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

U.S. Dairy Sustainability Progress Update To 2050 Goals

2023–2024

Welcome

Behind every glass of milk, slice of cheese or scoop of dairy protein is a network of people committed to something bigger: nourishing people today while safeguarding the shared resources that will sustain tomorrow. That dual responsibility, to feed communities while caring for the land, animals and natural resources that make it all possible, is the lifeblood of U.S. dairy. And today, it carries new urgency in a world where over 700 million people face undernourishment, and where safe, sustainable and affordable food has never been more critical.

At the heart of it all is a simple truth—the strength of our sustainability journey comes from proving our values through action, not just words. Dairy's progress is built on credible results and the practical know-how that comes from decades of doing the work, and by the humility to continually improve and aim higher. In part, that momentum is fueled by the power of precompetitive collaboration through the Innovation Center for U.S. Dairy. The challenges and opportunities we face demand every voice, every skill and every commitment working together for solutions that lift the entire category. Because when we unite behind a common purpose, we raise the bar for what's possible.

This shared vision is reflected throughout our Sustainability Report, which chronicles two years of progress across the U.S. dairy community. It is both a record of action and a measure of accountability, showing where we stand, where we are headed, and the results that matter to our customers, communities and stakeholders.

Among the proof points in this report, a few stand out as milestone achievements that reflect our collective commitment to action. We invested in nutrition leadership—from building a research roadmap and amplifying dairy's role in health and well-being to supporting food security through partnerships that delivered 1.5 billion dairy servings to families in need. We advanced the science that guides our progress, developing a peer-reviewed life cycle assessment that offers the most complete picture yet of U.S. dairy's greenhouse gas footprint and baseline for future measurement. We also refined our focus with an updated, third-party verified national materiality assessment, applying a double materiality lens to better understand both our impact and the risks and opportunities ahead. And for the first time, we are issuing industry-level reporting against our 2050 Environmental Stewardship Goals, delivering on the promise we made five years ago to measure and share our results transparently.

The progress in these pages is grounded in data, shared vision, and the daily efforts of people who bring dairy to life. These achievements build on many decades of improvement in efficiency, productivity and sustainability—progress that is part of dairy's DNA and underpinned by the U.S. Dairy Stewardship Commitment, our unifying framework for advancing and demonstrating impact as an industry. It's why our expectations are high, why our practices lead the world, and why we continue to push the boundaries of what's possible. We have shown that nutritional impact, environmental gains and economic viability can—and must—advance together.

Tomorrow's food system will demand more nutrition, more responsibility and more resilience, with reliable access to the essentials that sustain growth at its foundation. Rising to that challenge means continuing to pursue environmental stewardship not as an end in itself, but because protecting our resources is what allows us to nourish people—a need that must remain at the center of our work.

Every decision reflected in this report began with the same question: *Will this help us nourish people and protect what makes that possible?* We will keep asking it—because the answers shape not only our future, but the future of those who count on us most.

Barbara O'Brien

President and CEO, Innovation Center for U.S. Dairy
President and CEO, Dairy Management Inc.

Dennis Rodenbaugh

Chair, Innovation Center for U.S. Dairy
Board of Directors
President and CEO, Dairy Farmers of America, Inc.

2050 Environmental Stewardship Goals and Progress Snapshot

The 2050 Environmental Stewardship Goals build on a decades-long commitment to producing nutritious dairy foods that sustainably feed a growing population. Launched in 2020, the goals were shaped through an extensive stakeholder and public comment process, guided by representative leadership across the dairy value chain, including farmers, cooperatives, processors and retailers. They were further informed by a materiality assessment that prioritized the issues posing the greatest opportunities for the industry. Importantly, the goals are designed to aggregate and reflect the broad work happening across farms, businesses and communities, providing a unified way to represent U.S. dairy's leadership in responsible production to its consumers and stakeholders.

A five-year[1] progress update on these value chain-driven goals can be found below and in the following pages. This update draws on multiple data streams, including national-level life cycle assessments, reporting from Stewardship Commitment adopters, and peer-reviewed research. Together, these sources provide a comprehensive view, the breadth of industry action and the depth of science guiding the industry's path forward.

Select "Read More" for each goal to dive deeper and learn more about the industry's progress:

Achieve GHG Neutrality

↓ 2.5%
decrease in GHG emissions intensity from cradle-to-processing gate since 2020, while milk production increased 4.7%.

↓ 14.7%
reduction in GHG emissions per unit of milk within U.S. dairy's milk production from 2007 to 2025.

↑ ~3-fold
increase in fossil fuel energy displaced by biogas production from 2020 to 2025.

↓ 2.2%
approximate decrease in GHG emissions from dairy processing from 2020 to 2025.

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Optimize Water Use While Maximizing Recycling

A water use and recycling measurement strategy has been developed to estimate, monitor and enable progress towards the industry's goal.

33
processors collaborated to build the Dairy Processing Water Savings Opportunities guidance to help processors identify and implement strategies to conserve, capture and recycle water by product type.

↑ 20%
improvement in water efficiency during processing reported by legacy adopters of the Stewardship Commitment from 2021 to 2024.

↓ 30%
decline in on-farm water consumption per liter of milk from 2007 to 2017.

READ MORE

Improve Water Quality by Optimizing Utilization of Manure and Nutrients

A measurement strategy to monitor water quality outcomes from field-to-processor gate has been developed to enable progress towards the industry's goal.

94%
of Stewardship Commitment adopters have a policy, program and/or monitoring system in place to ensure routine compliance with industrial or storm water permit parameters.

Modeling efforts strongly suggest that U.S. dairy's contribution to nitrogen leaching, nitrogen runoff and phosphorus runoff decreased substantially between 1971 and 2020 (Rotz et al., 2024).

From managing nutrient runoff on farms to treating wastewater at processing facilities, dairy producers and processors comply with stringent federal and state regulations.

READ MORE

1 The time boundary is from 2020 to 2025. Data sources were updated to 2025, 2024 and 2023 where possible. However, certain data inputs remain unchanged from 2020 due to limited availability of updated information.

GHG Emissions and Energy

Driven by the value chain, U.S. dairy is working collectively to achieve GHG neutrality at the field, farm and processor levels by balancing GHG emissions with reductions and removals, as defined by the Intergovernmental Panel on Climate Change (IPCC). Its stakeholders are striving to significantly reduce emissions industry-wide and sequester carbon by scaling technologies and agricultural practices that increase resource use efficiency and resilience. Because there is no one-size-fits-all solution, numerous partnerships, collaborations, committees, forums and industry-wide events encourage the sharing of ideas and information across the value chain. In this way, U.S. dairy is bringing actionable measures to farms, processors, dairy customers and consumers in support of this goal.

New Life Cycle Assessments Establish Baseline

U.S. dairy is committed to reporting on the industry's GHG emissions—at a national level—every five years. Since announcing its industry-wide goals in 2020, U.S. dairy has invested and focused on establishing a robust baseline to measure and report progress, following best practices and incorporating the latest science and data available. Two life cycle assessments (LCAs) were commissioned to enable industry alignment on methods, metrics and terminologies, provide a national GHG emissions baseline to which companies can compare their individual GHG emissions footprints, and better understand U.S. dairy's GHG emissions footprint for insight into potential mitigation strategies.

Leveraging a top-down, national-level GHG emissions analysis, the innovative approach to these LCAs enhances transparency, replicability and comprehensiveness. While many LCAs rely on survey-based methods to collect primary data, which can be resource intensive and increase potential variability in results, the new LCAs use publicly available, primary data collected by USDA and other agencies in combination with data from remote sensing technologies such as satellite imagery.[2] This method uses recently published empirical models to estimate GHG emissions associated with regionally representative management practices at the field, farm and processor levels. The approach conforms with GHG emissions reporting guidance, such as the International Organization for Standardization (ISO), International Dairy Federation (IDF), the Food and Agriculture Organization of the United Nations (FAO), and the GHG Protocol Land Sector and Removals (LSRS). A peer-reviewed scientific publication describing the methods and results in significant detail, including uncertainty ranges and sensitivity analyses, can be found in the journal *Environmental Science and Technology*.[2]

The Innovation Center has outlined its intention to transition, in future years, from the use of a top-down GHG emissions assessment to a bottom-up approach incorporating aggregated, anonymized data from FARM Environmental Stewardship and the U.S. Dairy Stewardship Commitment's Processor Stewardship Reporting Tool, contingent upon sufficient data availability. The use of primary data from such sources will strengthen estimates of progress.

