



U.S. Dairy Industry Takes Leadership Role

June 2, 2010

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The U.S. dairy industry has a proud legacy of bringing fresh, delicious milk and other wholesome dairy foods to America's tables. Dairy products' health and nutritional aspects continue to be important to consumers, but there also is an increasing interest in understanding where food comes from and how it is produced.

The consumer definition of health and wellness is evolving to include not only personal health, but also social and global responsibility. This has led to a demand for more information about the environmental footprint of products they buy, including dairy. It is an issue that has captured the attention of government, industry and the general public — illuminating a host of new challenges, and opportunities for dairy.

In 2009, dairy industry leaders launched the U.S. Dairy Sustainability Commitment, a major initiative to build business value and meet the growing consumer demand for environmentally friendly products. The commitment to sustainability can boost sales, increase efficiency, reduce expenses, demonstrate leadership and enhance dairy's image.

A strategy for sustainability

The U.S. Dairy Sustainability Commitment is coordinated by the Innovation Center for U.S. Dairy, an organization that brings together industry leaders, including producer organizations, dairy cooperatives, processors and manufacturers to work together pre-competitively to foster innovation and increase sales. As a first step, the industry has committed to a voluntary goal to reduce greenhouse gas (GHG) emissions by 25% by the year 2020 equivalent to taking more than 1.25 million passenger cars off the road every year.

To meet the industry goal, the Innovation Center has implemented a series of projects that will reduce GHG emissions and deliver economic value industrywide. When fully implemented, these projects will reduce emissions by 12% and create an estimated \$238 million in business value. Building on the dairy industry's long history of environmental stewardship, the project's address each part of the supply chain from crop production to retail.

Packaging, processing and distribution GHG reduction projects --

Dairy Processor Carbon Reduction through Energy Efficiency (D-CREE)

Preliminary results of studies related to this project show that 75% of processing-related emissions come from electricity use, 23% from fuel use and 2% from refrigerant leakage.

Energy efficiency best practices directly impact the bottom line, and can improve system reliability, avoid maintenance and shutdown costs, increase productivity and add new revenue streams.

D-CREE is working to document best-practices and case studies on energy efficiency in processing facilities, along with a customizable simulation tool that will allow processors to assess plant energy performance and opportunities for improvement. The team has been working with processors since early 2009 to collect data. Some examples of the outcomes are available in the Best Practices section of the Sustainability Commitment Web site, USDairy.com/Sustainability.

One Wisconsin dairy plant energy audit resulted in multiple systemwide improvements that reduced an equivalent of 616 tons of CO₂ per year. The dairy is saving about \$39,000 annually from boiler improvements alone.

D-CREE is expected to save the dairy industry up to \$50 million per year and 405,760 metric tons of CO₂ equivalents per year by 2020.

Dairy Delivery Systems Life Cycle Assessment (LCA)

The raw materials used in the production of packaging account for an estimated 65 percent of total GHG emissions associated with packaging. The Dairy Delivery Systems LCA is assessing the GHG impacts of many existing and emerging packaging formats and associated processing technologies for fluid milk products.

These results are expected in 2011. They will provide dairy industry stakeholders with a timely, science-based collective data source that will help processors analyze the entire processing line, make informed decisions and improve their products' environmental impact.

The Dairy Delivery Systems LCA project offers three economic benefits for the industry:

- A single LCA shared among several processors and packaging companies — as opposed to several independent studies — reduces the cost burden on any individual company.
- LCA findings are intended to drive cost-neutral or cost-reducing packaging innovations, resulting in savings for the processor.
- Retailer commitment to this effort — and willingness to reward consumer-friendly, low-carbon formats — could lead to increased milk sales.

It is estimated that the opportunities identified through the Dairy Delivery Systems LCA will reduce CO₂ equivalents by 481,000 metric tons, equivalent to 88,000 passenger cars taken off the road.

Non-thermal Ultra-Violet (UV) Prototype

Energy efficiency improvements in milk processing plants are limited by the energy requirements of heat-based pasteurization, which includes heating and cooling milk. Non-thermal processes, such as UV technology, have the potential to cut demand for energy for pasteurization. The Non-thermal UV Processing project will help produce high-quality, safe milk products using significantly less energy, while reducing GHG emissions and associated costs.

