Dairy Processor Handbook

For use with the *U.S. Dairy Stewardship Commitment*

IDFA International Dairy Foods Association

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November 2021

Developed in Collaboration with Leading Dairy Processors

About this Resource

This *Processor Handbook* is a supplementary resource to the *Stewardship Commitment (Commitment)*. It is designed to support dairy cooperatives and processors that choose to voluntarily work across the industry and transparently report progress. This handbook provides measurement guidance for processors across topics essential to sustainable plant operations including: energy and greenhouse gas intensity, water use, resource recovery (waste management), workforce development, community contributions and product safety and quality.

This handbook was developed to aid dairy processors in credibly and consistently using the Commitment's processor metrics. It provides insights and guidance that processors can use to assess the sustainability of their operations, highlights responsible management practices and demonstrates progress using metrics defined in the Commitment.

Download the most up-to-date Commitment and Processor Handbook at: http://commitment.usdairy.com/#downloads

The Innovation Center for U.S. Dairy® (Innovation Center) in partnership with dairy farmers and businesses across the industry, intends to continually update the Commitment to reflect the latest scientific information and generally-accepted best practices. Through collaboration with the International Dairy Foods Association (IDFA) and dairy processors throughout the industry, the Handbook will be updated accordingly. It is the user's responsibility to refer to the most updated version of both the *Commitment* and *Processor Handbook*.

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NOTE: This document contains numerous hyperlinked tools and resources. It is, therefore, best viewed and used in PDF rather than print format.

U.S. Dairy STEWARDSHIP COMMITMENT

Innovation Center for U.S. Dairy

About the Stewardship Commitment

The U.S. Dairy Stewardship Commitment (Commitment) is a voluntary, stakeholder-aligned initiative to advance sustainability leadership across the dairy community. It aligns and quantifies industry action on important social responsibility areas and illustrates U.S. dairy's longstanding values of responsible production, community nourishment and continuous improvement.

More specifically, the Commitment outlines priority areas across the value chain, identifying relevant indicators and accompanying metrics to measure sustainability and social responsibility impact at the feed, farm and processor levels. For example, the Commitment provides processor metrics on impact areas such as energy, water, waste, community contributions and workforce development. Retailers and other dairy customers can use these common and consistent metrics to track their suppliers' sustainability and continuous improvement efforts and share this positive story with consumers.

Related to the Processor Handbook

The Commitment provides a high-level overview of the processor metrics defined in the Processor Handbook. The Processor Handbook is a supplementary resource to the Commitment that provides detailed measurement and reporting guidance for processors on each metric, aiding them in credibly and consistently using the Stewardship Commitment to demonstrate their dedication to responsible management practices. These metrics are underpinned with globally-recognized standards and voluntary, industry-aligned resources and reporting tools to advance continuous improvement and are developed through a transparent and collaborative multi-stakeholder process. Many of these tools and resources are referenced throughout the Processor Handbook to assist processors with measuring and reporting specific metrics.

To learn more about the U.S. Dairy Stewardship Commitment, including the benefits of adopting, opportunities to get engaged, and other available tools and resources, visit commitment.usdairy.com.

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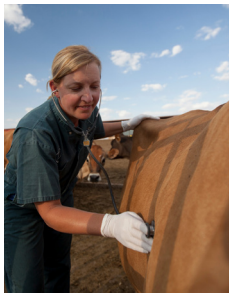
Stewardship Commitment Terms of Adoption

In 2018, the Innovation Center for U.S. Dairy (Innovation Center) celebrated its 10th anniversary. The milestone marks the dairy community's progress and commitment to ambitious goals and aspirations for years to come.

To catalyze this process, the Innovation Center Board of Directors approved voluntary, formal adoption terms for the Stewardship Commitment. Shaped by dairy farmers and representatives from more than 30 companies and industry organizations, these terms set the stage for dairy cooperatives and processors to demonstrate their alignment with U.S. dairy's shared values and metrics, and begin reporting on dairy's collective social, economic and environmental benefit. Companies that, in the exercise of their independent business judgment, decide to adopt the U.S. Dairy Stewardship Commitment, agree to the predetermined terms listed in the table below.

Cooperative and Processor Terms of Adoption*



Companies that, in the exercise of their independent business judgment, decide to adopt the U.S. Dairy Stewardship Commitment agree to the following:

1. Active membership in the Dairy Sustainability Alliance® and agreement to its terms of membership
2. Enrolled and in good standing with the National Dairy FARM (Farmers Assuring Responsible Management) Animal Care Program and/or sourcing 100 percent of milk from FARM enrolled farms.
3. Use of Stewardship Commitment Metrics for areas assessed by company as priorities. At a minimum this includes:
   - Dairy cooperatives and processors use the current version of the FARM program for Animal Care reporting
   - Dairy cooperatives use the FARM Environmental Stewardship Sampling Protocol to report on-farm GHG, energy and nutrient management metrics, OR have a time-bound goal in place to measure and report these metrics through this protocol
   - Dairy processors report using measurements consistent with methodologies outlined in the *Dairy Processor Handbook* (e.g., GHG Protocol, EPA Waste Hierarchy) through the Processor Stewardship Reporting Tool
   - Dairy processors commit to adopt and apply the voluntary U.S. Dairy Traceability Guidelines
   - Dairy cooperatives and processors use at least one Community Contributions metric
4. Engagement in Innovation Center volunteer opportunities to discuss and inform future indicators, metrics and reporting needs aimed at telling U.S. dairy's social responsibility story
   - Participate in Commitment-focused initiatives such as voluntary working groups, committees, stakeholder review, etc., and/or inform updates to relevant resources
   - For companies with priorities related to field and feed sustainability, engage with and/or support Innovation Center to advance consistency in field and feed reporting
5. Recognition of U.S. Stewardship Commitment adoption in dairy company's sustainability messaging, customer outreach and on website
6. Acknowledgement of U.S. Stewardship Commitment adoption and agreement with terms through an annual survey

Learn more at usdairy.com/sustainability/commitment.

**The Innovation Center for U.S. Dairy follows all applicable antitrust regulations. Each company is encouraged to exercise its own independent business judgment regarding whether or not to participate in this initiative and if so how. None of the suggested activities will take any action toward antitrust prohibited subject matters such as pricing, allocation of customers or markets, boycotts, or refusals to deal or any other matter that could be construed as a combination in restraint of trade.*

NOTE: *Cooperatives that process dairy products must meet both cooperative and processor adoption terms.

Terms of Adoption

Processors interested in adopting the Stewardship Commitment can learn more by downloading it at commitment.usdairy.com. For more information and to seek formal adoption, please contact Stewardship.Commitment@dairy.org.

In addition to adopting the terms outlined above, dairy cooperatives and processors that adopt the Stewardship Commitment must submit a written affirmation statement signed by a senior executive or CEO. Adopting companies affirm to be part of a movement to advance dairy's values, participate in the work that defines what the industry stands for and contribute to better public understanding of dairy's stewardship efforts.

Commitment Adoption Affirmation Statement

U.S. Dairy Stewardship Commitment – Company/Cooperative Affirmation

By adopting the U.S. Dairy Stewardship Commitment, <company/cooperative> proudly affirms U.S. dairy's long-standing values of responsible production and nourishing communities, emblematic of who we are as an industry and how we continually strive to improve.

As outlined specifically in the Terms of Adoption, < company/cooperative > commits to:

- Participate in U.S. dairy's pre-competitive, voluntary, transparent and multi-stakeholder input process to develop and agree upon important industry priorities, metrics and goals
- Implement industry-accepted best practices and use Stewardship Commitment Metrics to track and share progress, advancing the ability to aggregate and report on behalf of U.S. dairy as a whole
- Work to achieve stewardship goals that reflect values of < company/cooperative > and U.S. dairy, and to contribute to broader understanding of these efforts

By signing below, our organization affirms adoption of the Commitment.

Executive Signature:

*Executive Name:*_____

*Title:*_____

*Date:*_____

Commitment Metrics – Company and Aggregate Reporting

When the Stewardship Commitment was launched in 2018, no mechanism existed for dairy processors to report metrics defined in the Commitment in an efficient, secure and confidential way. To facilitate aggregated reporting of annual progress on behalf of U.S. dairy, the Innovation Center partnered with Harbor, an environmental consulting firm with expertise in refining accepted reporting programs to meet specific needs, to develop a processor reporting tool based on the Intelex Platform. Intelex is an online environmental, health, safety and quality (EHSQ) reporting platform used by over 1,300 companies worldwide.

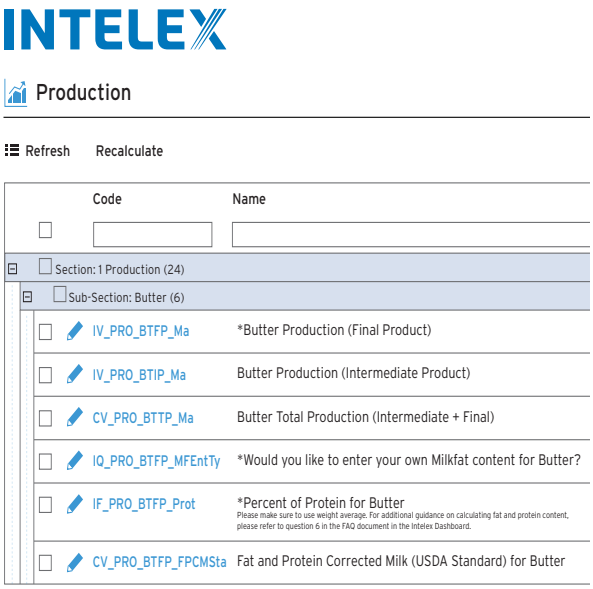
Overview

The Processor Stewardship Reporting Tool (Tool) provides a credible and cost-effective way to calculate and report on the processor Stewardship Commitment metrics on behalf of a respective company on a facility-by-facility basis, while simultaneously supporting U.S. dairy by contributing to aggregate data collection representative of the industry.

Reporting on Stewardship Commitment metrics through the Tool is a Stewardship Commitment Term of Adoption. Therefore, companies that voluntarily adopt the Stewardship Commitment agree to use this Tool.

Tool Governance & Funding

The Innovation Center Board of Directors created an LLC to financially support development and maintenance of the Processor Stewardship Reporting Tool. LLC members include processors that voluntarily adopt the Stewardship Commitment and financially contribute to the LLC.



Intelex platform software

Costs are allocated evenly across LLC members. There is a one-time introductory fee to join the LLC and undergo onboarding from Harbor that fluctuates between $10,000 and $15,000 annually based on necessary maintenance and updates. Subsequent annual fees are determined each year based on costs of administration, maintenance and supplementary resources. Subsequent fees are anticipated to be 50-80 percent of the year one onboarding fee, enabling access and use of the Intelex platform at a discounted rate compared to procuring an Intelex license independently. A five-person committee representative of LLC membership oversees the Processor Stewardship Reporting Tool LLC and the relationship with Harbor.

Characteristics of the Processor Stewardship Reporting Tool	
Confidential and Secure	Companies can access and review only their own data, not that of any other individual company. Innovation Center staff or representatives cannot access individual company data; only annual, anonymized, aggregated summaries.
Stakeholder Aligned	The Tool only requests data on the metrics established in the Stewardship Commitment.
Representative	Harbor produces an annual summary of aggregated processor Stewardship Commitment metrics for the Innovation Center that depicts the performance of the industry, not individual companies.
User-friendly	Harbor individually trains companies on using the Tool and provides a help desk to assist those in need.
Credible	Stewardship Commitment metrics are aligned to the extent possible with global reporting protocols and are consistent with customer reporting expectations.

Data Confidentiality

The Intelex Platform is structured so that individual users have specific security settings allowing them to see only the data, reports, dashboards and data entry forms for which Harbor grants access. Harbor is the sole system administrator, ensuring that the system remains secure, the data remains encrypted and no company has access to another company's data. Users cannot see which other companies are using the Tool, nor data or reports specific to any other processors. Users are not permitted to add users, or change security preferences within the Tool; these requests must be made of Harbor. To preserve confidentiality and security, data is aggregated and anonymized before sharing with the Innovation Center. The Innovation Center cannot access processor-specific data, reports or dashboards.

Location Setup and Onboarding

Each processor must complete an onboarding process to establish reporting sites within the Tool. During the onboarding process, LLC representatives attend virtual training sessions with Harbor to familiarize themselves with the Tool. Processors also complete a questionnaire that provides details on their company structure, employee information for Tool users and roles, and activities at each location. While each participating processor can choose to report on a company-wide level or at the facility level, all companies are encouraged to report at the facility level to achieve a more robust data set. The Tool is structured to customize metrics reporting to the unique situation at each facility based on processor responses to the questionnaire.

The SPI Module & Dashboards and Reports

Intelex has a Sustainability Performance Indicator (SPI) module, which is uniquely designed for tracking sustainability goals. The system is configured to allow users to input data in a variety of methods, convert all data to a common unit, and apply various factors for aggregation and comparison. The SPI module is ideal for reporting across the industry, as processors often have different record keeping methods, data reporting frequency, and data formatting. There are eight indicator sets built within the SPI module that mirror the sustainability areas covered in the Processor Handbook. Each indicator set contains a variety of indicators including input values, calculated values, factors, drop down selections, input text fields, and more. Indicator sets can be reported either monthly or annually, and all data is compiled into dashboards and reports.

Reports provide data details based on various criteria the user tells Intelex to use. For example, users can generate a monthly report that displays how much energy the site consumed compared to the same month last year. Dashboards are graphical representations of built reports. Dashboards allow real-time data visualization via graphs, charts, and other displays. While dashboards display data in real time, reports display data based on the snapshot in time that the report ran. Reports are stored within Intelex and can be regenerated any time.