2 Pelton, R., Tricarico, J., Bernal, F., de Ondarza, M. B., & Kurt, T. (2025). Spatially resolved greenhouse gas emissions of U.S. milk production in 2020. *Environmental Science & Technology, 59*(19). https://pubs.acs.org/doi/10.1021/acs.est.5c12673

PROGRESS TO 2050

Progress to GHG Neutrality by 2050

U.S. dairy continues to produce high-quality, nutrient-dense products for a growing global population while significantly enhancing resource-use efficiency and demonstrating environmental progress.

The scope of the data presented is from cradle-to-processor gate.[3]

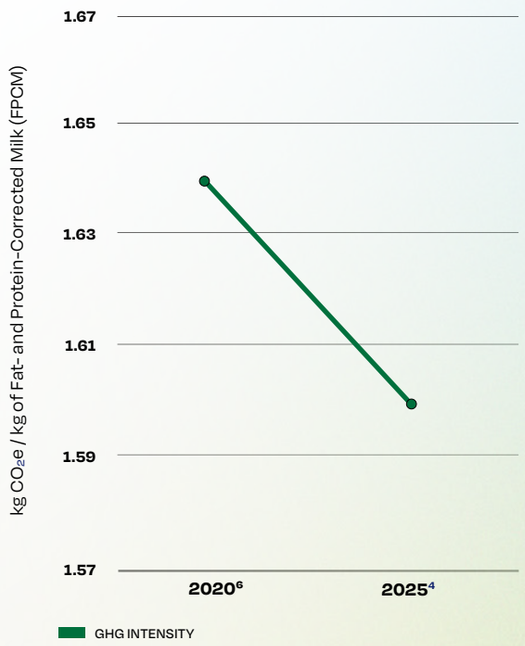
Feed Production: Crops such as corn, alfalfa hay and soybeans feed dairy cows

Milk Production: Dairy cows are housed, fed and milked on dairy farms

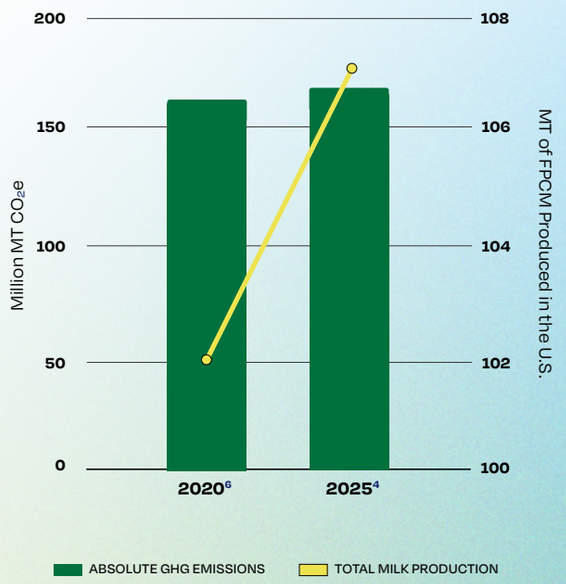
Milk Transportation: Milk is transported from farm to processor in insulated tanker trucks

Dairy Processing: Processing plants bottle milk and turn milk into cheese, yogurt and other dairy products

U.S. DAIRY'S GHG INTENSITY DECREASED BY 2.5% FROM 2020 TO 2025[4,5]



ABSOLUTE EMISSIONS ONLY INCREASED 2.1%, WHILE MILK PRODUCTION INCREASED 4.7%[5]



3 The scope is from cradle-to-processor gate, with the boundary being the physical areas used in dairy production including feed, farm and processing facilities (Pelton et al., 2025a,b). The scope of the assessment ends at the processor gate and does not include distribution to retail or food service industry.
4 Data sources were updated to 2025, 2024 and 2023 where possible. However, certain data inputs remain unchanged from 2020 due to limited availability of updated information.
5 Weighted average across 99.96% of dairy products.
6 Pelton, R, Bernal, F, Kurt, T. (2025). Comprehensive spatial greenhouse gas emissions from U.S. dairy products [Manuscript submitted for publication].

Measuring, Reducing and Removing Emissions at Field and Farm

Cradle-to-farm gate GHG emissions intensity decreased by 1.4% since baseline year 2020, from an average of 1.30 kg CO_2e / kg FPCM to 1.28 kg CO_2e / kg FPCM, as estimated using the updated LCA methods. This progress is a culmination of industry investments in research, technological advancements, partnerships and collaboration.

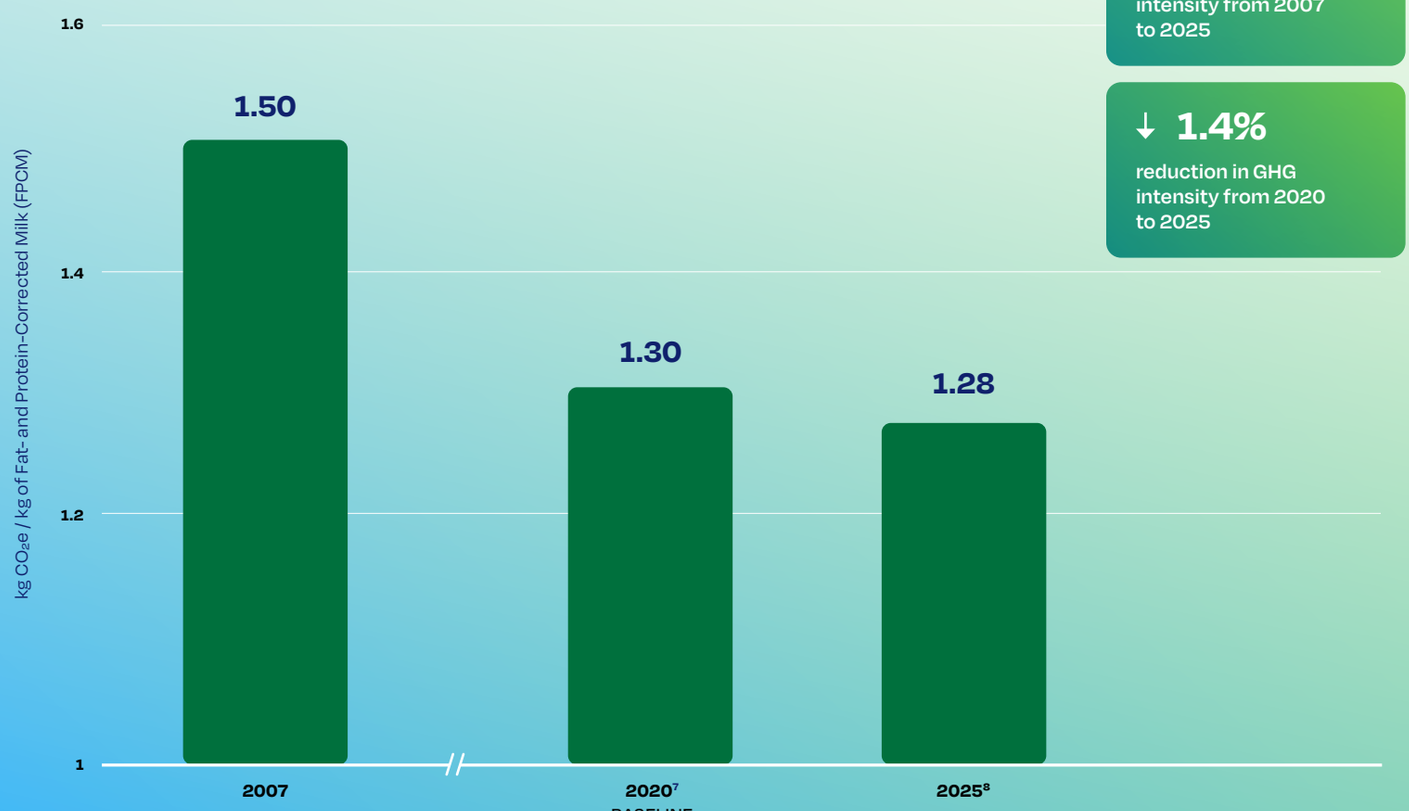
Given the relatively short five-year reporting window (2020–2025[7]) and challenges synchronizing updates with the availability of data, a retrospective analysis was conducted to better understand U.S. dairy's environmental progress from 2007 to 2020.

From 2007 to 2020, GHG emissions intensity associated with fluid milk production decreased approximately 13%.[7] During this period, absolute emissions associated with raw milk production increased only 10%, from 121 to 132 million MT CO_2e, while milk production increased an impressive 27%, from approximately 81 million MT FPCM to 102 million MT FPCM (approximately 186 billion lbs. to 223 billion lbs.; USDA NASS).[7] The results are consistent with other studies which indicate that GHG emissions intensity for fluid milk production in the U.S. has decreased substantially over time (Rotz et al., 2024; Capper and Cady, 2020).