The project team is developing a prototype that will demonstrate the commercial viability of non-thermal UV processing technology first as an adjunct to, and later as

an alternative to pasteurization. If approved by the U.S. Food and Drug Administration (FDA) as an alternative to pasteurization, the technology could save the industry more than \$30 million and 272,000 metric tons of CO₂ equivalents per year.

Dairy Innovation Australia Limited (DIAL) has been working with the Innovation Center for U.S. Dairy as a key member of both the Dairy Delivery Systems LCA and Non-thermal UV Prototype projects.

“DIAL’s participation has not only provided DIAL and its members with up-to-date valuable knowledge on both of these projects, but also has ensured that we do not reinvent the wheel with similar projects in Australia, unless there is a processing angle that is more specific to the Australian context,” said Elankovan Ponnampalam, senior process engineer for DIAL. “Should that occur, it is valuable to understand the methodologies that have been developed in the Innovation Center projects so that information can be shared efficiently and cost effectively.”

Next Generation Clean-in-Place (CIP)

High-heat CIP systems are another energy-intensive aspect of milk processing. More than half of a milk processing facility’s fuel is used to clean the processing lines and equipment.

The Next Generation Clean-in-Place project evaluates how reducing the temperature needed to clean milk processing equipment can maintain sanitation standards while requiring less energy.

A global leader in cleaning and sanitizing is currently testing a reduced-temperature CIP solution it developed to benefit the dairy industry. In five different trial sites, this company has uncovered 50% steam usage savings across various applications and conditions.

If a reduced-temperature CIP solution was commercially available, it could create an estimated \$11.8 million in business value for dairy processors and reduce GHG emissions by 64,842 metric tons of CO₂ equivalents.

Environmentally Sustainable Methods for Achieving Responsible Transportation (E-SMART)

GHG emissions in the transport and distribution links of the fluid milk value chain come almost entirely from diesel fuel use in trucks. The GHG emissions of fuel use equal approximately 824,000 metric tons annually, which is about 3% of fluid milk’s total GHG emissions.

E-SMART promotes the adoption of best practices to improve fuel efficiency of the dairy industry’s transport and distribution fleets through partnerships with the U.S. Environmental Protection Agency’s SmartWay program. E-SMART’s goal is to reduce 164,979 metric tons of CO₂ equivalents by 2020, saving the industry \$58 million annually at current fuel prices.

When applied solely to the largest private haulers associated with dairy, these improvements can achieve annual savings of more than 13 million gallons of diesel fuel:

- Retrofitting used trucks with existing technologies such as trailer aerodynamics, idle reduction systems and tire upgrades (reduces fuel consumption by more than

8% while driving and up to 60% while idling).

- Driver training and route efficiency programs (improve fuel efficiency by another 5% to 25%).

Continued advances in vehicle technology, such as heavy-duty hybrids and fuel cells, hold great promise for future best practices.

The Dairy Farmers of America (DFA) Mountain Area has already achieved significant results from best practices identified by E-SMART. In late 2007, the DFA Mountain Area installed a GPS-based electronic fleet management system that provides specific data about fuel consumption, route information, inspection data and driver speeds. Data analysis has resulted in fuel savings that eliminated the equivalent of more than 949 metric tons of CO₂ emissions annually.

A growing movement

Efforts to reduce GHG emissions present a unique opportunity to reduce costs, spur innovation and diversity in products, and attract retailers and consumers who are conscious of the environmental impact of their purchases.

So far more than 425 dairy leaders and volunteers are contributing to the U.S. Dairy Sustainability Commitment, including industry partners and stakeholders, sustainability experts, academics, and governmental and nongovernmental organizations.

The U.S. dairy business is one to be proud of. With approximately 57,000 dairy farms, more than 9 million cows and 1,000 dairy processing plants, the industry's estimated economic impact of nearly \$200 billion accounts for almost 10% of U.S. agricultural farm sales, and employs more than 900,000 Americans.

Another reason to be proud of U.S. dairy is the leadership role it is taking in sustainability, a role that will help ensure the health and well-being of our planet, communities, dairy businesses and consumers.

To be part of the movement, go to www.USDairy.com/Sustainability.

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