The Tool was configured with a Member Dashboard and Aggregate Dashboard. The Member Dashboard displays data specific to the participating processor. Data displayed can be tailored to present company-wide totals, or drill down into any facility within the company. The Aggregate Dashboard is developed annually and shared with the Innovation Center. This dashboard displays industry-wide data that is anonymized and not separable or drillable to preserve confidentiality for each participating processor. The Aggregate Dashboard displays sustainability metrics similar to the Member Dashboard, and processors can view and compare industry-wide performance against their own company.

Ongoing Support

In addition to the Processor Handbook, Harbor offers additional support mechanisms for processors reporting into the Tool. Harbor pins a FAQ document to the Member Dashboard for all users to access. These FAQ's are updated annually, incorporating questions that arise frequently throughout each reporting cycle. If processors cannot find the answer to a question in the FAQ, Harbor provides a Help Desk function, where system users can submit questions directly to Harbor, and usually receive a response within 24 hours. Additionally, processors can work independently with Harbor (for an additional cost) to expand their company dashboard to measure and report on additional metrics beyond those within Stewardship Commitment.

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Chapter at a Glance

- Value of Measurement
- Key Reporting Criteria
- Metrics
- Calculating Output

Scope of the Metrics

The scope of the Stewardship Commitment's metrics includes all company-owned facilities. The metrics[1] are intended for use by processors of fluid milk and dairy products (e.g., cheese, yogurt and ice cream). Also, when in an organization's direct operational control, the energy, water and GHG metrics cover transportation of milk from the farm to the retail or service center. The greenhouse gas (GHG) intensity metric aligns with widely-accepted GHG accounting practices and measures — Scope 1 (direct GHG emissions) and Scope 2 (GHG emissions from consumption of purchased electricity, heat or steam) emissions as defined in the GHG Protocol established by the World Resources Institute and World Business Council for Sustainable Development.[2]

Dairy companies should explain the boundaries of the reported information in their sustainability communications. If the scope or boundary of the reported information differs from the scope of Stewardship Commitment metrics, the dairy company should explain the difference and rationale for deviation.

Value of Measurement

Measuring sustainability metrics at the dairy processor level supports identification of business risks, while also providing opportunities for cost reduction and income generation. Processors have opportunities to enhance their leadership in sustainability through the verification and communication of their sustainability performance to stakeholders. This also enhances the broader reputation of the dairy community.

The processor metrics are intended to communicate to a range of stakeholders, such as customers and engaged consumers, for the purposes of:

- Informing stakeholders about the most important aspects of sustainable plant and, where applicable, transportation operations.
- Inviting stakeholders to review, pilot and provide feedback on Commitment metrics so they can be refined or expanded as needed.
- Highlighting responsible management practices in key areas.
- Communicating about the dairy community's dedication to continuous improvement.

When communicating about a processor's sustainability performance, it is important to provide stakeholders with contextual information including management strategies, priorities and risks, and opportunities related to the environmental, social and economic topics identified in this handbook. This information enables stakeholders and reviewers to more fully understand the company and landscape in which it operates.

Key Reporting Criteria

When reporting the Commitment's processor metrics, please note the following:

- The metrics, in their current format, should not be used to benchmark dairy companies against each other. The metrics do not include standardized allocations of input, output and processes; therefore, comparisons could lead to false interpretation of the performance of companies.
- Metrics are company-wide and should be used to measure and report by aggregating the totals from all facilities. If any facilities are excluded from a metric, the company should document the boundaries and explain the rationale.
- When comparing the performance of plants within the same company, the methods of measurement used in each plant must be the same.
- Some companies may process or produce non-dairy products. In that case, the company should indicate whether non-dairy products are included in the measurement and reporting (see page 9 for more information).

[1] *Indicator and metric terms defined on page 1 of the Stewardship Commitment (http://commitment.usdairy.com)*
[2] *Information on the GHG Protocol on their website (http://ghgprotocol.org)*

Processor Metrics at a Glance

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Indicator	Metric	Page
Energy Intensity	• Total energy use (converted to MMBtu)/lb. of production output	10
Greenhouse Gas Intensity	• Total GHG emissions (tonnes CO_2e, Scope 1 and 2)/lb. of production output	15
Water Withdrawal	• Gallons of water withdrawn by source of water supply/lb. of production output	20
Water Efficiency	• Gallons of water withdrawn/lb. of production output	20
Water Recycling and Reuse	• [Gallons of water supplied that are captured for reuse within the facility + milk water captured for use]/lb. of production output	21
Milk Water Use	• Gallons of water captured from milk for use within facility/lb. of production output	23
Surplus Water	• [Discharge volume – water withdrawal]/lb. of production output	24
Water Discharge and Quality	• Do you have a policy, program or monitoring system that ensures routine compliance with industrial or storm water permit parameters? (Y/N)	26
Waste Diversion	• Percent by weight total waste stream (lbs.) diverted from landfill or incineration without recapturing energy	28
Throughput Efficiency	• Total waste stream/lb. of production output	31
Resource Utilization	• Food/organics donated or repurposed as animal feed and non-food recycled or composted (lbs.)/total waste stream (lbs.) • Food/organics repurposed for industrial uses or compost and non-food repurposed for energy recovery (lbs.)/total waste stream (lbs.) • Waste sent to landfill or incineration without recapturing energy (lbs.)/ total waste steam (lbs.)	31
Human Resources	• Total number of jobs supplied and full-time employees at end of year • Indirect and non-monetary benefits available to employees	34
Worker Safety	• Do you have leading indicators to measure/encourage safe worker behavior? Describe measurement systems employed, and how this has led to a safer workforce • Days of restricted work activity or job transfer (DART) rate • Explain why this has changed over time	36
Community Volunteering	• Volunteer activities performed by employees	42
Monetary and Product Donations	• Monetary and product donation activities	43
Educational Opportunities	• Describe community educational events per year and the total number of participants.	44
Product Contributions	• Servings of dairy donated or consistently supplied to a non-profit organization to feed food insecure people. (For Stewardship Commitment reporting, companies report in lbs.)	44
Food Safety	• Do you have validated, verifiable food safety programs and management systems in place? (Y/N) • Do you frequently reassess your food safety programs to ensure efficacy and to reflect new food safety tools/practices and ensure continuous improvement? (Y/N)	47
Traceability	• Commitment to voluntary U.S. Dairy Traceability Guidelines (Y/N)	47

Efficiency Metrics

Many of the processor Stewardship Commitment metrics are efficiency-based metrics, meaning they quantify environmental impact on a per-unit basis (i.e., energy use, MMBtu/lb. of production output). Reporting efficiency-based metrics is advantageous for several reasons:

- It avoids year-over-year differences that result from changes in production levels.
  - For example, a reduction in absolute metrics can be a result of lower production as opposed to a sustainability achievement
- Efficiency does not penalize companies for economic achievement. Calculating impacts based on efficiency allows companies to celebrate economic success while still setting goals to improve/reduce natural resource use and impacts.

Across all processor efficiency-based metrics, the same denominator applies (production output) to calculate each Commitment metric. Therefore, accounting for a company's total production output for the reporting period will streamline Stewardship Commitment measurement and reporting because the same number may be referred to when calculating efficiency metrics.

However, companies should still calculate production output and Commitment metrics at each facility, as this allows plant managers to benchmark performance at a site-level to identify opportunities for localized improvement. Then, efficiency metric calculations from all facilities may be aggregated for company-wide reporting.

To normalize various units of production output across dairy products, companies should report in pounds. Pounds of production output can include:

- Pounds of product (e.g., milk, cheese, butter)
- Pounds of representative product mix (can include both dairy and non-dairy products)

To establish the company's total pounds of production output for the reporting period, aggregate pounds of product produced from all processing facilities in the portfolio. Refer to this number when quantifying efficiency-based metrics throughout the Stewardship Commitment.

Double Counting

In some instances, a company may produce products that are sent to: 1) another production line within the facility, or 2) another company-owned facility for further processing. In this scenario, production output is susceptible to double-counting since the same product may cross between intermediary and final production.

For the purposes of calculating total company-wide production, only production mass ready for transfer outside of the company may be counted.

EXAMPLE: Facility A processes 1.2 million lbs. of fluid milk.

- 700,000 lbs. of milk are shipped to Facility B for further processing into cheese and whey
- 200,000 lbs. of milk go to the yogurt production line for use as an ingredient (where it is processed into 190,000 lbs. of yogurt)
- 300,000 lbs. of milk go directly to retail sales in grocery stores.

To avoid double counting within the facility, Facility A will only count products transferred outside of the facility for production (i.e., milk that is made into yogurt is only counted once as yogurt).

And, to avoid double counting within the company, each product is designated as either a "final" or an "intermediate" product when it is transferred outside a facility. All "intermediate" products will be excluded when aggregating total company-wide production.

An example of disaggregating final and intermediary product streams is included in Table 1, page 9. Companies, however, should substitute these values with their individual plants' output values.

Company-wide Production Output for Reporting Period: _____ lbs.

Dairy Company Production Reporting			
Company	Product	Product Type	Pounds Produced
Facility A	Fluid Milk	Final Product	300,000
Facility A	Fluid Milk	Intermediate Product to Facility B	700,000
Facility A	Fluid Milk	Ingredient	200,000
Facility A	Yogurt	Final Product	190,000
Facility B	Cheese	Final Product	450,000
Facility B	Whey	Final Product	55,000
		Facility A Production	1,000,000 lbs. Milk + 190,000 lbs. Yogurt = 1,190,000 total lbs.
		Facility B Production	450,000 lbs. Cheese + 55,000 lbs. Whey = 505,000 total lbs.
		Company Production	300,000 lbs. Fluid Milk + 190,000 lbs. Yogurt + 450,000 lbs. Cheese + 55,000 lbs. Whey = 995,000 total lbs.

(Table 1) *Product stream accounting table to disaggregate final and intermediary products and avoid double counting*

Allocation of Non-Dairy Products and Non-Dairy Components of Dairy Products

The Innovation Center utilizes the Processor Stewardship Reporting Tool to capture sustainability metrics for dairy product processing only. Therefore, when processors report data into the Processor Stewardship Reporting Tool, all non-dairy production and associated consumption of water/energy/waste, etc. must be accounted for before aggregation of industry-wide numbers.

Dairy processing facilities may process other non-dairy products within the same building. For example, a dairy processor may make milk and orange juice in the same building. All metrics reported will be apportioned between dairy and non-dairy production using a straight allocation method. This same methodology was used in the Life Cycle Analysis study of Fluid Milk. For this reason, LLC processors are asked to report all non-dairy production that occurs within the facility. If a processor reports 60 million pounds of milk and 40 million pounds of orange juice production at the same location, the Processor Stewardship Reporting Tool will calculate dairy metrics based on the percentage (60 percent in this example) of dairy production over total consumption. For example, a processor would report a total electricity bill of 10,000 MMBtu and 6,000 MMBtu would be included in the Aggregate Dashboard values.

Certain dairy products may also contain non-dairy components within their final products. For instance, granola may be included in yogurt. Similarly, Oreo® cookie crumbles may be included within ice cream. Processors should report only the weight of the dairy components within a dairy product for production reporting purposes.

Non-dairy components should be reported under non-dairy production only if they impacted sustainability metrics by consuming energy, water, etc. so the allocation method may be applied. For example, a facility that manufactured (mixed, cooked, processed, etc.) the granola added to the yogurt would report all granola made as non-dairy production. If the facility makes 10 million pounds of yogurt cups with granola, but 10 percent of the finished product was granola, the facility will report nine (9) million pounds of yogurt produced and one (1) million pounds of non-dairy production.

Non-dairy components that did not impact sustainability metrics should not be reported under production. For example, Oreo® cookie crumbles made off-site and shipped to the facility for adding to ice cream would not be reported under production. If a facility makes one (1) million pounds of Oreo® ice cream, but five (5) percent of the finished product is Oreo® cookies, the processor would report 950,000 pounds of ice cream produced. The 50,000 pounds of Oreo® cookie crumbles would not be reported under production.

Energy Use

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Chapter at a Glance

- Value of Measurement
- Scope of Metric
- Measure and Report
- Resources/Definitions

Why Measure Energy?

Energy is frequently managed as part of a sustainability program due to the environmental impacts, including GHG emissions of the production and use of energy sources. This metric reveals a dairy company's relative energy intensity, or the amount of energy used to produce a specific quantity of finished product.

Value of Measurement

Energy efficiency benefits a company by reducing carbon footprint, controlling energy costs and improving energy efficiency. Better energy management can also result in:

- Lowering operational costs and future dependency on nonrenewable energy sources.
- Reducing regulations and issues related to air pollution and GHG emissions.
- Easing vulnerability to energy price volatility.
- Enhancing reputation with buyers and consumers.

If tracked over time, energy management can demonstrate the result of proactive efforts to improve energy intensity by introducing new technologies and/or management practices.

Energy intensity, however, should be analyzed within the context of a company's operations and production outputs. An improved intensity ratio is not a direct indication of reduced GHG emissions and, therefore, should be analyzed with care.[3]

Scope of the Metric

The energy intensity metric includes measurement of direct and indirect energy reported as total energy use per pounds of production output. (Find definitions of direct and indirect energy at the end of the section).