GHG emissions intensity associated with fluid milk production in the U.S. decreased by more than 14 .7% since 2007, while milk production increased 31% from 2007 to 2025—underscoring dairy farmers' commitment to continuous environmental improvement.

PROGRESS TO 2050

Steady Decrease in Cradle-to-Farm Gate GHG Emissions Intensity



↓ 14 .7%
reduction in GHG intensity from 2007 to 2025

↓ 1.4%
reduction in GHG intensity from 2020 to 2025

7 Pelton, R., Tricarico, J., Bernal, F., de Ondarza, M. B., & Kurt, T. (2025). Spatially resolved greenhouse gas emissions of U.S. milk production in 2020. *Environmental Science & Technology, 59*(19). https://pubs.acs.org/doi/10.1021/acs.est.5c12673.

8 Data sources were updated to 2025, 2024 and 2023 where possible. However, certain data inputs remain unchanged from 2020 due to limited availability of updated information.

PROGRESS TO 2050

Highlights

The cradle-to-farm gate LCA underscored that, while there is not a one-size solution for all farms, the industry is focusing on areas that matter most. U.S. dairy continues to research, invest and scale projects to reduce the industry's on-farm GHG footprint across four key areas: enteric methane, feed production, manure management and energy. The pathway to GHG neutrality for U.S. dairy continues to be refined and will become clearer as measurement capabilities, proven projects and economic drivers are harnessed.

The 2020 farm gate LCA estimated emissions reductions from specific on-farm practices including:

Anaerobic Digestion

Anaerobic digestion is the process by which microorganisms break down organic materials—such as dairy manure—in oxygen-deprived environments. Anaerobic digestion can effectively reduce GHG emissions while providing renewable sources of natural gas and electricity.

Between 2007 and 2020, virtually all regions saw substantial increases in the proportion of total dairy cow manure managed with anaerobic digestion, with notable increases in the Pacific Northwest (1.30% to 15.50%), the Intermountain region (0.10% to 6.40%),[9] the West (0.60% to 10.50%), New England (3.50% to 10.50%), the Upper Midwest (1.40% to 6.00%) and the Northeast (1.40% to 6.40%).[9]

Anaerobic digesters with biogas capture and utilization provide emissions offset credits (i.e., energy displacement) averaging 532 ,000 MT CO_2e in 2020, which reduces the 2020 cradle-to-farmgate footprint 0.4% across the industry and up to 0.8% in high-adoption areas.[9]

Energy displacement increased from ~532,000 MT CO_2e displaced per year in 2020, to ~1.5 million MT CO_2e displaced per year in 2025.[9]

Carbon Sequestration

Carbon sequestration refers to the process by which plants, such as animal feed crops, absorb CO_2 from the atmosphere and store it within soils. Soil carbon storage capacity depends on the soil type, precipitation amount and other factors. Carbon can also be released to the atmosphere when soil is disturbed—an issue of permanence. Conservation practices such as minimum or no-tilling and cover cropping promote carbon sequestration.

Carbon sequestration achieved by dairy producers increased 5.5% between 2007 and 2020, from approximately 1.88 million MT to 1.98 million MT CO_2e, accounting for a 1.4% reduction of the 2020 cradle-to-farmgate GHG emissions footprint.[9]

↑ ~3-fold
increase in fossil fuel energy displacement from biogas production from 2020 to 2025

↓ 1.4%
reduction of cradle-to-farmgate emissions from carbon sequestration from 2020 to 2025

Over 400
anaerobic digesters are managing dairy manure in the U.S. as of 2024

1.5 million MT CO_2e
displaced by anaerobic digesters with biogas capture and utilization in 2025

9 Pelton, R., Tricarico, J., Bernal, F., de Ondarza, M. B., & Kurt, T. (2025). Spatially resolved greenhouse gas emissions of U.S. milk production in 2020. *Environmental Science & Technology, 59*(19). https://pubs.acs.org/doi/10.1021/acs.est.5c12673.

Emissions Measurement With the FARM Environmental Stewardship Program

A key strategy to advancing progress is ensuring that farmers are equipped with the tools and resources to track, assess and communicate environmental achievements and progress. Launched in 2017, the Farmers Assuring Responsible Management Environmental Stewardship program is a farm-level environmental assessment and customer assurance program. **Since program inception in 2017, more than 6,000 assessments were completed on farms ranging in size from 10 to more than 35,000 lactating cows.**

Version 3 of the FARM Environmental Stewardship (FARM ES) program launched in October 2024, equipping dairy farmers with a scientifically robust tool that assesses the impact of conservation practices and technologies within the context of their individual operations. FARM ES version 3 uses the Ruminant Farm Systems (RuFaS) model, a whole-farm, process-based model that estimates farm-level GHG emissions and energy intensity. Created in collaboration among subject-matter experts at USDA-ARS, Cornell University, the University of Wisconsin, Colorado State University, Sustainability Science and other institutions, with support from DMI and other organizations, RuFaS simulates dairy farm processes and operations, starting with individual cows, and enables FARM ES users to conduct "what if" scenario-planning analyses. **As a fully documented, open-source model that is continually improved, RuFaS represents one of the most advanced, fit-for-purpose whole-farm environmental models available in the agriculture sector.**

As a result, FARM ES version 3 offers farmers an advanced, more refined output compared to previous versions of the program, including estimates of carbon sequestration, the ability to analyze the environmental and milk productivity impacts of various practices and technologies, and a detailed farm footprint. Dairy farmers can understand their farm footprint by feed, manure, enteric and energy sources, as well as by GHG type.

FARM ES results can be aggregated by dairy cooperatives and processors for reporting Scope 3 emissions to dairy buyers, in which case individual farm data are anonymized. FARM ES version 3 is a turning point as dairy farmers, cooperatives and processors continue to advance their sustainability efforts in ways that make the most sense for their business.

CASE STUDY

Advancing Climate Goals Through FARM ES at California Dairies, Inc.

California Dairies, Inc. (CDI) is a leading U.S. dairy cooperative, co-owned by more than 280 California dairy families. As part of its climate strategy, CDI is actively participating in the FARM ES program to measure and reduce GHG emissions at the farm level. CDI is conducting FARM ES evaluations on half of its member-owner farms each year and aggregates the results to monitor progress toward its climate goals. Already, 66% of CDI milk is produced on farms implementing at least one methane-reducing project, and over 75% of the electricity used on member farms comes from renewable or carbon-free sources. CDI is driving measurable reductions in its environmental footprint while supporting the long-term sustainability of its farms.

INDUSTRY COLLABORATION

CEO Task Force on GHG Accounting

Current Scope 3 GHG accounting, disclosure and goal-setting frameworks tend to prioritize uniformity, emphasizing consistency, traceability and prescriptive methodologies across all sectors. While this benefits comparability and reporting, it often overlooks fundamental operational and scientific differences between sectors, risking the undervaluation of innovative, science-backed and scalable mitigation solutions.

To address this challenge, the Innovation Center established a CEO-level Task Force on GHG Accounting in 2022 to build industry alignment and promote a more practical and flexible approach—one that enables climate action, increases transparency and reduces complexity. The Task Force developed a unified position reflecting key opportunities and principles, and submitted comments to the GHG Protocol's public consultation in early 2023, which were supported by nearly 40 additional U.S. dairy stakeholders.

The Task Force continues to engage with relevant organizations to drive change and ensure sector-specific realities are better represented in evolving standards. Complementing this work, the Innovation Center and National Milk Producers Federation also participates in the Value Change Initiative Food & Agriculture Working Group, a global forum where technical experts collaborate to address Scope 3 accounting barriers and engage with leading entities like GHG Protocol and the Science Based Targets initiative (SBTi).

Research and Insights for Emissions Reduction Solutions

Through research and on-farm pilots, U.S. dairy is identifying the most promising solutions, practices and technologies that will close knowledge gaps, advance innovative solutions and accelerate progress toward its goal of GHG neutrality. As part of this effort, U.S. dairy has identified pathways for the necessary research, data collection and modeling to inform a landscape assessment of what's possible and what's needed to inform economically viable farmer action.

