-nutrient needs at all phases of a cow's life to enhance animal health, increase productivity and reduce enteric emissions.

What's Next

The team plans to release the report in 2014.

Beyond the Farm

Dairy Plant Smart™

2020 Goals

Reduce greenhouse gas emissions for fluid milk by more than 160,000 metric tons.

Reduce energy costs by $45 million to $50 million.

Improve system reliability and operations 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 processors 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

In 2013, several processors and manufacturers pilot tested Dairy Plant Smart and the Guide's companion indicators in their facilities. The team also continued its collaboration with EPA's ENERGY STAR® Challenge for Industry initiative.

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.

2013 ENERGY STAR Challenge for Industry Results

Since the ENERGY STAR Challenge for Industry program began in 2010, **29 DAIRY PLANTS**, including four in 2013, have achieved the challenge, collectively contributing:

>1.2 million MMBtu in estimated energy savings

247,654 $MTCO_2e$ in estimated GHG reductions

ENOUGH TO POWER **27,818 homes** for a year

Data was provided by EPA ENERGY STAR Industrial Communications and Networking Manager (email communication, Feb. 11, 2014).

What's Next

The Dairy Plant Smart team will continue to enhance the Dairy Plant Smart tool. Longer-term, Dairy Plant Smart will be integrated with Farm Smart and Dairy Fleet Smart tools to become a single, comprehensive online tool that tracks product impacts across the value chain.

Dairy Fleet Smart™

2020 Goals

Reduce greenhouse gas emissions for fluid milk by more than 542,000 metric tons.

Reduce fuel costs by nearly $58 million.

Attain a payback period of approximately one year per truck, depending on fuel cost and usage.

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. In recognition of the Innovation Center's successes in recruiting EPA SmartWay program participants, the EPA promoted Innovation Center's status from a program affiliate to a program partner.

In 2013, 2,000-member dairy cooperative Foremost Farms USA pilot tested Dairy Fleet Smart in conjunction with its SmartWay program participation.

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

What's Next

The Dairy Fleet Smart tool will continue to evolve with each new release. Longer-term, Dairy Fleet Smart will be integrated with Farm Smart and Dairy Plant Smart tools to become a single, comprehensive online tool that tracks product impacts across the value chain.

End of Report