Direct energy includes fuel combusted on-site to power processing operations, such as natural gas combusted in a boiler or diesel fuel used to power generators. Direct energy also includes electricity generated on-site, such as solar arrays or biogas digesters. If within the organization's direct operational control, energy use during transportation of milk from the farm to the processing plants and from processing plants to retail or service centers is also considered direct energy use.

Indirect energy is electricity, heating, cooling and steam purchased for consumption, but generated offsite. The most common example is electricity purchased from the power grid.

Indicator	Metric

Energy Intensity	• Total energy use (converted to MMBtu)/lb. of production output
	• Pounds of production output can include:
	  ○ Pounds of product (e.g., milk, cheese, butter)
	  ○ Pounds of representative product mix (can include both dairy and non-dairy products)

[3]*A. Brush, E. Masanet and E. Worrell. "Energy Efficiency Improvement and Cost Saving Opportunities for the Dairy Processing Industry," Environmental Energy Technologies Division, Ernest Orlando Lawrence Berkeley National Laboratory, sponsored by the U.S. Environmental Protection Agency (2011).*

Measure and Report – Energy Intensity

1

Measure direct energy use. Total energy use in MMBTUs per reporting year for the company should be calculated and reported using the following equation. Use the conversion factors in Table 2 to calculate MMBTUs.

	Direct Energy Purchased
+	Direct Energy Produced
–	Direct Energy Sold
	Total Direct Energy Consumption

Electricity Conversion Factors	
Electricity	MMBtu[5]
Kilowatt-hour	0.003412
Megawatt-hour	34.1214
Gigawatt-hour	3412.1

(Table 2) *Electricity conversion factors for MMBTUs*

NOTE: If a facility consumes electricity that is generated from a non-renewable or renewable fuel source, this consumption is accounted for only once under fuel consumption.[4]

2

Assess the amount of direct energy purchased. Calculate in MMBTUs the amount of direct energy purchased by the dairy company's operation and transportation. This includes nonrenewable and renewable energy sources. Energy conversions (Table 3, page 12) are provided to convert energy usage from mass/volume measurements to a common unit – MMBTUs.

- Direct nonrenewable energy sources include:
  - Coal
  - Natural gas (including compressed natural gas [CNG], liquefied natural gas [LNG])
  - Fuels from crude oil: gasoline, diesel, liquefied petroleum gas (LPG)
- Direct renewable energy sources include:
  - Biomass-based intermediate energy
  - Biofuels including biodiesel (measure B20 and B100 use separately) and ethanol (measure E85 and E10 use separately)
  - Geothermal
  - Hydrogen-based intermediate energy
  - Hydroelectric energy
  - Biogas digesters
  - Solar
  - Wind

3

Measure indirect energy use. Utility bills commonly use the units of kilowatt-hour (kWh) for electricity. Use the conversion factors in Table 2 to convert energy units to MMBtu. Facilities consuming other forms of indirect energy (district heating, cooling and steam) must determine the appropriate energy conversion, if bills are measured in volume rather than energy.

NOTE: Reporting facilities should take care to report indirect energy consumption in terms of site energy, not source energy. (Site energy does not include the impact of power plant efficiency, transmission losses, etc.).

[4]*GRI Standard 302-1:2.1.1*

continued on next page

Measure and Report – Energy Intensity

3

Energy Conversion			
Units	MMBtu[5]	Units	MMBtu[5]
Coal		Natural Gas	
Tonne (metric)	17.156	Therm	0.1000
Ton (short)	18.911	Cubic foot	0.001036
Biomass Gas		Biofuel (B10)[6]	
Cubic foot	0.000655	U.S. gallon	0.1273
Gasoline		Biofuel (B100)[6]	
U.S. gallon	0.120333	U.S. gallon	0.128
Diesel		Liquefied Petroleum Gas	
U.S. gallon	0.137381	U.S. gallon	0.092
Fuel Oil		Propane	
U.S. gallon	0.138500	U.S. gallon	0.091
Ethanol (E100)3		Ethanol (E85)[6]	
U.S. gallon	0.084	U.S. gallon	0.0818
[5]All conversion factors are derived from U.S. EIA Energy Conversion Calculations unless otherwise cited. [6]U.S. EPA, 2018			

(Table 3) *Energy conversion factors of common fuels*

4

Measure total energy used. Measure total energy as the sum of total direct and indirect energy use.

Total Energy Use		
Total Direct Energy Use (MMBTUs)	Total Indirect Energy Use (MMBTUs)	Total Energy Used (Direct + Indirect Energy Use, MMBTUs)

(Table 4) *Energy use accounting table*

5

Measure total annual production. Assess the total annual dairy production output (lbs. of product).

NOTE: This is the same number calculated in the "Calculating Production Output" section in Table 1, page 9

Measure and Report – Energy Intensity

6

Report the energy intensity. Report the total energy used in MMBTUs per pounds of production output. Indicate whether non-dairy products were included in the measurement and reporting.

Energy Intensity		
Total Direct Energy Use (MMBTUs)	Production Output (Lbs.)	Energy Intensity (MMBTUs/Lbs. Production Output)

(Table 5) *Energy intensity accounting table*

7

Optional measurement considerations. As another information point for the company, consider reporting energy consumption in MMBTUs both in total and broken down by renewable primary energy source.

8

Documentation. Energy use information can be obtained by reviewing invoices and measuring or calculating heat/fuel accounting or estimations.

- Amounts of MMBTUs can be taken directly from invoices and delivery notes or can be converted using energy units multiplied by values in the table for Energy Conversion Factors for Common Fuels (page 12).
- For a processing plant, annual dairy product production can be calculated from annual sales.

Resources

- EPA's ENERGY STAR® Performance Indicators, http://bit.ly/362JqXk: Provides industry-specific benchmarking tools to score a plant's energy performance and compare it to that of similar plants; includes resources and guidance.
- Energy Insights and Tips, http://bit.ly/2NcvBNs: Includes insights on energy saving tips for employees, executives and building managers.
- EPA Water & Energy Efficiency by Sectors, http://bit.ly/2PcgDJZ: Provides guidance on how both energy and water can be used more efficiently.
- EDF Climate Corps Handbook, http://bit.ly/2PhTs0X: Provides strategic energy management information for organizations.

continued on next page

Definitions

Direct energy	Direct energy includes energy generated onsite through fuel combustion and/or energy collecting/harvesting. It can be purchased, extracted (e.g., coal, natural gas, oil), harvested (e.g., biomass energy), collected (e.g., solar, wind) or brought into the plant's boundaries by other means. (Definition from Global Reporting Initiative [GRI] Guidelines and updated to make relevant to processors). Emissions from direct energy consumption are considered Scope 1 for GHG reporting purposes.
Renewable energy sources	Renewables are those energy sources capable of being replenished within a short time through ecological cycles (as opposed to resources such as minerals, metals, oil, gas and coal that do not renew in short time periods). Such energy sources include the sun, wind, moving water, organic plant and waste material (biomass), and the earth's heat (geothermal). (Definition from U.S. EPA 2011)
Indirect energy	Indirect energy is produced outside the company's boundary to supply energy for the organization's intermediate needs (e.g., electricity or heating and cooling). The most common example is fuel consumed outside the company's boundary in order to generate electricity to be used inside the company's boundary. Emissions from indirect energy consumption are considered Scope 2 for GHG reporting purposes.
Energy intensity	Intensity is energy consumption per unit of product. Rather than absolute metrics that report total energy use across operations, intensity metrics provide a normalization factor (e.g., units of milk production) to more accurately track progress over time. By dividing absolute impact by units of production, energy intensity metrics allow the dairy community to measure progress regardless of changes to production volume.

Greenhouse Gas Emissions

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Chapter at a Glance

- Value of Measurement
- Scope of Metric
- Measure and Report
- Resources/Definitions

Why Measure GHG Emissions?

Processing accounts for 2.50 lbs. of CO_2e of the 17.6 lbs. of CO_2e per gallon of milk consumed in the U.S., which represents approximately 14 percent of the complete cradle-to-grave footprint of U.S. milk production.[7] In order to understand the industry's progress toward its goal, emissions from dairy plants should be estimated and reported.

Value of Measurement

Measuring the carbon footprint of dairy processing can support dairy companies in identifying ways to reduce their GHG emissions and meet other environmental sustainability goals. In many cases, measuring GHG emissions can strengthen the economic sustainability of processing facilities.

Several practices that reduce GHG emissions, such as increasing energy efficiency, can provide cost savings to the processor. Finally, an emissions evaluation can be used to assess the reputational risks of a dairy company's association with GHG emissions.

Scope of the Metric

The intensity metric measures direct and indirect GHG emissions in line with Scope 1 (direct GHG) and Scope 2 (indirect GHG) accounting methodology from the GHG Protocol Corporate Standard (Corporate Standard).[8] In addition, the Innovation Center has developed comprehensive guidance in line with the Corporate Standard specific to U.S. dairy processors to aid in composing a GHG inventory (refer to Scope 1 & 2 GHG Inventory Guidance).

Scope 3 GHG emissions (arising from supply chain activities) are not covered by the GHG metric for dairy processors. The Innovation Center, however, developed guidance for processor-based Scope 3 emissions accounting based on the GHG Protocol Corporate Value Chain Standard (refer to Scope 3 GHG Inventory Guidance for U.S. Dairy Cooperatives and Processors). This addresses a need because many customers are requesting that their suppliers disclose comprehensive GHG inventories. GHG intensity reporting under this metric, though, is the total (Scope 1 + Scope 2) GHG emissions per pound of production output.

The GHG intensity metric can be used internally by dairy companies to compare the ratios over various time intervals. The metrics should be used to measure and report at the company level by aggregating the totals from all their facilities.

Indicator	Metric

GHG intensity	• Total GHG emissions (tonnes CO_2e, Scope 1 and 2)/lb. of production output
	• Pounds of production output can include:
	  ○ Pounds of product (e.g., milk, cheese, butter)
	  ○ Pounds of representative product mix (can include both dairy and non-dairy products)

[7] *Thoma et al., "Greenhouse Gas Emissions of Fluid Milk in the U.S." University of Arkansas, 2010, http://bit.ly/2a9Md64.*
[8] http://www.ghgprotocol.org.

Measure and Report – GHG Intensity

1

Measure GHG emissions. Processors should indicate the method used to estimate GHG emissions from the following choices:

- Direct measurement (e.g., continuous online GHG analyzers)
- Calculation based on site-specific data (e.g., fuel use)
- Calculation based on default data
- Estimations (If estimations are used due to a lack of default figures, indicate which basis figures were obtained.)

Processors may refer to the Innovation Center's Scope 1 & 2 GHG Inventory Guidance to compose a Scope 1 and 2 GHG inventory.

Assess Scope 1 (direct) GHG emissions from all sources owned or controlled by the processor including:

- On-site generation of electricity, heat or steam
- Fugitive refrigerant leaks from plant (not including ammonia)
- Biogenic methane and nitrous oxide emissions (e.g., from nitrogen-rich wastewater land spreading*)
- Fugitive refrigerant leaks from distribution fleet (if fleet is owned or controlled by processing company)
- Fuel use from transportation of milk from the farm to the processing facility (if transportation infrastructure is owned or controlled by processing company)
- Fuel use from transportation of dairy products to distribution or retailer facilities and transportation of materials, supplies and waste related to dairy products (if transportation infrastructure is owned or controlled by processing company)

Assess Scope 2 (indirect) GHG emissions from all sources including consumption of purchased electricity, heat or steam.

** Nitrogen-rich wastewater is wastewater containing a total nitrogen concentration of at least 2 mg/L, as defined by the EPA as the minimum acceptable range of nitrogen in wastewater.*

2

Measure total annual production. Assess the total annual volume of fluid milk processed and/or total annual product output.

NOTE: This is the same number calculated in the "Calculating Production Output" section in Table 1, page 9

3

Report GHG intensity. Once all Scope 1 and 2 GHG emission sources from all processing plants and owned or controlled fleets are measured, aggregate these values to calculate the company-wide absolute emission inventory. Then, report the GHG emissions (metric tonnes CO_2e, Scope 1 + Scope 2) per pounds of production output.

- Indicate whether non-dairy products were included in the measurement and reporting.

continued on next page

Measure and Report – GHG Intensity

3

Scope 1 & 2 GHG Emissions			
Scope 1 Sources		Scope 2 Sources	
On-site generation of electricity, heat or steam		Purchased electricity	
Fugitive refrigerant leaks from plant			
Fuel use from transportation of milk from farm to processing plant, or product from processing plant to processing plant (if owned/controlled)		Purchased heat	
Fuel use from transportation of dairy products to distribution/retail (if owned/controlled)		Purchased steam	
Fugitive refrigerant leaks from distribution fleet (if owned/controlled)			
Biogenic methane and nitrous oxide			
Total (tonnes CO_2e)		**Total (tonnes CO_2e)**	

(Table 6) *Scope 1 & 2 GHG emissions source accounting table. Use to aggregate emissions at each processing plant and from transportation fleets (if applicable).*

Company-wide GHG Emission Intensity				
Company-wide Scope 1 Emissions (tonnes CO_2e)	Company-wide Scope 2 Emissions (tonnes CO_2e)	Total Scope 1 & 2 Footprint (Company-wide Scope 1 + Company-wide Scope 2, tonnes CO_2e)	Company-wide Production Output (lbs.)	GHG Emissions/ Production Output (tonnes CO_2e/lbs.)

