



NON-LABOR

SUPPLIES

RECEIVING

PACKAGING

REPAIRS

PROCESSING

MANUFACTURING

UTILITIES

LABOR

DRYER

COST

ELECTRICITY

DEPRECIATION

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ANNUAL

CALIFORNIA 2012 DATA

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CALIFORNIA



Manufacturing Cost Annual

2012 Data

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Special Thanks

This publication would not be possible without the cooperation of the individuals and firms engaged in the production, manufacture, and distribution of milk and dairy products.



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Introduction

The California Food and Agricultural Code specifies that the California Department of Food and Agriculture (CDFA) must consider manufacturing costs in determining appropriate minimum prices for products categorized as Class 4a (butter and dried milk products) and Class 4b (cheese). To comply with the legislative decree, CDFA has a direct need for gathering and summarizing information provided in the cost studies to formulate reasonable manufacturing cost (make) allowances through the public hearing process.

CDFA maintains a Manufacturing Cost Unit that consists of professional auditors specializing in dairy accounting practices. The auditors work with plant management to gather data on all aspects of the operation, review plant records on-site, and allocate plant expenditures to each product manufactured by the plant. The studies are conducted and developed in conformity with generally accepted accounting principles, cost accounting techniques, and instructions contained in the Dairy Marketing Branch's Audit and Cost Procedures Manual.

Any plant that produces Class 4a and/or Class 4b products may be asked to participate in the cost studies. Information gathered in the studies provides an accurate sampling of California's annual butter, nonfat dry milk (NFDM), and Cheddar cheese production. The 2012 California Manufacturing Cost Annual includes data obtained from seven butter plants, nine NFDM plants, and four Cheddar cheese plants. Data on condensed skim and cream is collected concurrently from plants that participate. Plants that manufacture condensed skim and cream but do not manufacture butter, NFDM, or Cheddar cheese are not included in the condensed skim and cream overview. As a result, data on condensed skim and cream is based on a lower percentage of annual production.

The data from the cost studies has a practical significance beyond the boundaries of California. They are the only studies in the U.S. which present the audited and detailed processing costs of butter, NFDM, and Cheddar cheese over several years. For the plants in the study, the results can help to isolate the actual costs of manufacturing and provide benchmark figures obtained from other California manufacturing plants.



Introduction

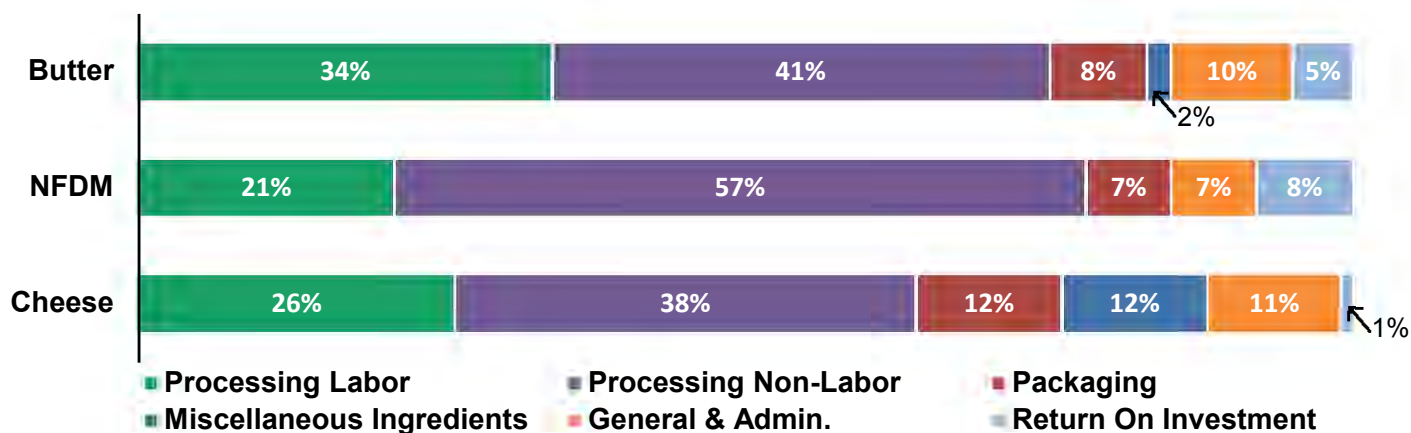
Manufacturing Cost Overview

The weighted average manufacturing cost of a product is a sum figure derived from the six categories of cost listed in Figure 1. To obtain a weighted average cost, each plant's manufacturing cost is weighted by its production volume relative to the production volume of all the plants included in the study.