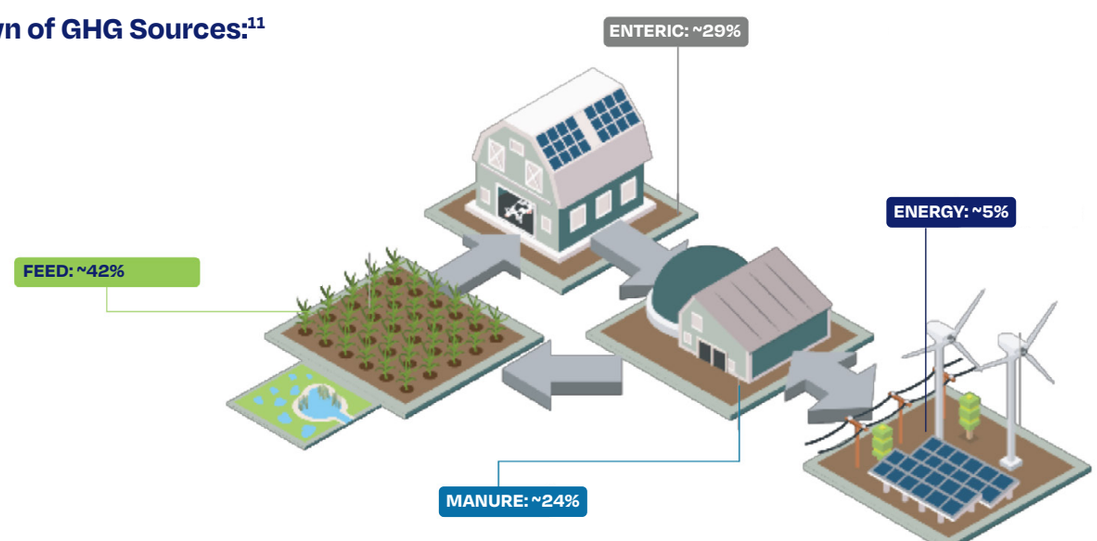
Other major research initiatives supported by DMI and the Innovation Center include the Dairy Soil and Water Regeneration (DSWR) project and the recently announced Health, Efficiency and Resource Dynamics (HERD) Initiative. The HERD Initiative, a collaboration between DMI, the Foundation for Food & Agriculture Research (FFAR) and Zoetis, will examine the role of animal health in U.S. dairy environmental and economic outcomes. Cows are at the heart of dairy production and available evidence[10] suggests that animal health could be a significant lever for enhancing environmental progress.

>$7 Million Awarded through the Greener Cattle Initiative to Close Research Gaps on Enteric Methane Emissions Reductions

Developing options to reduce livestock enteric methane emissions begins with discovery research. The Greener Cattle Initiative is a five-year, public-private collaboration to drive new research and provide effective, scalable and commercially feasible solutions to reduce methane emissions from dairy and beef cattle. The research focuses on five distinct areas: dairy cow nutrition, rumen microbiome, dairy cow genetics, sensing and data technology, and socioeconomic analysis. As a vehicle for collaboration and exposure to new ideas, the program leverages resources and de-risks research and development. Experts from across the value chain inform the program priorities and project funding decisions. Participants include the Innovation Center for U.S. Dairy, FFAR, ADM, the Council on Dairy Cattle Breeding, Elanco, Genus, Global Methane Hub, JBS, National DHIA, Nestlé, and the New Zealand Agricultural Greenhouse Gas Research Centre. The Greener Cattle Initiative has already proven to be an effective leveraging mechanism to address research gaps.

The program—partially funded by dairy farmers—has awarded over $7 million, with more in the pipeline, for research that represents a tenfold return on investment for dairy farmers. Grants awarded include a project on genomic selection for low-emitting cows that will phenotype approximately 4,000 cows. In September 2023, the Greener Cattle Initiative awarded a $3.3 million grant to Francisco Peñagaricano, UW–Madison assistant professor of animal and dairy sciences, for his project that takes a three-pronged approach: using genetics to selectively breed cattle that produce lower methane emissions; developing a milk-based test that can predict a cow's methane emissions; and exploring the rumen microbiome for possible dietary or other interventions.

Estimated Breakdown of GHG Sources:[11]



10 Kyriazakis, I., et al. (2024). Improve animal health to reduce livestock emissions: Quantifying an open goal. Proceedings of the Royal Society B: Biological Sciences, 291(2027), 1–12. https://doi.org/10.1098/rspb.2024.0675

11 Please note these are approximate percentages. Source: Pelton, R., Tricarico, J., Bernal, F., de Ondarza, M. B., & Kurt, T. (2025). Spatially resolved greenhouse gas emissions of U.S. milk production in 2020. *Environmental Science & Technology, 59*(19). https://pubs.acs.org/doi/10.1021/acs.est.5c12673

Collaboration and Partnerships Scale On-Farm Emission Reductions

U.S. dairy is collaborating to take the knowledge and insights gained from research, analysis and on-farm pilots to support widespread farmer adoption of environmentally sustainable practices and technologies. Since the industry goals were announced in 2020, more than $100 million has been committed by partners to support DMI- or Innovation Center-driven programs that empower sustainability action, with nearly $60 million distributed throughout 2023 and 2024. Together, the tools, projects and collaborative efforts contribute to providing more information, increasing technical assistance and addressing economic challenges for accelerating voluntary adoption.

Dairy Feed in Focus: Nearly 8,000 MT CO_2e Reduced and $4 Million Attracted

The **Dairy Feed in Focus** program launched in 2021 to scale the adoption of best management practices in feed and forage production that have environmental and economic benefits for farms of all sizes. Success in this program requires coordination between project partners—often buyers and/or processors of dairy—and farmers and their cooperatives. Partners involved in the program include DMI, the Innovation Center and The Nature Conservancy, with funding support from supply chain partners including Nestlé and Syngenta. Additional partners have joined, including General Mills, Domino's and Walmart/Sam's Club.

In 2024, more than 40 farms of different sizes and regions participated, representing approximately 50,000 acres and 45,000 cows. As of May 2025, Feed in Focus has attracted over $4 million in technical assistance and has provided over $1.7 million in direct incentives to farmers. From program inception through May 2025, the program helped reduce nearly 8,000 tons of CO_2e.

To support the implementation of these projects, a **Dairy Feed in Focus Practice Guidebook** was updated in January 2024 with support from The Nature Conservancy and DMI. The guide is a resource for producers and service providers on the potential environmental benefits and considerations for the successful implementation of field and farm practices.

Financing Dairy Climate Solutions: New Report and Pilot Advance On-Farm Emissions Reductions

Developing scalable financial solutions will help farmers make economically viable sustainability investments on their dairy farms. To that end, the Innovation Center and the Environmental Defense Fund collaborated to publish the Financing Dairy Climate Solutions report in 2024. The report outlines eight financial models designed to overcome financial barriers associated with the adoption of on-farm technologies that can reduce GHG emissions. The report activates collaboration and builds a common language between financial institutions and the dairy sector.

In 2024, DMI, Midwest Dairy and Lasso launched a pilot to support farmers with grant applications at no cost. The pilot attracted overwhelming interest and was able to fully support 12 farmers through the grant identification, writing and application process. Based on its success and popularity among farmers, the program is expanding its scope in 2025 to further support grant applications in other regions. DMI also worked with Lasso to build a searchable national and local grants database highlighting opportunities available to dairy farmers, along with a Grant Funding 101 resource guide sharing best practices when applying for grants and working with grant writers.

CASE STUDY

Maola Secures Over $100 Million for On-Farm Sustainability Initiatives

Maola is a cooperative of family-owned dairy farms dedicated to producing high-quality, local dairy. Through strong partnerships, Maola farmers secured over $100 million in support for on-farm initiatives that improve environmental outcomes while strengthening farm operations. These projects range from constructing modern animal housing and stabilizing erosion-prone areas to planting thousands of trees to protect local waterways. In 2024, Maola farms emitted 8.09% fewer GHG emissions than the national average, reflecting the impact of widespread adoption of practices like cover cropping, no-till farming, anaerobic digesters, manure injection, riparian buffers and environmental assessments. Together, these efforts showcase Maola's commitment to continuous improvement and its role as a pioneer in climate-smart dairy farming.

Measuring and Reducing Dairy Processing Emissions

While U.S. dairy's processing GHG footprint is approximately 20% of the industry's total from cradle-to-processing gate, U.S. dairy cooperatives and processors are committed to doing their part in support of the industry's goal to achieve GHG neutrality.

An updated farm gate-to-processor gate life cycle assessment completed in 2025 provided a renewed 2020 baseline of processing-specific GHG emissions.[12]

This new assessment analyzed the GHG impact of 33 unique dairy products and ingredients processed and manufactured across the country. The boundary includes emissions impact from transportation of milk to the processing facility, energy consumption and refrigeration during primary and secondary processing, and packaging.