(Table 7) *Emissions intensity calculation table.*

Resources

- Scope 1 & 2 GHG Inventory Guidance for U.S. Dairy Processors, https://bit.ly/33UC60F: Industry-specific GHG accounting and reporting guidance based on the GHG Protocol Corporate Standard.
- Scope 3 GHG Inventory Guidance for U.S. Dairy Processors, https://bit.ly/2VSbucI: Industry-specific supply chain GHG accounting and reporting guidance based on the GHG Protocol Corporate Value Chain Standard.
- The CDP, https://www.cdp.net/en: Works with some of the largest corporations worldwide to ensure that an effective carbon emissions reduction strategy is made integral to their business.
- EPA Center for Corporate Climate Leadership, http://bit.ly/2oeSRSL: Includes comprehensive sector-specific GHG inventory guidance, emission factors and reporting tools.
- EPA's GHG Equivalencies Calculator, http://bit.ly/3647hGb: Translates energy or GHG emissions data into concrete equivalent impacts.
- The GHG Protocol Corporate Standard, http://bit.ly/2N8VhuA: Provides requirements and guidance for companies and other organizations preparing a corporate-level GHG emissions inventory.
- The GHG Protocol Corporate Value Chain Standard, http://bit.ly/31DIlgZ: Provides requirements and guidance for companies and other organizations preparing a Scope 3 value chain GHG emissions inventory.
- The Climate Registry, http://bit.ly/2pIjLTj: Has voluntary and compliance GHG reporting programs and assists organizations in measuring, verifying and reporting emissions.

Definitions

Scope 1 direct emissions	Direct emissions are from sources that are owned or controlled by the dairy processor. For example, direct emissions related to combustion would arise from burning fuel for energy within the processor's operational boundaries.
Scope 2 indirect emissions	Scope 2 indirect emissions result from processor activities but are generated at sources owned or controlled by other businesses. In this context, indirect emissions refer to GHG emissions from the generation of electricity, heat or steam that is imported and consumed by the processor.
Scope 3 indirect emissions	Scope 3 indirect emissions are all other indirect emissions not accounted for in Scope 2. These emissions occur upstream and downstream in processors' supply chains. For example, the Scope 1 and 2 emissions generated from producing a certain quantity of fluid milk on-farm are equivalent to a processor's scope 3 emissions if it purchases that fluid milk.
Carbon dioxide equivalent (CO_2e)	Carbon dioxide equivalent is the measure used to compare the emissions from various GHGs based on their global warming potential (GWP). CO_2e is derived by multiplying the tons of the gas by the associated GWP, assuming a 100-year time frame. • GWP values from the IPCC Fifth Assessment Report • EPA GWP calculation explanation
GHG intensity	GHG intensity is emissions per unit of product. Rather than absolute metrics that report total GHG emissions across operations, intensity metrics provide a normalization factor (e.g., lbs. of milk production) to more accurately track progress over time. By dividing absolute impact by units of production, GHG intensity metrics allow the dairy community to measure progress regardless of changes to production volume.

Water Management

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Chapter at a Glance

- Value of Measurement
- Scope of Metrics
- Measure and Report
- Resources

Why Measure Water?

Water is a finite resource under increasing pressure from human activities as well as changing climate. As such, water management is increasingly important and includes a variety of practices to reduce water withdrawal and negative impacts on quality.

The systematic effort to monitor and improve the efficient use of water is directly linked to water withdrawal costs. Total water withdrawal can indicate the level of risk posed by disruptions to supplies or cost increases. Water scarcity and drought can impact production processes that rely on large volumes of water. In regions where water sources are highly restricted due to availability and/or regulations on withdrawals, the company's withdrawal pattern can influence relations with other stakeholders.

Value of Measurement

Measuring efficiency allows for comparison of water use per unit of output over time. It is a key component of a water management plan. Analyzing water efficiency data can identify opportunities for improved production processes and cost savings.

A program, policy and/or monitoring system to maintain compliance with water permits is necessary to assess risks and opportunities for improvement. Finally, a system to monitor and improve the efficient discharge to a water source or land source is directly linked to water disposal costs.

Reporting the total volume of water recycled contributes to an understanding of the overall scale of avoided impacts and risks associated with the company's water use. The total recycled volume indicates the company's relative size and importance as a recycler of water. It also provides a baseline figure for other calculations related to recycling efficiency and water reuse.

Scope of the Metrics

The metrics cover the direct water withdrawal and quality impacts of dairy processing plants. They should be used to measure and report at the company level, aggregating the totals from all facilities.

Water efficiency is one intensity metric that can be used by dairy companies to compare the ratios and demonstrate improvements over time. Due to the breadth of dairy products and manufacturing processes, water efficiency measures should not be used to benchmark one company against another.

Priority	Indicator	Metric
Water quantity	Water withdrawal	• Gallons of water withdrawn by source of water supply/lb. of production output. Pounds of production output can include: o Pound of product (e.g., milk, cheese, butter) o Pound of representative product mix (can include both dairy and non-dairy products)
	Water efficiency	• Gallons of water withdrawn/lb. of production output
	Water recycling and reuse	• [Gallons of water supplied that are captured for reuse within the facility + milk water captured for use]/lb. of production output
	Milk water use	• Gallons of water captured from milk for use within facility/lb. of production output
	Surplus water	• [Discharge volume – water withdrawn]/lb. of production output
Water quality	Water discharge and quality	• Do you have a policy, program or monitoring system that ensures routine compliance with industrial or storm water permit parameters? (Y/N)

Measure and Report – Water Withdrawal

1

Measure water withdrawal. Assess the total volume (in gallons) of water withdrawn from each water source that was either withdrawan directly or provided through intermediaries such as water utilities. This quantity includes the abstraction of cooling water.

- Total water withdrawn is the sum of all water withdrawal within the boundaries of the reporting organization from all sources (including surface water, ground water, collected rainwater and municipal water supply) for any application over the course of the reporting period.
- If a municipality is involved, information about the supply source will need to be collected and included in the water accounting. Water provided by a municipality, but not listed elsewhere in the reported water withdrawal as being derived from a specific source, remains classified as the municipal water supply.

2

Report water withdrawal. Report the total volume of water withdrawal in gallons/lb. of production output for each of the company's sources. Pounds of production output can include:

- Pounds of product (e.g., milk, cheese, butter)
- Pounds of representative product mix (can include both dairy and non-dairy products)

Gallons of water withdrawn is measured as the volume of water brought into the plant's boundaries and excludes recycled water within the system. Indicate whether non-dairy products were included in the measurement and reporting. For each facility, aggregate water withdrawal from each source and divide this total by production output. Then, aggregate water withdrawal by source across all facilities. Refer to the Water Withdrawal Table 8 below.

Water Withdrawal			
Water Source	Gallons of water withdrawn	Lb. of production output	Water withdrawal by source (Gallons/Lbs.)
Surface water, including water from wetlands, rivers, lakes and oceans			
Ground water			
Rainwater collected directly and stored by the reporting organization (includes snow and ice melt water)			
Wastewater from another organization			
Municipal water supplies or other water utilities (and source)			
Totals			

(Table 8) *Water withdrawal based on source to be reported in gallons extracted/lbs. of production output. Divide gallons of water from each source by lbs. of production output to calculate water withdrawal by source.*

Measure and Report – Water Efficiency

1

Measure water efficiency. Assess the total gallons of water withdrawn for each facility by referring to the bottom row of the second column of the Water Withdrawal Table 8 (above). Aggregating this value across facilities yields all water withdrawn by the company during the reporting period.

Measure and Report – Water Efficiency

2

Report water efficiency. Report water efficiency in gallons (aggregate total of all sources) per lbs. of production output. Pounds of production output can include:

- Pounds of product (e.g., milk, cheese, butter)
- Pounds of representative product mix (can include both dairy and non-dairy products)

Gallons of water withdrawn is measured as the volume of water brought into the plant's boundaries and excludes recycled water within the system. Indicate whether non-dairy products were included in the measurement and reporting.

Water Efficiency		
Gallons of Water Withdrawn	Lbs. of Production Output	Water Efficiency (Gal. Consumed/Lbs. Pro. Output)

(Table 9) *Water efficiency to be reported in total gallons of water withdrawn per lbs. of production output.*

Measure and Report – Water Recycling and Reuse

1

Measure water recycling and reuse. Recycling/reuse is the act of processing used water/wastewater through another cycle before discharge to final treatment and/or discharge to the environment.

2

Calculate the volume. Calculate the volume (in gallons) of water supplied that is captured for reuse within the facility.

- For example, if the company has a production cycle that requires 200 gallons of water per cycle, the company withdraws 200 gallons of water for one production process cycle and then reuses it for an additional three cycles. The total volume of water recycled/reused for that process is 600 gallons.
- This indicator measures both water that was treated prior to reuse and water that was not treated prior to reuse. Gray water (i.e., collected rainwater and wastewater generated by non-septic water collection) is included.

Next, if applicable, calculate the volume (in gallons) of water extracted from evaporative/condensing processes (condensate of whey) that was reused or recycled during the reporting period. Guidance on calculating this value is included in the 'Milk Water' section (Page 23).

3

Report water recycling and reuse. Processors can report this indicator to convey their water conservation and efficiency management practices. Report the total volume of water recycled/reused within each facility. Then sum the total water recycled across all facilities and divide by total production output for the company in pounds (Table 10, page 22).

continued on next page

Measure and Report – Water Recycling and Reuse

3

Water Recycling and Reuse			
Water Recycling Category	Water Recycled (Gallons)	Lbs. of Production Output	Water Recycling Ratio (Total Water Recycled/ Lbs. of Production Output)
Water supplied that is captured for reuse within the facility			
Milk water (condensate of whey) extracted for reuse/recycling in same facility			
Total water recycled (water captured for reuse + milk water)			
Totals			

(Table 10) *Report water recycling and reuse in gallons per facility divided by pounds of production output.*

4

Optional measurement considerations. Certain organizations may find reporting water recycling and reuse as a percentage of total water consumption as valuable to their internal business and sustainability operations. Therefore, organizations have the option to report this metric in the following format as well.

Calculating Percentage of Water Recycled/Reused		
Total Water Recycled/ Reused (Gal.)	Total Water Withdrawn (Gal.)	Percent Water Recycled/Reused (Recycled Water/Total Water Withdrawal)

(Table 11) *Values needed to calculate total recycled/reused water as a percentage. Divide gallons of water recycled/reused by gallons of total water consumed to yield percentage.*

5

Documentation. Information can be obtained from regulatory permits as well as water meters and bills. If water meters, bills or reference data do not exist, use the company's own estimate based on an audit or inventory.

Measure and Report – Milk Water Use

1

Measure milk water use. Milk water, sometimes referred to as "COW water," is the remaining water after milk has evaporated or concentrated through multi-effect evaporation or process reverse osmosis.[9] This water can be recovered, cleaned and reused within a processing plant.

Processors have several methods by which measuring milk water retention and reuse is possible:

- Mathematical estimation based on total volume of milk processed
- Meters on condensers and/or evaporators
- Separate milk water tanks

This guidance recommends measuring milk water use with either a segregated holding tank or volumetric meters installed on condensers/evaporators. (These methods yield the most accurate and granular measurements.) If an organization lacks the physical or financial resources to implement this infrastructure, estimate milk water by using Table 12 (below).

Milk Water Recovery Estimation		
Volume of Milk Processed (Gal.)	Milk Water Recovery Factor	Estimated Milk Water Recovered in Gal. (Processed Milk Volume x Recovery Factor)
	0.87	

(Table 12) *Activity data needed to calculate an estimate of milk water recovery if processing plant lacks sufficient measurement infrastructure*

The residual water from condensing/evaporating milk represents approximately 87 percent of the total volume of milk processed, as defined by the International Dairy Federation (IDF). Therefore, 0.87 can be used as a coefficient to estimate the volume of milk water extracted assuming that all of it is used within the same facility. Although a significant quantity of milk water can be recovered for reuse, the dairy industry must abide by the Federal Grade A Pasteurized Milk Ordinance as a guideline to determine how this water can be reused. Reusing cow water for potable purposes is difficult because complying with the standards necessary to achieve this stringent water quality criteria is not easy. Also, the financial investment necessary to meet the criteria is significant.

However, milk water can be reused for non-potable processes in the plant, such as boiler feedwater, cooling water makeup, CIP pre-rinse, cleaning solutions makeup water, case washing and pump seals.[9]

2

Report milk water use. Report how much milk water the organization recovered, treated and reused within the reporting period. It is important to note there are restrictions of where and how milk water can be used based on characteristics such as turbidity, chemical oxygen demand and biological content. Therefore, if a portion of milk water is recovered, but not fit for internal process use, it should not be disclosed in this indicator.

Once milk water use is calculated for each processing plant, aggregate values for all plants.

Milk Water Use		
Water Captured from Milk for Use Within Facility (Gal.)	Production Output (Lbs.)	Milk Water Use (Gal./Lbs.)

(Table 13) *Activity data needed to report milk water use in reporting period*

[9] *Recycle Cow Water Best Practices. Ecolab, 2018.*

Measure and Report – Surplus Water

1

Assess surplus water. Dairy processors may often have excess water after processing operations are conducted. As a result, this water can be recovered, treated and discharged beneficially.

The term "discharged beneficially" is susceptible to many interpretations depending on local watershed geography and state laws. However, the EPA's National Pollutant Discharge Elimination System (NPDES)[10] dictates water treatment regulations for discharged water based on a permit system. Therefore, so long as a company has the appropriate discharge permits, discharging water into local surface waterways and groundwater wells is considered beneficial since it contributes to numerous environmental benefits.

