

The Dairy Industry and the 2 Percent Solution

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What's the carbon footprint of a glass of milk? It's more than a mere trivia question. Calculating, managing, and reducing the emissions of everyday products is a growing quest for companies across the business spectrum. But most products are multi-company affairs. So, it's one thing for a company to do this. It's altogether another thing to address climate change across an entire industry.

That's what's happening in the dairy industry, where a vast and complex web of players has come together to address their individual and collective climate -- um,

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This week, the industry announced it has completed a carbon footprint study that measured the life-cycle greenhouse gas emissions associated with producing milk in the United States. Researchers followed the journey of a gallon of milk across its entire life-cycle: growing crops to feed cows; producing milk and delivering it to processors; processing, packaging and distributing it to retailers; and consumer use and waste.

That's a big task, made bigger by the fact that milk is produced in all 50 U.S. states by hundreds of large and small dairy farmers. Putting the information together was no doubt a gargantuan task. Figuring out what to do about it is even harder.

But the exercise underscores both the complexity of industrial systems and the need for collaboration to measure environmental impacts, share best practices, and optimize the entire process.

The milk study was conducted by the Applied Sustainability Center at the University of Arkansas on behalf of the [Innovation Center for U.S. Dairy](#), a two-year-old trade group, and is being presented this week at the International Food LCA Conference. It involved 540 farms, more than 210,000 roundtrips of transportation, and 54 processing plants -- about one-fifth of the U.S. total.

It concluded that the U.S. dairy industry's greenhouse gas production is about 2 percent of total U.S. emissions. That's far less than others had estimated (a 2006 Food and Agriculture Organization study put the number at 18 percent), but it's still a significant contribution to global climate change -- roughly equal to that of the airline industry. The airline industry, for its part, [has pledged to halve its emissions](#) over the coming years, and other sectors are being pressed to account for and reduce their emissions. The milk industry has its own plans to squeeze carbon emissions out of its value chain -- 25 percent by 2020.

It's not simply a feel-good thing. The dairy industry has been feeling the heat. "Our customers -- major retailers and food channels -- want us to do better," Erin Fitzgerald, vice president of

sustainability for the innovation center, told me recently. "Our consumers are demanding this." Other players in the beverage industry, like [Coca-Cola](#) and [Pepsico](#), are making their own moves to address their carbon emissions. "Even the financial community is asking, 'Are you able to measure your impact and quantify it for the future?'" Beyond that, says Fitzgerald, "It makes good business sense. It's better to be self-directed than directed by others."

The study also underscores how much climate emissions depend on the practices and efficiency of every member of the complex industry web. For example, it found that regardless of a dairy operation's size, region, or other factors, management practices were the biggest factors affecting carbon emissions. There's a dairy farm's "feed conversion efficiency" -- based on how, how often, and what cows are fed -- that affects their yield of milk and production of manure. The more efficient you can feed the animals, the lower the enteric emissions -- that is, methane gas emitted from both ends of the cow (belching and farting, in plain speak), which represents 25 percent of the industry's emissions. The types of fertilizers used to grow feed crops like corn and alfalfa are another factor, 19 percent total emissions. Then there's manure management -- when and how it is applied to the land as a fertilizer, which affects methane emissions -- another 24 percent.

All told, nearly three-fourths of total emissions occur by the time the milk leaves the farm, before it goes to processing, packaging and distribution.

Consumers aren't left out of the equation. It turns out that fully 20 percent of milk is wasted by consumers -- presumably, disposed of after exceeding its "sell-by" date. Retailers, too, cry over spilled milk -- about 12 percent of milk waste occurs within store operations. Together, those account for 5 percent of industry emissions.

(You can download the executive summary of the report [here - PDF](#).)

Why bother with all this trivia? "In the political environment, we're entering a period of radical transparency," explains Fitzgerald. "We thought it was very important to measure our impacts and chart a path for our industry to follow."

The good news is that there's a lot that can be done at every step of the process: changing livestock feeds, reducing or optimizing crop fertilizers, adopting no-till farming methods, switching from annual to perennial crops, installing energy-producing digesters to capture methane produced during manure storage, making boilers (for pasteurizing) and refrigeration more efficient, optimizing delivery routes, and many others. Not to mention growing feedstocks for biofuels and installing solar panels and wind turbines on their land.

It's a seemingly endless list of solutions. Fitzgerald's group has compiled [a portfolio of 12 projects](#) with names like "Cow of the Future" (practices and technologies to reduce enteric emissions) and "Next Generation Clean in Place" (reduced-temperature milk processing).

There are policy implications, too. The federal government is considering offering carbon offsets and incentive payments to encourage rural landowners to pursue climate-friendly activities. State governments and others may also include ag as part of their efforts to reduce climate emissions.

There's great potential here for farmers. "There is a move to look at ecosystems services -- carbon trading, water trading, biodiversity trading," says Fitzgerald. All of which will require the industry to closely account for its climate impacts and benefits. "Take green spaces, for example. We have no idea of how much farms contribute to the value of green spaces. What would happen if farms were converted to urban landscapes? We're starting to quantify those environmental attributes."

Understanding those values could allow farmers some day to bottle up and sell not just milk, but also credits that result from being model climate citizens.

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