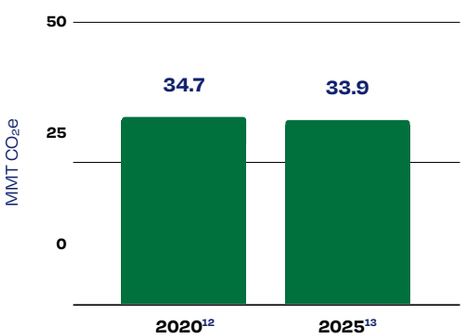
This in-depth product-level analysis provides a robust, science-based baseline for dairy cooperatives and processors to measure and compare their performance, and identify targeted improvement opportunities that yield emission reductions at scale.

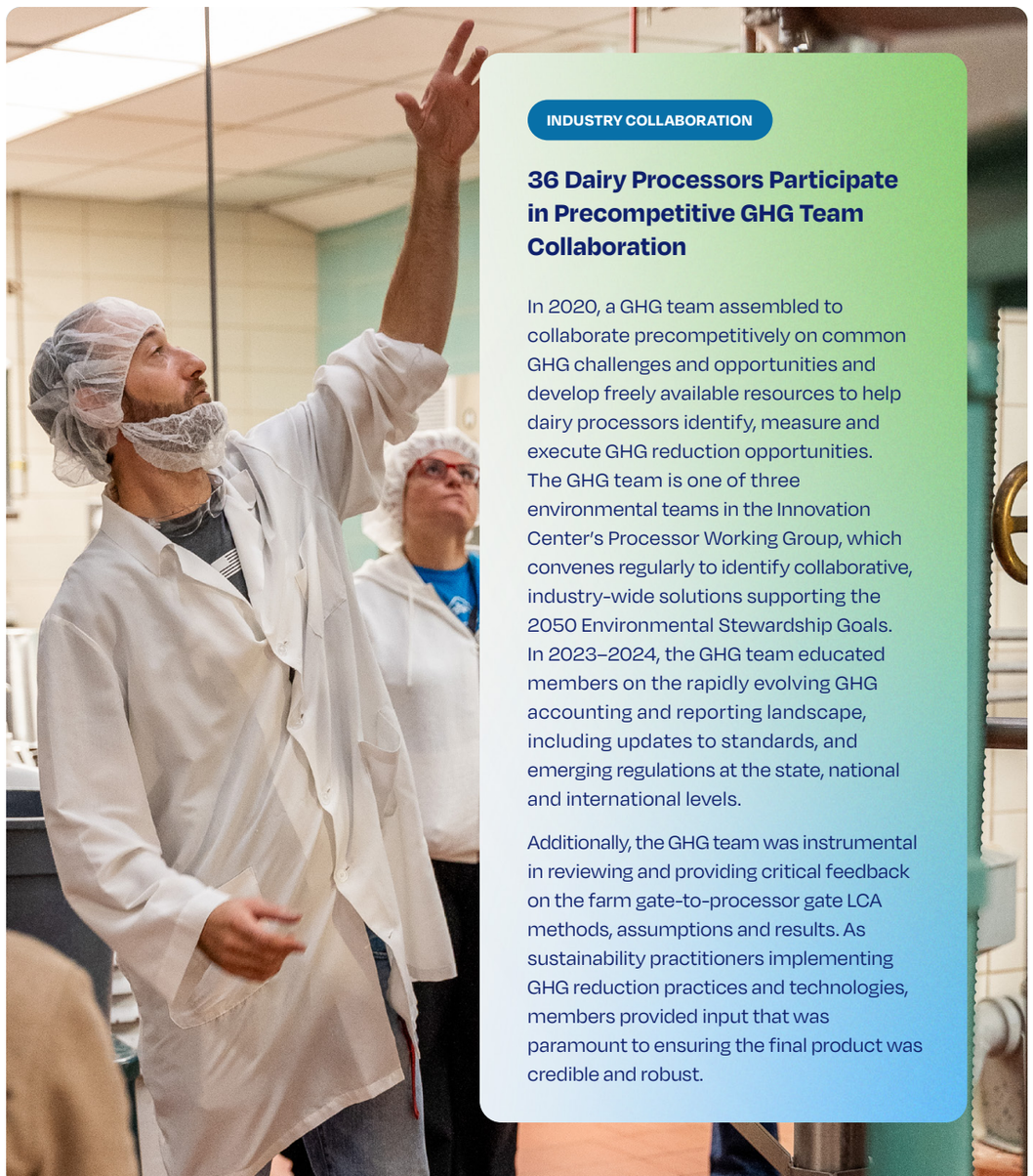
From 2020 to 2025,[13] the absolute GHG emissions from dairy processing, specifically, decreased approximately 2.2%. In the same time period, U.S. milk production grew by 4.7%, and dairy production (measured in pounds of final product) decreased by approximately 4.1%. Shifts in consumer demand and changes in product mix can significantly influence total dairy production as well as the dairy processing GHG footprint over time.

↓ 2.2%

approximate decrease in GHG emissions from dairy processing from 2020 to 2025[13]

PROCESSING ONLY GHG EMISSIONS





INDUSTRY COLLABORATION

36 Dairy Processors Participate in Precompetitive GHG Team Collaboration

In 2020, a GHG team assembled to collaborate precompetitively on common GHG challenges and opportunities and develop freely available resources to help dairy processors identify, measure and execute GHG reduction opportunities. The GHG team is one of three environmental teams in the Innovation Center's Processor Working Group, which convenes regularly to identify collaborative, industry-wide solutions supporting the 2050 Environmental Stewardship Goals. In 2023–2024, the GHG team educated members on the rapidly evolving GHG accounting and reporting landscape, including updates to standards, and emerging regulations at the state, national and international levels.

Additionally, the GHG team was instrumental in reviewing and providing critical feedback on the farm gate-to-processor gate LCA methods, assumptions and results. As sustainability practitioners implementing GHG reduction practices and technologies, members provided input that was paramount to ensuring the final product was credible and robust.

12 Pelton, R, Bernal, F, Kurt, T. (2025). Comprehensive spatial greenhouse gas emissions from U.S. dairy products [Manuscript submitted for publication].
13 Data sources were updated to 2025, 2024 and 2023 where possible. However, certain data inputs remain unchanged from 2020 due to limited availability of updated information.

Investments in Technology and Practices

While many practices and technologies can largely apply to dairy processors nationally, it is important to note that no two dairy processing facilities are the same. Like dairy farms, every processing location has unique aspects driven by geography, products produced, process technologies and more. As outlined in the Dairy Processor GHG Reduction Opportunities Guidance, processors have several avenues to consider for reducing their GHG footprints.

In conjunction with the LCAs, U.S. dairy is also developing a decarbonization roadmap that illustrates potential combinations of technologies and practices that can enable dairy processors to cost effectively reduce GHG emissions. Because dairy processing can be energy intensive, the most cost-effective GHG interventions include upgrades to make compressors, heat pumps and condensers more energy efficient, optimizing pipe insulation, installing automated controls, and LED lighting retrofits. Other GHG reduction opportunities exist, such as boiler upgrades, combined heat and power systems, and onsite solar, although these can often be cost prohibitive in the short term and require larger investments.

PROGRESS TO 2050

Progress Reported by Stewardship Commitment Adopters

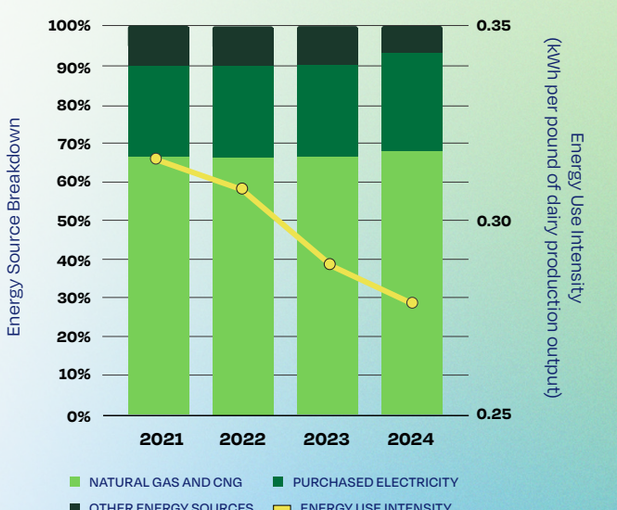
U.S. dairy companies that are adopters of the U.S. Dairy Stewardship Commitment report their emissions on an annual basis and have been doing so through the Processor Stewardship Reporting Tool since its launch in 2020. The reported emissions are aggregated to provide an industry-level view of progress. The Innovation Center developed resources for dairy companies, including Scope 1 and 2 Inventory Guidance, Scope 3 Inventory Guidance, and Processor Emissions Reduction Opportunities.