- It is important to note that discharging excess water for land or surface water application is regulated by states and regional EPA offices.
- These agencies set specific agronomic rates by which wastewater discharge must abide, and the rates vary by region, watershed and industry.
- Therefore, it is important to check the permitted effluent discharge guidelines at your organization's facilities to ensure compliance.
- Watershed-based NPDES discharge permits specify what the water quality limits are.
    - Dairy processing effluent guidelines can be found in the EPA Dairy Products Processing Effluent Guidelines.
    - Watershed-based discharge permit guidelines can be found on the EPA Watershed-based Permitting webpage.

Furthermore, the EPA defines other non-environmental beneficial uses of discharged water in addition to surface water discharge and groundwater recharge. Specifically, applications of recycled discharge water include:[11]

- Agriculture
- Public parks
- Golf course irrigation
- Processing water for mills, plants
- Landscape
- Toilet flushing
- Dust control
- Construction activities
- Concrete mixing
- Artificial lakes
- Cooling water for power plants and oil refineries

Surplus water is similar to milk water. However, the key difference originates at the point at which the water volume is measured. Milk water is measured *after* it has been separated from milk solids, but *before* it is used for internal processes such as boiler feedwater or cooling.

Some milk water is lost as evaporation, or condensation when it is used in internal operations, so the quantity of resulting water after these operations is likely less. Surplus water is measured *after* it has been used in internal plant operations and treated, but *before* it is discharged into the environment. This is done to avoid accounting for water that is likely lost in dairy processing.

NOTE: Deep well injection and evaporation basins are not considered beneficial uses of discharge water. These methods do not directly contribute to water recovered into the local water supply.

[10] *EPA – Summary of the Clean Water Act*
[11] *EPA - Water Reuse and Recycling: Community and Environmental Benefits*

Measure and Report – Surplus Water

2

Report surplus water. To accurately quantify the excess water discharged to beneficial use, facility-level activity data must first be collected:

- Volume of water discharged to each source
- Volume of water withdrawn for facility processing activities

Excess Water Discharge Volume		
Volume of Water Withdrawn in Facility (Gal.):	Processing Facility Location:	
	Volume of water discharged to agriculture	
	Volume of water discharged to landscape	
	Volume of water discharged to public parks	
Volume of Water Discharged to Publicly Owned Treatment Works (Gal.):	Volume of water discharged to golf course irrigation	
	Volume of water discharged to cooling	
	Volume of water discharged to processing	
	Volume of water discharged to municipal toilet water supply	
	Volume of water discharged to dust control	
	Volume of water discharged to construction activities	
	Volume of water discharged to concrete mixing	
	Volume of water discharged to artificial lakes	
	Volume of water discharged to surface water bodies	
	Volume of water discharged to replenish groundwater aquifers	
	Total discharge volume (gallons)	

Once these values are obtained for every facility, aggregate the volume of water withdrawn for all facilities. Then, aggregate the total discharge volume across all facilities. Finally, take the difference between total water discharged and total water withdrawn.

Total Discharge Volume Across all Facilities
Σ Facility Total Discharge Volume — Σ Facility Total Water Volume Withdrawn

(Table 14) *Wastewater discharge accounting table for each processing facility in an organization's portfolio*

Surplus Water Calculation				
Company-wide Total Discharge Volume (Gal.)	Company-wide Total Water Withdrawal (Gal.)	Difference	Production Output (Lbs.)	Surplus Water (Gal./ Lbs. Production Output)

(Table 15) *Calculation table for quantifying surplus water during reporting period*

Measure and Report – Water Discharge and Quality

1. **Determine all industrial or storm water permits relevant to your facility**. Verify all permits have an associated policy, program or monitoring system to manage compliance.

2. **Report**. Report whether your organization has a monitoring system to manage compliance.

Resources

- National Standards for Wastewater Discharges to Surface Waters and Publicly Owned Treatment Works for Dairy Products Processing, http://bit.ly/2dugHQg: Many states and localities require processors to comply with a permitting process.
- The Water Footprint Network, http://waterfootprint.org/en: Works across sectors to share knowledge and insights for water stewardship and resource efficiency.
- ISO 14046, http://bit.ly/2eH2HpB: An international standard which helps organizations identify and define their water footprint.
- The World Resources Institute Aqueduct Measuring and Mapping Water Risk Tool, http://bit.ly/1XLTIE9: Provides comprehensive global mapping to understand water risks and opportunities worldwide.
- Recycling Cow Water Best Practices, https://bit.ly/36YO6hw: Ecolab resource document outlining best uses and practices for recycled milk water.
- EPA – About NPDES, https://bit.ly/2KmfAUx: General information on the National Pollutant Discharge Elimination System created under the Clean Water Act.
- EPA - Watershed-based Permitting, https://bit.ly/2NNRIkw: Information and agronomic limits for wastewater discharging based on watershed.
- EPA – Industrial Wastewater, https://bit.ly/2KohcOh: Information on wastewater discharging for industrial processes.
- EPA – Dairy Processing Effluent Guidelines, https://bit.ly/2Kmofqa: Industry-specific discharge guidelines for wastewater.

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Chapter at a Glance

- Value of Measurement
- Scope of Metrics
- Measure and Report
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Why Measure Resource Recovery?

Resource recovery options include recycled packaging and repurposed organics/food waste. Of these, food waste is a priority issue for agricultural products. In the United States, one in three calories is wasted and 40 percent of food goes uneaten.[12] At the same time, one out of every six Americans lacks a secure supply of food.[13]

Organizations can donate safe and nutritious food to a food bank or food rescue organization. Both reduce food sent to landfills and feed those in need. By donating edible food to food banks or food rescue organizations, businesses can claim tax benefits.

The case for resource recovery comes from dairy buyers and consumers. Many dairy customers, as well, are calling for suppliers to reduce overall waste. Furthermore, current and emerging legislation strengthens the case for resource recovery even more. Through tracking and measuring progress in waste reduction and resource recovery, dairy processors can enhance their reputation with customers and consumers, while reducing risks from environmental regulations, fines and fees.

Value of Measurement

Optimizing resource recovery is a business imperative. It reduces the volume of materials consumed and increases efficiencies directly related to lower operational costs. Also, repurposed material, such as recyclable products, can result in an added source of revenue.

In addition to revenue generation and cost savings, optimizing resource recovery generates societal and environmental benefits essential to a sustainable food system. Faced with a growing population and a finite resource base, there is a clear need to do more with less. Furthermore, food waste is a significant contributor to GHG emissions and comprises nearly 20 percent of what is hauled to landfills.[12]

The Scope of Metrics

The scope of resource recovery includes all waste or byproducts produced from a processing facility during normal manufacturing processes (except for "out of scope" topics). A facility includes the manufacturing building and any office space that is located within the building footprint. The facility will communicate progress for the manufacturing of any product (not just dairy).

Materials in scope include (but are not limited to) paper, plastics, organic/food waste, cardboard, used oil, metals, hazardous waste, wood, biogas and electronics. Sludge is within the scope of resource recovery metrics and is defined as liquid waste that cannot be discharged as wastewater and must be transported off-site for further treatment and processing. Wastewater is otherwise out of scope as this topic is addressed separately within the processor water metrics (page 19).

Out of scope issues include:

- Consumer and customer packaging waste outside of the manufacturing process
- Wastewater (i.e., treated or untreated water that can be discharged on-site)
- Transportation waste (e.g., tires from fleet trucks)
- Construction and demolition waste
- One-time incidents such as natural disasters and other emergency situations

The boundaries of the metrics are the point where a recycling, treatment or disposal facility accepts the facility's waste. This means, for example, that waste generated/landfilled by the recycling process for cardboard and plastic, or the ash from incineration facilities, is not considered to be within the scope of a facility's waste. This is a globally accepted approach and, if not followed, it would be virtually impossible to ever achieve zero manufacturing waste to landfill.

The metrics do not cover food donations as a stand-alone metric. This metric is linked to two other metrics: monetary and product donations and product contributions (page 42).

[12] *NRDC Food Waste, http://on.nrdc.org/2dJD6g9*
[13] *Sustainable Management of Food Basics, U.S. Environmental Protection Agency, http://bit.ly/2eccbFN*

Indicator	Metric
Waste diversion	• Percent by weight total waste stream (lbs.) diverted from landfill or incineration without recapturing energy
Throughput efficiency	• Total waste stream/lbs. of production output
Resource utilization	• Food/organics donated or repurposed as animal feed and non-food recycled or composted (lbs.)/total waste stream (lbs.) • Food/organics repurposed for industrial uses or compost and non-food repurposed for energy recovery (lbs.)/total waste stream (lbs.) • Waste sent to landfill or incineration without recapturing energy (lbs.)/total waste steam (lbs.)

Measure and Report – Waste Diversion

1

Measure waste streams using established hierarchies. The first step to reducing waste is to measure and track the amount, type and reason for its generation. A variety of tools exist to conduct waste audits, from simple waste logs to commercial measurement and tracking software and equipment. Knowing how much and why waste is generated helps a business create targeted waste prevention strategies. This baseline also serves as a marker for measuring diversion rates and changes in spending.

The EPA's widely adopted Waste Management and Food Recovery Hierarchies provide guidance to prioritize actions to prevent and reduce waste. Each tier of these hierarchies focuses on different waste management strategies.

- **The Food Recovery Hierarchy** (Figure 1, page 29) refers to organic materials, such as whey solids, from the dairy processing stream that have the potential to be fed to either humans or animals, whether they actually are used for such purposes.
- **The Waste Management Hierarchy** (Figure 2, page 29) refers to waste that cannot be fed to either humans or animals.

The top levels of the hierarchy are the best ways to prevent and divert waste because they create the most benefits for the environment, society and the economy. The EPA hierarchies define source reduction or preventing waste before it is ever created as the most desirable approach. Benefits include reducing disposal costs, over-purchasing and resources associated with food and raw material production.

While preventing waste generation is preferred, the EPA food recovery hierarchy provides guidance on how best to repurpose the inevitable waste that does occur. Feeding hungry people is the best use of surplus food. Dairy processors can play leadership roles in this area by donating safe, wholesome and edible dairy products.

continued on next page

Measure and Report – Waste Diversion

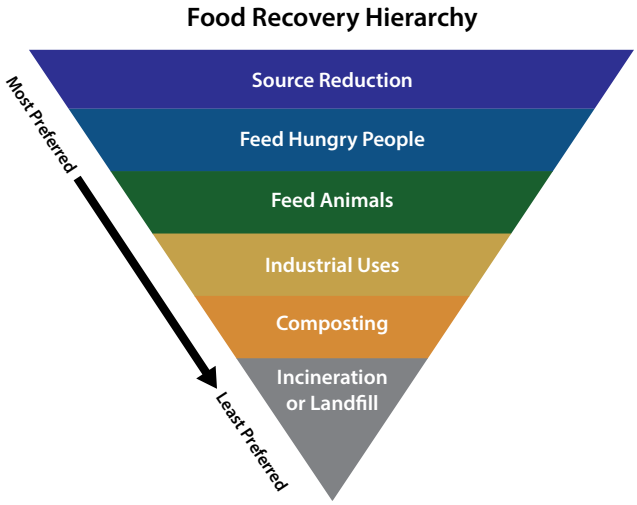
1

Should surplus food or organic material be unsuitable for human use, feeding animals is the next best diversion strategy. For dairy processors, sending organic waste back to farms as animal feed helps close the loop for sustainable food systems and nutrient cycling. Also, this approach can reduce disposal costs. Federal laws and regulations, however, govern the use of dairy products for livestock feed. State-by-state regulations also vary in the type of foods that can be used as livestock feed or feed supplements.

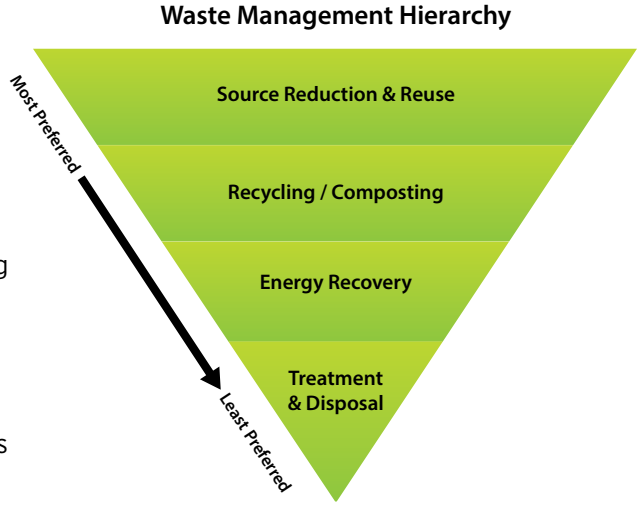
Industrial uses are next in the Food Recovery Hierarchy. This includes rendering fats, oils and greases and converting organic waste into biofuel. Recovering food scraps for anaerobic digestion is also considered an industrial use.

Should more desirable re-purposing alternatives be unavailable, composting organic material as a soil amendment remains a preferred approach to the landfill. Benefits of composting include reducing the need for chemical fertilizers, opportunities to turn waste into a marketable commodity and the avoidance of methane and leachate formulation in landfills. However, there are regulations for composting facilities and the feasibility of composting at a commercial level will vary state-by-state. Land application of food waste as a soil amendment is also applicable when responsibly managed in compliance with applicable laws and regulations.

The Waste Management Hierarchy (Figure 2) provides similar guidance for prioritization of non-food waste. Recycling is the process of collecting waste items, sorting and processing them into raw materials and, finally, remanufacturing them into new products. Energy recovery is the conversion of waste into usable heat, electricity or fuel.



(Figure 1) *Food Recovery Hierarchy in order of most preferred (top) to least preferred (bottom).*



(Figure 2) *Waste Management Hierarchy in order of most preferred (top) to least preferred (bottom)*

NOTE REGARDING WASTEWATER SLUDGE: Wastewater sludge generated from dairy processing operations is considered non-food waste, since it is inedible organic material. Therefore, processors should follow the EPA Waste Management Hierarchy (Figure 2) when accounting for wastewater sludge applications in waste diversion reporting. Various applications of wastewater sludge are classified into the following categories:

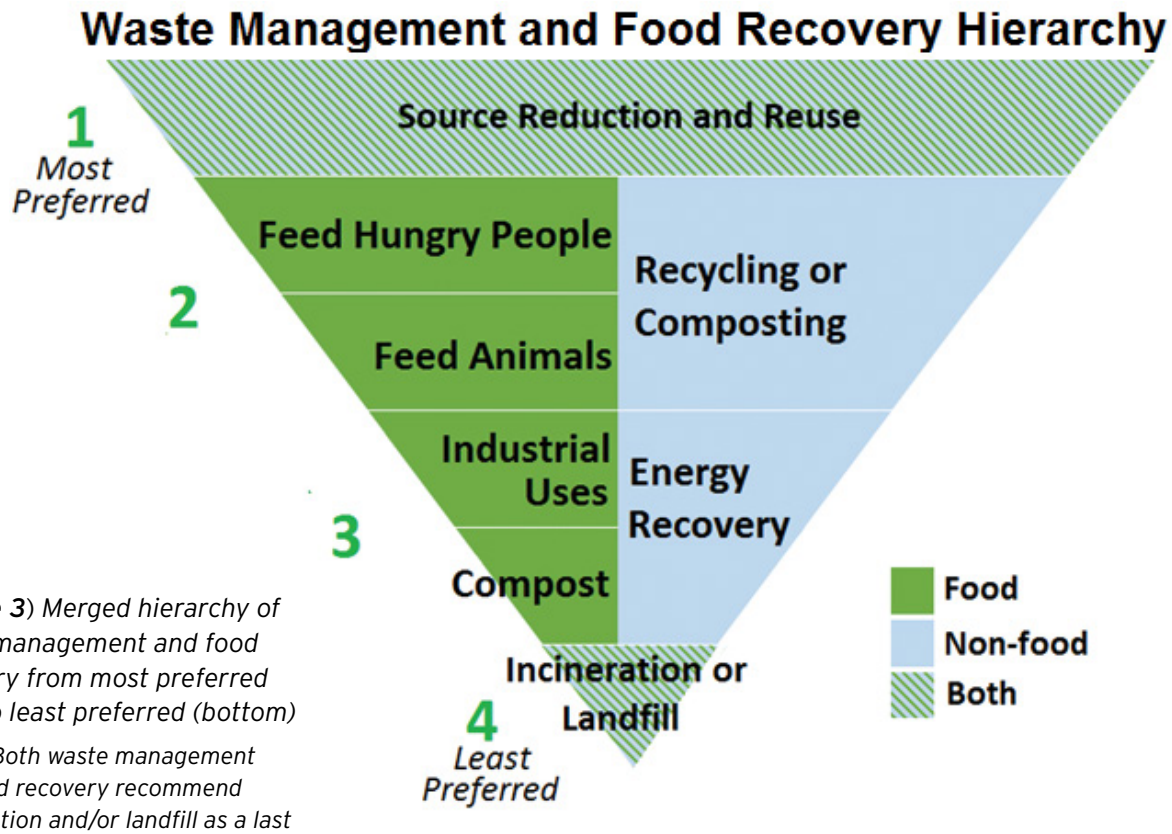
- Land application – Non-food waste that is recycled or composted (Category 2)
- Use for industrial purposes (e.g., further processing for fertilizer use) – Non-food waste that is recycled or composted (Category 2)
- Use in an anaerobic digester – Non-food waste used for energy recovery (Category 3)

Both hierarchies consider landfill and incineration as a last resort. This alternative should only be considered when no other economically viable approach is available. A merged hierarchy (Figure 3, page 30) can aid processors in waste stream accounting and metric calculations.

continued on next page

Measure and Report – Waste Diversion

1



*(**Figure 3**) Merged hierarchy of waste management and food recovery from most preferred (top) to least preferred (bottom)*

NOTE: *Both waste management and food recovery recommend incineration and/or landfill as a last resort option.*

2

Track waste streams. Assess the total weight of waste in each category of the hierarchy. Use the Waste by Category table (Table 16) to track waste streams by weight.

NOTE: *Source reduction (Category 1) is not included in resource recovery metrics, as it is not part of existing waste streams. However, having no waste to begin with is the most preferred method of waste reduction. Processors are encouraged to communicate their source reduction efforts. Source reduction is also fundamental to improving throughput efficiency in the throughput efficiency indicator.*

Waste by Category*	Weight in Lbs.
Food/organics repurposed to feed hungry people	
Food/organics repurposed to feed animals	
Non-food waste that is recycled or composted	
Category 2 Total	
Food/organics repurposed for industrial uses	
Food/organics sent to compost	
Non-food repurposed for energy recovery	
Category 3 Total	
Waste sent to incineration without energy recovery	
Waste sent to landfill	
Category 4 Total	
Grand Total – Categories 2+3+4	

***(Table 16)** Track waste streams by weight.*

Measure and Report – Waste Diversion

3

Report the waste diversion metric. Report the percent of waste diverted from Category 4 (landfill or incineration without energy recovery):

$$\text{\% Waste Diverted} = \frac{\text{(Category 2 Total + Category 3 Total)}}{\text{(Grand Total Categories 2 + 3 + 4)}}$$

- This metric is essential to measure a processor's progress to zero waste. (See the definitions on page 32 to learn more.)

Measure and Report – Throughput Efficiency

1

Measure total annual production. Assess the total annual volume of fluid milk processed and/or total annual dairy product output in pounds.

2

Report the throughput efficiency metric. Due to the breadth of dairy products and manufacturing processes across plants, throughput cannot be used for benchmarking or comparison. This is intended for use by processors as an internal operational indicator only.

$$\text{Throughput Efficiency} = \frac{\text{(Grand Total Categories 2+3+4)}}{\text{Lbs. of Production Output}}$$

Measure and Report – Resource Utilization

1

Measure the resource utilization metric. Report the percent by weight in each category of the hierarchy (Figure 3, page 30):

- Category 2 Total/(Grand Total Categories 2+3+4)
- Category 3 Total/(Grand Total Categories 2+3+4)
- Category 4 Total/(Grand Total Categories 2+3+4)

Resource utilization is an aspirational indicator that tracks efforts to move beyond zero waste and repurpose resources to their highest possible use.

Food donations are not specifically reported in this metric. They are captured in the dairy processor indicators as monetary and product donations (page 42).

2

Documentation. Information on waste streams can be obtained from trash collection bills, recycling collection bills, calculations derived from other available waste data or (if neither bills, nor reference data exist) the company's own estimates.

Resources

- Resources for Repurposing Food, https://bit.ly/33OeXuQ: Includes training materials, guidance documents and assessment tools.
- EPA's Food Recovery Hierarchy, http://bit.ly/2dCAltP: Includes definitions for each tier of the hierarchy.
- EPA's Waste Management Hierarchy, http://bit.ly/29PfUWP: Used to inform indicators for non-food products, includes definitions for each tier of the hierarchy.
- EPA WastewWise, https://www.epa.gov/smm/wastewise: A voluntary partnership program that uses an online data management and reporting system to track an organization's waste generation and reduction activities. WasteWise also provides a Climate Profile to calculate the reduction of GHG emissions resulting from waste reduction efforts.
- Comprehensive Guidance for Sustainable Materials Management, www.epa.gov/smm: Promotes a system approach to reducing materials use and the associated environmental impacts over the materials' entire life cycle.

Definitions

Resource recovery	Resource recovery is the selective extraction of disposed materials (waste) for a specific next use, such as recycling, composting or energy generation. The aim is to extract the maximum practical benefits from products, delay the consumption of virgin natural resources and generate the minimum amount of waste. Additionally, dairy processing plants can implement waste management plans, which help to reduce waste before it is ever created (avoided waste).
Zero waste	Zero waste is a philosophy that encourages the redesign of resource life cycles so that all products are reused. As in nature, a zero waste system is cyclical and does two fundamental things: 1) it redesigns resource use "from product design to disposal" to prevent wasteful and polluting practices; and 2) it then captures, discards and uses recycled materials, rather than natural resources, to make new products. This creates far less pollution and feeds the local economy. Zero waste suggests that the entire concept of waste should be eliminated. Instead, waste should be thought of as a potential resource to counter the basic acceptance of waste as a normal course of events. To meet zero waste goals within food processing, programs typically include the following strategies: • Reduce consumption • Reuse discards • Implement comprehensive recycling • Donate and implement comprehensive composting or bio-digestion of organic materials • Develop policies, regulations, incentives and financing structures to support these systems While zero waste implies that no waste goes to landfills and incinerators, the Environmental Protection Agency defines zero waste as reaching a minimum 90 percent diversion rate. This means that 90 percent of all disposed materials must be diverted from landfills and incinerators. However, many industry leaders are exceeding the 90 percent threshold and moving beyond zero waste to ensure the best possible use of manufacturing waste and byproducts.

Workforce Development

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Chapter at a Glance

- Value of Measurement
- Scope of Metrics
- Measure and Report
- Resources

Why Measure Workforce Development?

Labor management is closely watched by external stakeholders to help ensure employee safety and wellbeing. It is also an area monitored closely by processors as employee productivity is essential to profitability and business success.

Dairy processing operations rely on factory workers to convert raw milk into safe products for human consumption. Furthermore, fostering a safe and productive workplace through employee engagement and participation is critical to a successful processing operation.

Value of Measurement

The sustainability of the dairy industry depends upon the availability, safety and retention of quality dairy plant employees. Dairy processing jobs can be a leading multiplier and contributor to community development.

By understanding the number of jobs and benefits generated by dairy processing facilities, communities and the general public can realize the positive impact the dairy industry has on economic prosperity, job creation and community support.

Scope of the Metrics

The scope of the workforce development metrics for processors includes employment opportunities, employee benefits (such as housing and health care), and worker safety. Worker safety is evaluated through establishing and tracking leading indicators for a safe work environment and by annually tracking the Days of Restricted Work Activity or Job Transfer (DART) metric for processors with 11 or more employees.

If possible, it is suggested that smaller processors complete and communicate similar information in their sustainability reports.

Indicator	Metric
Human resources	• Total number of jobs supplied and full-time employees at end of year • Indirect and non-monetary benefits available to employees
Worker safety	• Do you have leading indicators to measure/encourage safe worker behavior? Describe measurement systems employed, and how this has led to a safer workforce. • Days of restricted work activity or job transfer (DART) rate ○ Explain why this has changed over time.

Measure and Report – Human Resources

1

Measure the number of jobs supplied. Identify the number of jobs supplied using the employees hired table (Table 17).

- An employee is defined as any one person of legal working age who receives a salary or wages directly from the employer. Supply chain workers are not included in this metric (e.g., third-party transportation providers).
- The Fair Labor Standards Act does not define full-time or part-time employment. Employment status is a matter generally to be determined by the employer. To apply a consistent definition for measurement, a full-time employee is anyone who works 40 hours a week or more. A part-time employee is anyone who works less than 40 hours a week.

Employees Hired	
	Number
Number of Full-Time Employees	
Total Number of Employees (include both full- and part-time employees) at end of year	

(Table 17) *Number of full-time employees hired in the reporting period.*

- Information on employee numbers and salary can typically be obtained from a processor's human resources department and payroll.

2

Report the number of jobs supplied. Report the numbers per category by using the employees hired table (Table 17).

3

Measure employee benefits. Identify and report benefits offered to all employees (even if employees choose not to enroll in benefits).

- Employee benefits can be both indirect and non-monetary compensation and include health insurance, retirement plans, housing, processed products, use of company vehicles, employee discounts, etc.
- Indirect compensation has a cash cost to the employer, but the employee may not realize or know the cash value. Some indirect compensation is mandated, such as social security contributions. Other indirect compensation includes benefits like health insurance, retirement program contributions, moving allowances, auto and travel allowances, professional or association memberships, etc. These items are highly variable.
- Non-monetary compensation includes items that reduce an employee's cost of living but are difficult to assign a dollar value. Examples include the use of a farm vehicle and tools, continuing education opportunities or products from the processing facility.
- Potential sources of information include benefit summaries, employee orientation materials and employee contracts.

Measure and Report – Human Resources

4

Report employee benefits. Report benefits offered to full-time and part-time employees by using the employee benefits table (Table 18).

Employee Benefits		
	Full-Time Employees Eligible for this Benefit? (Y/N)	Part-Time Employees Eligible for this Benefit? (Y/N)
Health insurance without employer contribution		
Health insurance with employer contribution		
401k (or comparable retirement plan)		
Housing		
Produced/processed products (milk/produce)		
Company vehicle or auto allowance (excludes rental cars)		
Other types (please list)		

(Table 18) *Indirect and non-monetary benefits accounting for full- and part-time employees*

Measure and Report – Worker Safety

1

Leading indicators in dairy processing. OSHA defines leading indicators as "proactive, preventative and predictive measures that provide information about the effective performance of your safety and health activities."[14] In their simplest form, proactive programs focus on actions people can take to prevent injuries vs. reacting after one has happened. For example, putting a hose away and getting it off the floor before someone trips and falls is a simple, but powerful example of being proactive. Furthermore, leading indicators can vary significantly based on company makeup, so engaging employees to identify which leading indicators will yield the most impactful safety outcomes is paramount.