The accuracy, quality and completeness of this data continues to improve, and remains a focus for adopters in their annual sustainability reporting. The GHG intensity data reported by Stewardship Commitment adopters has been temporarily omitted from this year's report while validation work is underway. To ensure that data reported is both credible and decision-useful, adopters of the U.S. Dairy Stewardship Commitment remain fully committed to measuring, improving and transparently reporting their GHG performance. Once the data has been reviewed and validated, it will be included in future reports as part of our ongoing commitment to accountability and continuous improvement.

Legacy adopters of the Stewardship Commitment representing approximately 74% of U.S. milk production reported a 13% reduction in energy use intensity within processing facilities since 2021.

13%
reduction in energy use intensity reported by legacy adopters from 2021 to 2024

13%
increase in grid electricity generated from renewable sources reported by legacy adopters from 2021 to 2024



Building Efficiency and Processing Infrastructure Efficiency

Whether through HVAC, lighting or boiler upgrades, processors have a variety of options to reduce Scope 1 and 2 emissions through efficiency measures.

CASE STUDY

Tillamook Deploys Reverse Osmosis, Saving 1.4 Million kWh per year[14]

As part of the cheesemaking process, curds are separated from whey. The liquid whey is then concentrated—typically through evaporation—to produce a powder used in nutritional supplements and animal feed. To increase the plant's ability to receive more whey, Tillamook County Creamery Association invested in improving efficiency at this stage and optimized the volume of production flowing through the whey plant's reverse osmosis unit.

By increasing the volume of solids captured, the company reduced energy demand and saved approximately 1.4 million kWh per year. Additional operational fine tuning of equipment flow rates of steam helped yield an additional 900,000 kWh in annual energy savings. By adjusting system controls to meet exact demand from incoming product, the team achieved lower steam and electricity consumption and yielded over 2 million kWhs per year in energy reduction.

Renewable Energy

Procuring and/or producing renewable energy is an option for processors to significantly lower their Scope 2 emissions, often at a competitive expense to traditional energy sources such as natural gas, oil and coal.

CASE STUDY

Great Lakes Cheese Invests in Renewable Energy Sources[15]

Great Lakes Cheese's commitment to reducing GHG emissions is evident through its participation in a Virtual Power Purchase Agreement (VPPA), which enables the company to source renewable energy generated by a wind farm in Marion County, Kansas. The VPPA was facilitated by Walmart, and Great Lakes Cheese is joined by several other companies that signed the agreement.

In 2024, Great Lakes Cheese's participation in the VPPA accounted for 35% of the company's energy usage. Over the agreement's term, it is expected that 250,000 megawatt-hours of renewable power will be generated—the equivalent of avoiding emissions from more than 458,000 gasoline-powered passenger cars driven in a year.

CASE STUDY

United Dairymen of Arizona's Milk Hauling Fleet Reduces Emissions[16]

United Dairymen of Arizona (UDA) is accelerating its sustainability efforts by transitioning its milk-hauling fleet to compressed natural gas (CNG) trucks. As of 2024, 31 CNG trucks are in operation, with a goal of 69 by 2034. The switch to CNG not only reduces GHG emissions but also lowers fuel costs, improves air quality and supports local job creation. Backed by its Board of Directors, UDA formed partnerships with six carrier companies, including Ozinga Energy, Duco Geo Solutions and Shull Transportation, to fully transition their fleets to natural gas. UDA is also leveraging renewable natural gas (RNG) sourced from landfill digesters through a partnership with Waste Management, creating a more circular and sustainable fuel system.

The shift to CNG is central to UDA's goal of cutting total emissions by 50% by 2030 under the SBTi. Since October 2024, the transition has already reduced transportation-related CO_2 emissions by 7%. Once the full fleet is converted, UDA anticipates up to a 82.3% reduction in transportation emissions.

14 Tillamook. *2023 Stewardship Report*. https://www.tillamook.com/stewardship-report/environmental-action

15 Sources: International Dairy Foods Association. (n.d.). International Dairy Food's Association (IDFA)'s post. https://www.linkedin.com/posts/idfa_as-we-continue-our-celebration-of-earth-day-activity-7321205438555869186-udMO/ and Walmart. (2022). Gigaton PPA: Walmart, Ørsted and Schneider Electric announce first cohort for renewable energy supply chain program. https://corporate.walmart.com/news/2022/10/18/gigaton-ppa-walmart-rsted-and-schneider-electric-announce-first-cohort-for-renewable-energy-supply-chain-program

16 United Dairymen of Arizona. https://stewardship.uda.coop/environment

Water Use and Recycling

As water availability varies regionally, dairy farmers and processors are working to increase efficiency across milk production and processing. While management approaches are tailored to individual operations and locations throughout the U.S., practices such as water reuse and recycling are common on dairy farms and in processing plants.

The dairy community manages water as a shared essential natural resource. U.S. dairy's blue water use accounts for approximately 3% of the nation's freshwater withdrawal. While the full dairy value chain relies on water, approximately 97% of U.S. dairy's water use occurs during feed production. Less than 3% of U.S. dairy's total water use is used for milk production, processing and other purposes.[17]

PROGRESS TO 2050

U.S. dairy is committed to optimizing its water use and increasing recycling by 2050 across field, farm and processor, and has a track record of water use efficiency improvements:

- According to Rotz et al., (2024), the intensity of blue water use at the field and farm level decreased by approximately 50% between 1971 and 2020. The authors attribute this progress primarily to conversion from furrow irrigation to center pivot irrigation systems, along with improvements in cattle feed efficiency.[18] Other research supports this trend, as Capper et al., (2009) note an approximate 30% decline in on-farm water consumption per liter of milk from 2007 to 2017.[19]
- For dairy processing, legacy adopters of the U.S. Dairy Stewardship Commitment, representing nearly 74% of U.S. milk production, reported a 20% improvement in water withdrawal intensity since 2021. For more information, see page 33.

↓ 30%

decline in on-farm water consumption per liter of milk from 2007 to 2017

↓ 20%

reduction in water withdrawal intensity since 2021 reported by legacy adopters of the U.S. Dairy Stewardship Commitment

17 Rotz, A., Stout, R., Leytem, A., Feyereisen, G., Waldrip, H., Thoma, G., Holly, M., Bjorneberg, D., Baker, J., Vadas, P. & Kleinman, P. (2021). Environmental assessment of United States dairy farms. *Journal of Cleaner Production, 315*, p. 128153.

18 Rotz, C. A., Beegle, D., Bernard, J. K., Leytem, A., Feyereisen, G., Hagevoort, R., Harrison, J., Aksland, G., & Thoma, G. (2024). Fifty years of environmental progress for United States dairy farms. *Journal of Dairy Science, 107*(6), 3651–3668. https://doi.org/10.3168/jds.2023-24472

19 Capper, J. L., Cady, R. A., & Bauman, D. E. (2009). The environmental impact of dairy production: 1944 compared with 2007. *Journal of Animal Science, 87*(6), 2160–2167. https://doi.org/10.2527/jas.2009-1781.

Progress Towards 2050 Goal Starts With Measurement

Comprehensive datasets corresponding to the scope and boundary of U S. dairy's water use footprint (from field and farm through processing), are not publicly available. The Innovation Center is committed to developing and implementing a robust water use and recycling measurement strategy to track industry progress towards the goal to optimize water use while maximizing recycling by 2050.

Improvements in water use efficiency enable the dairy industry to maintain or increase production using less water, supporting long-term food and nutrition security without depleting water resources. Water use measurement strategies need to account for not only water withdrawn from surface and groundwater sources but also water returned to the watershed through infiltration and recharge (i.e., water balance). A substantial amount of water on dairy farms and within dairy processing facilities is reused or recycled often multiple times, further contributing to the efficient use of this critical resource.

Water management is a complex task, and the industry's water measurement and reporting strategy must consider many factors and complexities to be credible. Estimating water balance needs to account for local precipitation amount and timing, irrigation practices and technologies, groundwater and surface water sources as well as pressures (i.e., scarcity), local hydrology characteristics, and other factors. In addition, water rights and regulations vary significantly by state and can be influenced by interstate compacts, changing policies and shifting jurisdictions.