> Ideally, leading indicators are created and decided upon through true employee involvement. Engage workers to identify meaningful and monitorable metrics that lead to positive safety contributions.

Contrarily, lagging indicators measure work-related injuries, illnesses and accidents that already occurred, and can be used to measure the effectiveness of leading indicators. Hence, leading indicators are instrumental in preventing hazards from even occurring in the first place, ensuring a safer, more productive and happier workplace.

- There is a huge variety of leading indicators that organizations employ, depending on their industry, workplace processes and internal policies and culture.
- The dairy processing industry is in the process of adopting leading indicators like many other industries. However, keep in mind that certain processors with fewer or smaller plants may be early on in their journey towards establishing worker safety protocols, while other more tenured or larger processors may have an established, well-documented culture that demands more robust and advanced leading indicators.
- Processors may have the capacity to implement more advanced indicators as their company grows and matures.
- Merging what the rules say dairy processing companies must do to comply with a simple list of behavior-based actions done routinely will go a long way in establishing the foundation of a true, proactive safety program that will evolve into a world-class operation.

2

Characteristics and examples of leading indicators. Ata minimum, leading indicators should include characteristics identified in Table 19 to ensure they contribute to continuous improvement of worker safety.

Characteristics of Effective Leading Indicators	
Specific	Leading indicator provides specifics for the action that the company will take to minimize risk from a hazard or improve a program area
Measurable	Leading indicator is presented as a number, rate or percentage that allows a company to track and evaluate clear trends over time
Accountable	Leading indicator tracks an item that is relevant to the goal
Reasonable	Leading indicator reasonably achieves the established goal
Timely	Leading indicator is being tracked regularly enough to spot meaningful trends from data within the desired timeframe

(Table 19) *Characteristics of effective leading indicators according to OSHA*

[14] *OSHA, Using Leading Indicators to Improve Safety and Health Outcomes*

continued on next page

Measure and Report – Worker Safety

2

In addition, below are several examples of leading indicators that dairy processors may consider adopting. Each indicator tracks the following characteristics:

- **Measurement difficulty** – How difficult the leading indicator is for a processor to measure
- **Reporting protocol** – How frequently and through what channel the leading indicator is reported
- **Span of involvement** – The number of employees that can participate in the leading indicator measurement
- **Verification method** – How the leading indicator and measurement methodology is vetted for credibility and robustness
- **Manipulation risk** – How susceptible the leading indicator is to manipulation and/or improper measurement
  - Low manipulation risk: Indicator is very unlikely to be susceptible to measuring skewed performance results.
    - Example: Accurately accounting for monthly training attendees is unlikely to be misconstrued.
  - Moderate manipulation risk: Indicator is susceptible to some skewed performance results.
    - Example: Employees changing behavior because they know they are being observed during an inspection
  - High manipulation risk: Indicator is susceptible to many skewed performance results.
    - Example: Unsupervised employees racing through an online training module and retaking a knowledge-check quiz repeatedly until they pass, having not read or retained any relevant training information
- **Safety culture/risk impact** – The strength of culture necessary to implement the leading indicator and the risk to culture associated with the indicator

Example 1: Monthly Awareness Training. Relevant awareness training is given to the full staff from office, whey, cheese, processing, milk, receiving, maintenance and warehouse departments. Department managers must attend.

- **Goal:** Employees are trained on 90 percent of annual training subject matter
  - As culture improves, it is recommended that the goal be increased over time.
- **Scoring:** 1 point per employee per training is awarded for attendance; 12 points possible

NOTE: Monthly awareness training should not be confused with compliance training since compliance training must be administered at 100 percent of the frequency set forth by OSHA regulations. It is recommended that each location train on two awareness topics per month which are designed to keep safety at the forefront of each employee's mind. Examples of ways this type of training can be accomplished are: in a classroom, at a shift pass-down/change meeting, or via computer.

Monthly Awareness Training					
Measurement Difficulty	Reporting Protocol	Span of Involvement	Verification Method	Manipulation Risk	Safety Culture/ Risk Impact
Low	Monthly, formal/ informal	High	Annual audits / monthly scoring	Low	Culture: moderate risk: low

continued on next page

Measure and Report – Worker Safety

2

Example 2: Department Safety Inspections. Minimum of one inspection from department manager and supervisor in tandem for whey, cheese, processing, milk, receiving, maintenance and warehouse departments. In addition, one employee from each department conducts an inspection with the department manager and obtains endorsement sign off. Processing facilities may use corporate inspection sheets or internal inspection sheets that meet relevant legal requirements.

- **Goal:** Full inspections conducted 90 percent of annual cycle
- **Scoring:** One point per full inspection; 12 points possible

Department Safety Inspections					
Measurement Difficulty	Reporting Protocol	Span of Involvement	Verification Method	Manipulation Risk	Safety Culture/ Risk Impact
Moderate	Monthly, formal	Low	Annual audits, management review	Moderate	Culture: moderate risk: moderate

Example 3: Senior Management Safety Meetings/Action Items. Senior management team hosts meetings with detailed minutes, action items and deadlines documented. Meetings must have all plant management staff present and can include other employees if necessary.

- **Goal:** Meetings with fully detailed minutes, action items and deadlines 100 percent of annual cycle
- **Scoring:** One point per meeting; 12 points possible

Senior Management Safety Meetings/Action Items					
Measurement Difficulty	Reporting Protocol	Span of Involvement	Verification Method	Manipulation Risk	Safety Culture/ Risk Impact
Low	Monthly, formal	Low	Email	Moderate	Culture: high risk: moderate

Example 4: Culture Index/Safety Engagement Activities. Develop a list of voluntary safety culture indexes or engagement activities that employees can conduct that will raise the safety IQ throughout each location. Examples of activities include, but are not limited to:

- Leading training
- Reviewing safety program or procedure
- Conducting a behavior observation
- Conducting a safety inspection
- Participating in a safety committee

It is recommended that the organization starts with a list of six to eight safety culture indexes or engagement activities, encouraging employees to choose and conduct a minimum of one per month.

- **Goal:** Participate in or complete one engagement activity per month
- **Scoring:** One point per month (regardless of total engagement activities conducted); 12 points possible

Culture Index/Safety Engagement Activities					
Measurement Difficulty	Reporting Protocol	Span of Involvement	Verification Method	Manipulation Risk	Safety Culture/ Risk Impact
Moderate	Monthly, formal/ informal	High	Email, document review, monthly scoring	Moderate	Culture: high risk: moderate

continued on next page

Measure and Report – Worker Safety

3

Establish leading indicators. This guidance does not define nor recommend that dairy processors adopt specific leading indicator metrics. Rather, processors should conduct an internal analysis of plant operations, processes and culture to determine which leading indicators are most valuable to ensuring worker safety. This includes close consultation with line workers and supervisors to establish indicators that will have the most influence on safety outcomes. Indicators may vary between processing plants.

Analyze data from the organization's last one to three years on near misses and recorded incidents (i.e., slips, trips and falls). Consistently occurring events at the facility or organization level can reveal where leading indicators may be most impactful. Implementing leading indicators in these areas can quickly influence the safety culture and bottom line.[15]

Furthermore, many datasets exist for companies from which to build. Almost every factory-based operation accounts for common indicators such as slips, trips and falls; securing machine guards; de-energizing machines to work on them; and preventing chemical exposure. From this known data, dairy companies can engage with employees to create a tailored series of proactive behaviors that fit the specific needs at their respective plants. Organizations with publicly available data on workplace safety indicators include:

- OSHA
- NSC
- ANSI
- ISO

For additional guidance on incorporating leading indicators, companies may refer to *An Implementation Guide to Leading Indicators and Beyond Safety: Leading Indicators for Health & Wellbeing*, two research papers published by The Campbell Institute at the National Safety Council.

4

Measure and report days of restricted work activity or job transfer (DART) rate. Use Occupational Safety and Health Administration (OSHA) Form 300, which is included in OSHA Forms for Recording Work-Related Injuries and Illnesses, to calculate the DART rate. Companies with 11 or more employees will have completed this form and only need to complete the following calculations:

- If a plant is not required to report a DART rate, consider completing the worksheet in Form 300.
- Employee records, employee contracts, attendance records and accident records will provide relevant data for this indicator.

DART Incidence Rate
[(Number of entries in Column H + Column I) X 200,000] ⁄ Number of hours worked by all employees = DART incidence rate

[15] *EHS, Don't Follow the Pack, Lead the Way with Leading Indicators*

Measure and Report – Worker Safety

5

Report leading indicators. Account for leading indicators employed by the organization. Describe how the organization measures each indicator and how they have contributed to a safer workforce.

Examples are provided in the table below. Substitute your organization's leading indicators in the table for reporting purposes.

Leading Indicator Inventory		
Indicator	Measurement System	Impact on Workforce
Monthly awareness training	On a monthly basis, locations report the number of employees that have earned a point for participating in assigned awareness trainings (12 points possible per year).	Facilities have increased their focus on safety and for locations meeting all leading indicator targets. A decrease in recordable injuries has occurred since implementing awareness training one year ago.
Department safety inspections	On a monthly basis, department managers and supervisors conduct inspections in tandem through their respective departments, using an internal checklist. For every inspection conducted, a point is earned (12 points possible per year).	Plant floor accident rate has decreased 10 percent since implementing the indicator six months ago.
Senior management safety meetings/action items	On a monthly basis, the senior management team hosts safety meetings with detailed minutes, action items and documented deadlines. All plant managers must be present. For every meeting with full participation and required documentation, a point is earned (12 points possible per year).	All deadlines at all facilities have been met since senior management began detailed recording in monthly safety meetings one year ago.
Culture indexes/EHS engagement activities	On a monthly basis, locations report the number of employees that have earned a point for completing at least one culture index or engagement activity (12 points possible per year).	The percentage of employees participating in culture index/engagement activities has gradually risen to 75 percent across the entire company since implementing the indicator six months ago.

(Table 20) *Accounting table for measuring and reporting leading indicator success at the plant level*

Resources

- The Bureau of Labor Statistics, http://bit.ly/2JjicCl: Find the National Industry-Specific Occupational Employment and Wage estimates for the dairy product manufacturing industry provided by the Bureau of Labor Statistics.
- OSHA 2012, Form 300A, http://bit.ly/32JSK0i: Get forms for recording work-related injuries and illnesses.
- International Dairy Foods Association Worker Safety Awards, https://www.idfa.org/safety-recognition-awards: Honors facilities for outstanding worker safety performance.
- International Dairy Foods Association Worker Safety, http://bit.ly/2JgjH4f: Provides general information on worker safety for dairy processing plants.
- OSHA Guidance – Using Leading Indicators to Improve Safety and Health Outcomes, https://bit.ly/3mBVeaS: Background on leading indicators and guidance on how to use them in your organization.
- Campbell Institute – Transforming EHS Performance Measurement Through Leading Indicators, http://bit.ly/37ZTdR5: Research project report describing research done to advance the state of knowledge and practice on using leading indicators to measure EHS performance in organizations.
- EHS Daily Advisor – Don't Follow the Pack, Lead the Way with Leading Indicators, http://bit.ly/32MjSfe: Article providing background on leading indicators and how leading indicators can manage risk.
- Ebook – Leverage Organizational Data to Measure and Improve Safety Performance, http://bit.ly/2p84QBX: Provides information on the key metrics to collect and report data on to mitigate incidents and improve safety culture.
- Campbell Institute – An Implementation Guide to Leading Indicators, http://bit.ly/2pSNRU3: Describes the chronological process associated with developing leading indicators tailored to your organization.
- Campbell Institute – Beyond Safety, http://bit.ly/32GjcrG: Leading Indicators for Health and Wellbeing: Describes five categories of leading indicators that best measure employee health and wellbeing.

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Chapter at a Glance

- Value of Measurement
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- Resources

Why Measure Community Contributions?

Dairy processors contribute to their local communities and regions in ways that can be obvious to consumers and stakeholders, such as direct economic support, local taxes paid and a source for local employment opportunities. Other impacts may be less obvious: 1) community engagement by employers and employees to service organizations, churches and schools, 2) charitable contributions or 3) general contributions and capacity building to support the overall vitality of many rural communities.

Value of Measurement

The benefit of measuring community contributions is vital to the sustainability story. Not only do they serve as employers and corporate taxpayers, dairy processors – and their employees – play crucial community leadership roles. Their contributions include serving in local government, fire departments and school boards and participating in civic, neighborhood and youth programs.

Dairy processors often give back by:

- Creating scholarships for college students.
- Securing grant funds for public projects.
- Engaging in volunteer and charitable efforts.
- Donating products to support local activities.

These contributions strengthen community ties, while promoting dairy products and the industry. For instance, Feeding America has a network of over 200 food banks and over 60,000 agencies that dairy processors can leverage to provide hungry people with nutritious milk and other dairy products.

Finally, to enhance the public's understanding of agriculture, dairy processors often host educational events at, or beyond the plant, factory or facility. (Not all plants offer educational tours due to plant design, location or safety concerns.)

Scope of the Metrics

The metrics focus on the impacts dairy processors have on sustaining socially vibrant communities. They include time and financial contributions such as volunteering and donations as well as educational opportunities provided in the form of tours and informational events.

Indicator	Metric
Community volunteering	• Volunteer activities performed by all paid employees
Monetary and product donations	• Monetary and product donation activities (including college scholarships)
Educational opportunities	• Describe educational events per year and the total number of participants
Product contributions	• Servings of dairy donated or consistently supplied to a non-profit organization to feed food-insecure people

Measure and Report – Community Volunteering

1

Describe volunteer activities. Provide a narrative description of volunteer activities for all employees (including manager/owner) sponsored by the organization during the past year. Volunteering is defined as the donation of time or service to an outside organization without expectation of pay to advance humanitarian objectives[16].

Volunteer Activities for All Employees	
Volunteer Activity	Description

(Table 21) *Volunteer activities accounting table for all employees during the reporting period*

[16]*DOL. 2012. FLSA Advisor: Volunteers, https://webapps.dol.gov/elaws/whd/flsa/docs/volunteers.asp*

Measure and Report – Community Volunteering

2

Optional measurement considerations. Report the total number of hours volunteered by all employees (including manager/owner) in company-sponsored volunteer activities for the reporting year. The Optional Measurement Considerations - Volunteer Hours table (Table 22) provides a template for optional reporting.

Optional Measurement Considerations - Volunteer Hours	
Type of Service	Hours Volunteered
Civic organizations	
Emergency services (e.g., ambulance, fire department)	
Industry organizations	
Local government	
Non-profit	
Religious	
School	
Youth group	
Other	
Total Hours Volunteered	

(Table 22) *Optional measurement considerations for community volunteering in addition to qualitative narrative of volunteer activities*

Measure and Report – Monetary and Product Donations

1

Describe monetary and product donation activities. Monetary donations are financial contributions to outside organizations. These can include sports and event sponsorships, scholarships and awards, non–profit donations, etc.

- Monetary efforts help to support local initiatives and generate a strong relationship between dairy processors and their communities. Company product donations are also a large component of supporting philanthropic efforts.
- Product donations include donations of cheese, yogurt, ice cream, butter and other finished products to fundraising events, soup kitchens and other local and national causes. Donations are defined as products provided to outside organizations without remuneration.
- Information on monetary donations can be found in financial records. Product donations can be found in product inventories.

Measure and Report – Monetary and Product Donations

2

Optional measurement consideration. Report the total monetary and product donation dollar value for all donation activities during the past reporting year. Detailing these numbers as a total figure or broken out by donation recipient is at the respondent's discretion (Table 23).

Optional Measurement Consideration - Monetary and Product Donations			
Organization, Event, Sponsorship	Monetary or Type of Product	Amount Donated / Product Donated	Market Value of Product (optional)
Total Amount Donated		**Total Value of Products Donated**	

(Table 23) *Optional measurement considerations for monetary and product donations in addition to qualitative narrative of donations*

3

Report educational opportunities. Educational opportunities may include factory tours, demonstrations and informational events. Report and describe educational events held on or off-site and the number of times the event occurred in the past year in the Education Opportunity table (Table 24). Example values are included in the table. Replace these values with your organization's values.

Educational Opportunity			
Opportunity (includes tours, demonstrations and informational events)	Average Number of Participants	No. of Times Held (if applicable)	Total Participation
Tour	15	53	795
Booth at fair	1000	1	1000

(Table 24) *Educational opportunity accounting table to track various educational activities throughout the reporting period*

Measure and Report – Product Contributions

1

Measure and report product contributions. Provide the total quantity (in lbs.) of dairy (milk, cheese, yogurt, etc.) donated or consistently supplied to a non-profit organization to feed food-insecure people.

- Dairy Nourishes America is a joint initiative between the Innovation Center for U.S. Dairy and Feeding America that provides opportunities to supply dairy foods to hungry people in the United States via four donation models:
  - Milk Purchase Model – The consistent purchase of a supply of milk by a local food bank
  - Cheese Purchase Model – The consistent purchase of a supply of cheese by a local food bank
  - Guaranteed Donation Model – Processor commitment to consistently donate dairy foods to food banks
  - Consumer Donation Model – Consumer donations and retail activations generate funds that are used to purchase milk for food bank clients

continued on next page

Measure and Report – Product Contributions

1

- More information on the donation models and their associated benefits can be found in the Dairy Nourishes America Toolkit and/or by emailing DairyNourishesAmerica@dairy.org
- Processors should also measure and report applicable product contributions that are not associated with Dairy Nourishes America.

Product Contributions		
Product Contributions	Quantity Contributed (Lbs.)	Non-Profit Recipient
Total Quantity of Contributions		

(Table 25) *Product contributions accounting table to track quantities of dairy donated to various organizations*

Common Units Converted into Pounds	
Gallon	8.6 pounds
Fluid Ounce	0.0625 pounds
Quart	2.15 pounds
Pint	1 pound

(Table 26) *Common volumetric units of dairy converted into pounds for the purposes of reporting*

Pounds to Servings of Dairy Conversion Factors	
1 Pound Fluid Milk	2 Servings Dairy
1 Pound Yogurt	2 Servings Dairy
1 Pound Cheese	10 Servings Dairy

(Table 27) *Conversion factors to report pounds of dairy in servings if necessary*

If a processor wishes to calculate the number of servings of dairy provided to food-insecure people, the USDA Choose My Plate conversion factors are provided in (Table 27) for each product type.

Resources

- The U.S. Department of Labor Fair Labor Standards Act, DOL 2012, https://bit.ly/35KUMQD: Provides clarification on what is meant by volunteer activities.
- Examples of community contributions by dairy companies:
  - Cabot Cheese Community Programs, http://bit.ly/1ZEDQke
  - Hilmar Cheese Company Sustainability Report, http://bit.ly/2eP1iLa
  - Northern Illinois Food Bank and Prairie Farms Dairy, http://bit.ly/29I3HgX
- Dairy Nourishes America Toolkit, https://bit.ly/3gn8EFs: Describes four donation models to provide hungry people with nutritious dairy products.
- Feeding America's Map the Meal Gap Tool, https://map.feedingamerica.org/: Provides map of food insecurity by county across the U.S. to identify where donating dairy products is the most impactful.

Product Safety and Quality

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Chapter at a Glance

- Value of Measurement
- Scope of Metrics
- Measure and Report
- Resources

Why Measure Product Safety & Quality?

Dairy products have been a safe, healthy and important part of the U.S. diet for generations. Upholding and enhancing a reputation for quality requires that the industry maintains and continuously improves the highest food safety standards. Dairy processors can reinforce their rigorous food safety standards by following accepted practices and continuously updating systems with the latest validated food safety tools, templates and techniques.

Furthermore, in 2009, the Innovation Center for U.S. Dairy made improved traceability a priority because of its increasingly important role in both domestic and global markets. A working group comprised of U.S. processors met and then engaged their fellow dairy processors on behalf of the Innovation Center for U.S. Dairy and the U.S. Dairy Export Council, to gain a better understanding of the variety of approaches being used for traceability. This led to the 2013 release of Guidance for Dairy Product Enhanced Traceability: Voluntary Practices and Protocols for Strengthening the U.S. Dairy Supply Chain (U.S. Dairy Traceability Guidelines) which more than 80 percent of the U.S. milk supply has agreed to follow. In 2020, version 2.0 Guidelines were released with changes to language and recommended practices due to the implementation of the Food Safety Modernization Act (FSMA) by U.S. processors.

Value of Measurement

Ensuring the safety of dairy products from grass-to-glass is foundational and an ongoing priority for the industry. Mitigating food safety risks and safeguarding consumer confidence in dairy products requires ongoing diligence and frequent reassessment of food safety management programs to ensure continuous improvement.

Through science and research, the Innovation Center's Food Safety Committee develops food safety tools, leads food safety workshops, designs up-to-date assessment materials for dairy processors, and publishes guidance documents. These resources help strengthen manufacturing practices in dairy processing facilities, advance science-based tools to diminish food safety risks and help assure dairy products are safe across all facets of dairy manufacturing. The use of food safety metrics is key in assessing and communicating the industry's commitment to follow and continuously improve food safety programs and management systems.

In addition, more companies are seeing the benefits of traceability, not only in safeguarding themselves against a potential food safety crisis, but also in enhancing operational and logistical management. In order to maintain market growth, traceability is essential to distinguish U.S. dairy products in the global marketplace, meet customer demands and enhance consumer confidence.

Scope of the Metrics

The metrics focus on strong, validated food safety management programs with regular reassessments to ensure continuous improvement. In addition, measuring processor commitment to the U.S. Dairy Traceability Guidelines ensures robust traceability accounting.

Indicator	Metric
Food Safety	• Do you have validated, verifiable food safety programs and management systems in place? (Y/N) • Do you frequently reassess your food safety programs to ensure efficacy and to reflect new food safety tools/practices and ensure continuous improvement? (Y/N)
Traceability	• Commitment to voluntary U.S. Dairy Traceability Guidelines (Y/N)

Measure and Report – Food Safety

1

Account for food safety programs and management systems. Food safety programs include practices, conditions and procedures needed prior to and during the production of safe food. These programs are essential for food safety and provide a foundation for an effective system.

Specifically, implementing food safety programs and management systems that are both validated and verifiable ensures maintaining the highest standards for food safety across the industry. According to Quality Assurance & Food Safety Magazine[17], validation and verification are defined as:

- **Validation** – A preemptive scientific evaluation that provides documented evidence that a particular process is capable of consistently delivering a product that meets predetermined specifications. In other words, it is a collection of scientific proof that a particular process involving chemical, physical and biological inputs is consistently delivering a desired effect to ensure the destruction of pathogenic microorganisms.
- **Verification** – The activity or activities conducted to ensure that the implemented processes are effectively and consistently carried out. In other words, it is the confirmation that you are doing what you intended or planned to do and that it is effective.

Food Safety Programs and Management Systems		
Critical programs and management systems (Add specific programs for your company)	Validated? (Y/N)	Verifiable? (Y/N)

(Table 28) Food safety program and management system validation and verification accounting table

2

Account for food safety program reassessment frequency. Processors are encouraged to reassess their food safety programs to ensure efficacy, reflect new food safety tools/practices and ensure continuous improvement.

This guidance does not specify how often processors should reassess their programs, however a common periodic assessment is once per year. This ensures that processors stay up-to-date with new tools, information and resources related to food safety protocols.

Food Safety Reassessment Frequency	
Food safety programs reassessed frequently?	(Y/N)

(Table 29) Food safety program reassessment accounting table

Measure and Report – Traceability

1

Commit to voluntary U.S. Dairy Traceability Guidelines. The Innovation Center developed robust, industry-wide guidance for processors to implement traceability protocols and compare current practices to a set of minimum standards for traceability. This helps to identify improvement areas.

[17] *Quality Assurance & Food Safety Magazine. 2015. Validation and Verification of Food Safety Control Measures, https://www.qualityassurancemag.com/article/aib0615-food-safety-validation-verification-methods/*

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Measure and Report – Traceability

1

The Innovation Center set and achieved a goal of having 80 percent of the U.S. milk supply committed to adopting and applying the recommended best practices for traceability outlined in the U.S. Dairy Traceability Guidelines by September 2014.

Updated in 2020, the Traceability Guidelines are part of the U.S. Dairy Stewardship Commitment, a voluntary pledge through which the U.S. dairy community can document and demonstrate its progress to consumers, customers and other stakeholders. Companies that adopt the U.S. Dairy Stewardship Commitment meet defined criteria for important areas like animal care, the environment, food safety and traceability and other important initiatives to report on impact in a transparent and meaningful way.

U.S. Dairy Traceability Commitment Status	
Is your organization committed to following the U.S. Dairy Traceability Guidelines?	(Y/N)

(Table 30) *Traceability Guidelines commitment status*

If your company is ready to make the commitment, or simply has questions, contact innovationcenter@usdairy.com. Your company will be listed in future updates and you can promote your U.S. Dairy Traceability Commitment in your marketing materials.

Resources

- Validation and Verification of Food Safety Control Measures, http://bit.ly/31Hmutx: Definitions of validation and verification in food safety from Quality Assurance & Food Safety Magazine.
- Innovation Center Food Safety Website, http://bit.ly/2BG171b: Hub for Innovation Center workshops, tools, checklists and guidance documents.
- U.S. Dairy Traceability Guidance Homepage, http://bit.ly/2W7Xs5C: Hub for U.S. dairy traceability guidance, resources and industry trends.
- U.S. Dairy Traceability Guidance Document, http://bit.ly/2HyVMyR: In-depth guidance document detailing how to adopt the Traceability Guidance practices and protocols.
- 21 Point Enhanced Dairy Traceability Checklist, http://bit.ly/31HGTif: Streamlined checklist that summarizes all 21 key procedures to successfully implement the U.S. Dairy Traceability Guidelines.

Notes:

About the Innovation Center for U.S. Dairy®

The Innovation Center for U.S. Dairy® is a forum that brings together the dairy community to address the changing needs and expectations of consumers through a framework of shared best practices and accountability. Initiated in 2008 by dairy farmers through the dairy checkoff, we collaborate on efforts that are important both to us and our valued customers – in areas like animal care, food safety, nutrition and health, the environment and community contributions.

Visit USDairy.com for more information about the Innovation Center for U.S. Dairy.

www.USDairy.com • InnovationCenter@USDairy.com

About the International Dairy Foods Association®

IDFA represents the nation's dairy manufacturing and marketing industry, which supports more than 3 million jobs that generate $159 billion in wages and $620 billion in overall economic impact. IDFA's diverse membership ranges from multinational organizations to single-plant companies, from dairy companies and cooperatives to food retailers and suppliers, all on the cutting edge of innovation and sustainable business practices. Together, they represent 90 percent of the milk, cheese, ice cream, yogurt and cultured products, and dairy ingredients produced and marketed in the United States and sold throughout the world. Delicious, safe and nutritious, dairy foods offer unparalleled health and consumer benefits to people of all ages. To learn more, go to www.IDFA.org.

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