Given these constraints, it is important for farmers to understand their individual operations in terms of water use efficiency and opportunities for improvement, in addition to estimating water use efficiency at a national level to demonstrate industry-wide progress over time. At the level of the individual farm, scientists at DMI are exploring the potential to develop a water use efficiency model that could enable scenario planning and inform decision making.

After consulting with a variety of stakeholders throughout 2023–2025, the Innovation Center developed a draft process for estimating national level, industry-wide water use efficiency and is receiving third-party feedback. U.S. dairy's national water use and recycling measurement strategy will follow LCA methodologies, conforming with IDF, FAO and ISO methodologies, and will have a scope of cradle-to-processor gate, with a geographical boundary of the area used in feed production, farming and processing. Results will be aggregated at a national level, starting with a baseline year of 2020. As the measurement strategy advances, progress updates on this goal will be reported.

Processing-specific data reported by adopters of the U.S. Dairy Stewardship Commitment, in addition to other external third-party data sources, will inform the analysis and model to estimate water use efficiency during processing.

On-Farm Water Efficiency

Dairy farmers do not take an ounce of water for granted. In fact, the typical journey of a single drop of water on a dairy farm is complex. Whether used to clean milking equipment, keep cows hydrated, or grow crops, farmers across the United States work with local communities and researchers to continually optimize their water usage.

Water plays many roles on a farm. For example, water is typically used to help chill milk from 101°F to 38°F. Many farmers choose to re-use the same water as a safe drinking option for their cows. Dairy farmers may choose to re-use the water to rinse cow manure from their barns, enriching the water with a natural fertilizer that can be recycled to grow crops for feed. Recycling water decreases overall usage and consumption, saving farmers money while improving their environmental and community impact.

CASE STUDY

McCarty Family Farms Recovers and Reuses Water From Farm to Plant[20]

McCarty Family Farms, a B-Corp certified dairy farm located in Kansas, takes great care when it comes to water re-use and recovery. The farm operates a state-of-the-art milk condensing plant on-site, where the milk's natural water is extracted before the milk is transported to a dairy processing company. The reclaimed water is then used to clean and maintain the processing plant, clean the barns, irrigate crop land, and be consumed by the cows. Through this innovative approach and technology, McCarty Family Farms is able to reclaim approximately 158 million gallons of water annually.

20 Sources: Dairy Management, Inc. https://www.usdairy.com/news-articles/dairy-farm-water-usage and McCarty Family Farms. Creating a positive environmental impact. https://www.mccartyfamilyfarms.com/environmentalimpact

Dairy Processing Approach to Water Management

Water is a vital resource in dairy processing, essential for sanitation, product formulation, cooling and more. Operating under a robust framework of environmental regulations, processors routinely undergo inspections, testing and reporting to ensure compliance. Through ongoing efforts to reduce water use and invest in operational efficiencies, U.S. dairy processors are committed to safeguarding shared water resources.

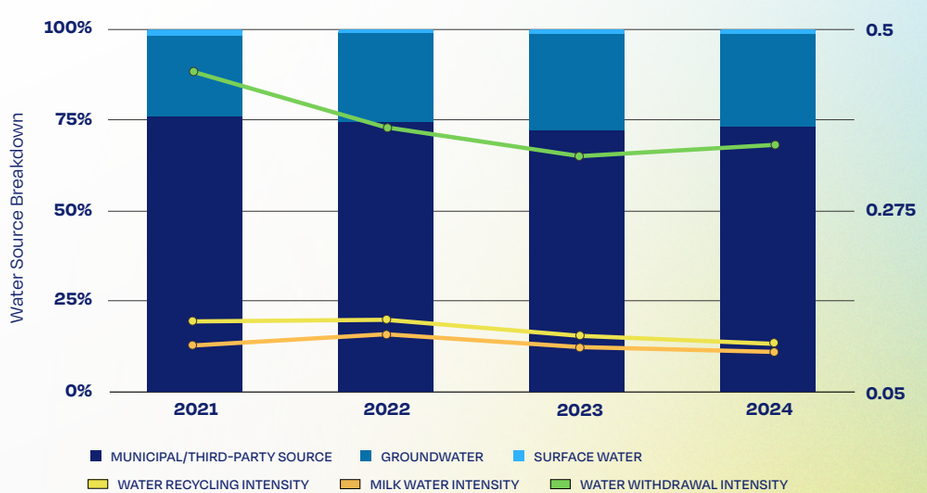
PROGRESS TO 2050

Progress Reported by Stewardship Commitment Adopters

Since announcing the industry's goal to optimize water use and increase recycling in 2020, U.S. dairy cooperatives and processors that adopted the U.S. Dairy Stewardship Commitment have consistently measured and reported key water performance indicators in the Processor Stewardship Reporting Tool. Now with four years of aggregated data, the industry can analyze water performance trends and track processor performance toward the 2050 goals.

U.S. dairy cooperatives and processors that reported data as part of the Stewardship Commitment since 2021 are referred to as legacy adopters. The legacy adopters, which represent approximately 74% of U.S. milk production, demonstrated a 20% improvement in water withdrawal intensity from 2021 to 2024.

WATER WITHDRAWAL AND RECYCLING FROM 2021 TO 2024



↓ 20%
reduction in water withdrawal intensity reported by legacy adopters from 2021 to 2024

INDUSTRY COLLABORATION

33 Processors Comprise Processor Working Group Water Team

The Processor Working Group water team collaborates on shared challenges, opportunities and best practices related to in-plant water stewardship and develops precompetitive resources to help processors improve their water management practices. For example, the water team developed the Dairy Processing Water Savings Opportunities guidance to help processors identify and implement strategies to conserve, capture and recycle water by product type. The guidance was developed in consultation with industry water experts to ensure best practices are included.

CASE STUDY

Hilmar Cheese Company Reuses Nearly 100% of Milk Water[21]

Hilmar Cheese Company employs a comprehensive water management strategy across its manufacturing facilities. Nearly 100% of the water originally contained in the milk it processes is captured and reused. During production of cheese, whey protein, lactose and animal feed, Hilmar recovers and purifies the remaining water for reuse in equipment cleaning, facility sanitation, and boiler steam generation. Used wash water is then directed to on-site or local water reclamation and biogas facilities, where it is treated and converted into biogas. The recycled water is further repurposed for landscaping and crop irrigation, supporting both operational efficiency and environmental stewardship.

21 Hilmar Cheese Company Sources: 2023 Corporate Sustainability Report. https://www.hilmar.com/wp-content/uploads/2023/07/Hilmar-Cheese-Corporate-Sustainability-Report.pdf and the Sustainability page of their website https://www.hilmar.com/sustainability/

Water Quality and Nutrient Management

Water quality is critical for thriving dairy production systems—from farms to processors—and is a shared priority for the U.S. dairy industry and broader society. U.S. dairy actively manages water quality during feed production, milk production and dairy processing to protect surrounding communities and the general public. The Innovation Center set a 2050 goal to improve water quality by optimizing the utilization of manure and nutrients.

Properly managed water quality practices are essential to meet and maintain regulatory requirements. From managing nutrient runoff on farms to treating wastewater at processing facilities, dairy producers and processors comply with stringent federal and state regulations, such as the Clean Water Act administered by the U.S. Environmental Protection Agency (EPA). These regulations most often require dairy operations and processing plants to obtain permits, which regulate wastewater volume and pollutant levels. Many states have additional permitting, nutrient management, or water monitoring requirements specific to dairy operations.

U.S. dairy is committed to improving water quality by optimizing the utilization of manure and nutrients by 2050.

Progress Towards 2050 Goal Starts With Measurement

Reporting aggregated water quality outcomes at a national level, especially from cradle-to-farm gate, has limitations in informing meaningful action at a local or regional level, given the specificity of external factors and production practices involved. Estimating water quality outcomes associated with different agricultural practices is complex due to a variety of factors such as the topography, soil type, geology, precipitation events, surrounding ecosystem, and practices of other users within the same watershed. Factors directly attributed to dairy production include manure collection, treatment, storage and application practices, crop rotation and nutrient uptake rates, feed production practices such as cover cropping and conservation tillage, field management and drainage, the use of buffer strips and other edge-of-field practices, among other factors.

To address these measurement challenges, the Innovation Center aims to model water quality outcomes at an individual farm level. Enabling farmers and farm advisors to model water quality outcomes in the context of their operational and local conditions is critically important, along with the ability to understand how different management practices impact water quality and production outcomes.

To this end, the Innovation Center is exploring an opportunity to build the capability to model farm-level water quality outcomes in collaboration with the team at RuFaS, so that producers and farm advisors can understand the impacts of different practices on water quality outcomes in the context of other trade-offs within their production system. In collaboration with external scientists, the process of integrating the water quality measures and outcomes into the RuFaS model has been initiated. Once complete, the model will be validated and refined against available empirical research and expert input, as appropriate.

Processing-specific data reported by adopters of the U.S. Dairy Stewardship Commitment will be leveraged, in addition to other external third-party data sources, to estimate water quality outcomes during processing.

As the measurement strategy advances, national-level progress updates on this goal will be reported.

On-Farm Water Quality Practices

While dairy farmers have limited influence over field-specific practices for feeds grown by suppliers, they have direct operational control over feeds they grow. Farms develop and use nutrient management plans and other practices to protect air, soil and water quality. Effective nutrient and manure management supports water quality while delivering multiple co-benefits such as increasing water-holding capacity and organic carbon content of soil, which can also improve crop productivity.

Dairy farmers across the country demonstrate field practices, edge-of-field practices, manure handling and nutrient management technology can reduce runoff and protect the quality of the water that leaves the farm.

Techniques include:

- Nutrient management plans to identify and document opportunities to reduce runoff
- No-till farming to reduce soil erosion and increase water filtration and soil retention of organic matter
- Planting cover crops to optimize feed production and retain soil nutrients for better health
- Installation of buffer strips to minimize runoff into waterways
- Sub-surface application of manure to incorporate nutrients into the soil with minimal exposure to water runoff
- Using precision agriculture techniques to preserve soil nutrients and water quality

PROGRESS TO 2050

On-Farm Improvements in Water Quality

The Innovation Center reviewed potential contributors to water quality outcomes, informed by scientists and industry experts, and established consensus on two priorities for measurement and reporting, given their potential to have negative ecosystem impacts: (1) sediment, and (2) nutrients, specifically nitrogen and phosphorus.

The two primary routes by which sediment and nutrients find their way into watersheds are through runoff and leaching. Runoff occurs when precipitation (in the form of rain, snowmelt or irrigation) exceeds the soil's capacity to absorb water, with the excess water flowing into the watershed or basin. Leaching is the downward movement of water and dissolved substances into groundwater. Sediment is almost solely an issue of erosion and runoff, whereas nitrogen and phosphorus have the potential to access surface or groundwater through either runoff or leaching.

Modeling efforts strongly suggest that U.S. dairy's contribution to nitrogen leaching, nitrogen runoff and phosphorus runoff—both soluble and "legacy" phosphorus contained within sediment—decreased substantially between 1971 and 2020.[22]

CASE STUDY

Maryland Dairy Farm Restores 14,000 Feet of Streams and Plants 60,000 Trees to Protect Chesapeake Bay[23]

Located within the Chesapeake Bay watershed, Long Green Farms in Rising Sun, Maryland, is committed to being a responsible steward of the waterways that flow through the farm. The farm employs a number of best practices to manage water runoff from rainfall events, including a covered, heavy-use area with manure storage and a non-eroding surface in areas used by animals. In addition, the farm reforested pastureland near a waterway to improve its riparian buffer through a partnership with the Alliance for the Chesapeake Bay. This is complemented by another effort with the Appalachian Stream Restoration and Wetland Studies to reconstruct more than 14,000 linear feet of streams and plant approximately 60,000 trees. These initiatives support overall water quality and water management in a large watershed that is home to millions of people.[24]

CASE STUDY

Trinkler Dairy Optimizes Water Quality and Reduces Water Usage by 36%

Trinkler Dairy in Northern California partnered with Sustainable Conservation, Netafirm and UC-Davis to evaluate and verify the economic viability of the dairy's irrigation system. The innovative manure sub-surface irrigation system monitors and tests impacts on GHG emissions, water savings and water quality. The project led to a 36% reduction in water usage, a reduction in nitrogen application and a five-fold decrease in nitrous oxide emissions. The water savings led to a net financial benefit. This type of research is necessary for understanding yields, environmental impacts and financial feasibility.

22 Rotz, C. A., Beegle, D., Bernard, J. K., Leytem, A., Feyereisen, G., Hagevoort, R., Harrison, J., Aksland, G., & Thoma, G. (2024). Fifty years of environmental progress for United States dairy farms. *Journal of Dairy Science, 107*(6), 3651–3668. https://www.journalofdairyscience.org/article/S0022-0302(24)00010-9/fulltext

23 Long Green Farms. Conservation efforts. https://www.longgreenfarms.com/conservation-and-sustainability

24 National Oceanic and Atmospheric Administration https://www.fisheries.noaa.gov/topic/chesapeake-bay

Processing Water Quality Practices

At the processing level, effluent treatment and discharge practices are highly regulated and more accessible to modification and oversight. Dairy processors implement policies, procedures or monitoring systems to ensure compliance with related standards and regulations.

Dairy wastewater treatment is a complex process resulting from a wide variety of product types such as milk, yogurt, cheese, cream, butter and ice cream. Treatment systems typically combine several stages—ranging from pre-screening and dissolved air flotation to more advanced technologies—tailored to the specific composition and flow rate of the wastewater. Due to the variability in production processes and wastewater characteristics, each processing facility requires a customized approach.

Proper characterization of the wastewater is essential to designing an effective and sustainable treatment system. A well-planned combination of technologies ensures compliance with environmental discharge regulations and supports water reuse strategies. Treated wastewater can be released into municipal sewage systems, discharged into the natural environment, or stored for external waste management—options that are heavily influenced by cost, local regulations, and environmental considerations.

Wastewater reuse represents the most sustainable option, although it demands more advanced infrastructure. When reclaimed properly, wastewater can support non-potable uses such as irrigation or equipment washing, reducing the demand on freshwater resources. Investing in efficient, site-specific treatment systems supports efforts to meet the industry's goal of improving water quality.

CASE STUDY

Cabot Creamery Utilizes Digester to Upcycle Byproduct[25]

In 2024, Cabot Creamery partnered with PurposeEnergy to launch an advanced anaerobic digester serving its cheese manufacturing facility and other nearby food processors in Middlebury, Vermont. This innovative system allows Cabot to convert cheesemaking byproducts—previously considered waste requiring careful disposal—into valuable resources. The digester transforms these byproducts into clean water, renewable electricity and natural fertilizer, supporting more sustainable and circular production practices.

CASE STUDY

Bongards Recognized for Excellence in Wastewater Operations[26]

Bongards Creameries is a dairy cooperative of hundreds of family-owned farms, committed to producing high-quality dairy products, while protecting natural resources for future generations. At the Perham plant, all wastewater is fully treated and reused to irrigate nearby agricultural fields, supporting both sustainability and local farming operations. The Minnesota Pollution Control Agency (MPCA) recognized Bongards for wastewater operational excellence at the Perham facility in 2022, 2023 and 2024, and at the Norwood facility in 2024. This recognition reflects Bongards' high environmental standards and commitment to supporting the long-term health of Minnesota's water systems.

PROGRESS TO 2050

Progress Reported by Stewardship Commitment Adopters

Since announcing the industry's goal to improve water quality in 2020, U.S. dairy cooperatives and processors that adopted the Stewardship Commitment have been reporting on water quality at processing levels, including discharge volume, as well as policies, programs and monitoring systems to ensure water quality compliance. Reported by adopters representing approximately 76% of U.S. milk production in 2024, the scope of this data covers the water quality efforts within their processing operations.

25 Cabot Creamery. Environmental highlights. https://cabotcreamery.com/blogs/community/impact-in-depth#environmental-highlights

26 Bongards. Committed to a greener future. https://www.bongards.com/about/sustainability/

INNOVATION CENTER FOR U.S. DAIRY®

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FULL U.S. DAIRY SUSTAINABILITY REPORT ▸

The full report is available at USDairy.com/InnovationCenter. We welcome your feedback on both this report and the U.S. dairy industry's sustainability efforts at InnovationCenter@USDairy.com.

Founded by Dairy Management Inc. (DMI), the Innovation Center for U.S. Dairy is an organization that works with leaders from across the dairy value chain to align on precompetitive priorities, drive progress and speak with one voice. DMI and its related organizations work to increase sales and demand for dairy through research, education and innovation, and to maintain confidence in dairy foods, farms and businesses. DMI manages the dairy checkoff which was created by American dairy farmers and is funded by the nation's dairy farm families and those that import dairy into the U.S. DMI, the Innovation Center for U.S. Dairy and its related organizations cannot and do not seek to influence governmental policy or action.

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