- Processing labor costs are derived from plant wages, payroll taxes, and fringe benefits associated with the processing of a product.
- Processing non-labor includes costs such as, utilities, repairs, maintenance, supplies, depreciation, plant insurance, outside storage, and rental expenses.
- Packaging costs include all non-reusable items used in the packaging of a product, such as boxes, bags, tape, glue, and stretch wrap.
- Miscellaneous ingredient costs may include salt, color, rennet, etc.
- General and administrative costs include expenses incurred in the management of a plant, for example, office supplies, short-term interest, dues and subscriptions, accounting fees, headquarter expenses, office clerical wages, and executive salaries.
- Return on investment (ROI) allowance is an opportunity cost that represents how much interest the plant could have earned if its capital was not tied up in land, buildings, and equipment. In other words, it is viewed as an alternative source of income had the plant invested its capital elsewhere.

The chart below displays the breakdown of manufacturing cost for each product by category (Figure 1).

Figure 1. Manufacturing Costs by Category



Butter Study

The butter study included seven butter processing plants. The seven plants processed 647.91 million pounds of butter during the period January 2012 through December 2012, representing 99.04 percent of the butter processed in California. Production included both bulk and cut butter; however, published costs are for the processing of bulk butter (25-kg and 68-lb block) only.

To avoid revealing plant specific information, each plant was assigned to either a low or high cost group based on its total manufacturing cost. In 2012, the low cost group included three plants, the high cost group included four plants. Table 1 lists the weighted average cost per pound for each category of the butter manufacturing cost.

Table 1. Butter Manufacturing Costs

CURRENT Study Period: January through December 2012
With Comparison to the same time period Prior Year (2011)

- Manufacturing cost data were collected and summarized from seven California butter plants. The seven plants processed 647.91 million pounds of butter during the 12-month study period, January through December 2012, representing 99.04% of the butter processed in California.
- The volume total includes both bulk butter and cut butter, but the costs reflect only costs for bulk butter (25 kg and 68 lb. blocks).
- To obtain the weighted average, individual plant costs were weighted by their butter processing volume relative to the total volume of butter processed by all plants included in this cost study.

Breakdown of Butter Manufacturing Costs - January through December 2012

Categories	Low Cost Group	High Cost Group	Range of Costs		CURRENT Weighted Average Cost All Plants Jan-Dec 2012	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2011	Actual Difference Current Less Prior Year
			Minimum	Maximum			
<i>Dollars Per Pound of Butter</i>							
Number of Plants	3	4	7	7	7	8	-1
Processing Labor	\$0.0605	\$0.0537	\$0.0246	\$0.0895	\$0.0572	\$0.0613	-\$0.0041
Processing Non-Labor	\$0.0617	\$0.0790	\$0.0552	\$0.1297	\$0.0701	\$0.0741	-\$0.0040
Packaging	\$0.0136	\$0.0124	\$0.0115	\$0.0137	\$0.0130	\$0.0118	\$0.0012
Misc. Ingredients	\$0.0026	\$0.0026	\$0.0019	\$0.0031	\$0.0026	\$0.0024	\$0.0002
General & Administrative	\$0.0139	\$0.0197	\$0.0101	\$0.0249	\$0.0167	\$0.0166	\$0.0001
Return on Investment	\$0.0078	\$0.0108	\$0.0026	\$0.0204	\$0.0092	\$0.0113	-\$0.0021
Average Total Cost	\$0.1601	\$0.1782	--	--	\$0.1688	\$0.1775	-\$0.0087
Volume in Group (Lbs.)	335,451,926	312,453,288	--	--	647,905,214	617,006,399	30,898,815
% Volume by Group	51.80%	48.20%	--	--	100.0%	100.0%	--

Butter Study

Butter Manufacturing Costs

Processing labor costs of \$0.0572 per pound represented 34 percent of the total butter manufacturing cost. Analysis revealed general plant labor to be the most costly function performed (Figure 2). General plant labor includes plant supervision and various general plant labor expenses.

Figure 2. Butter Processing Labor

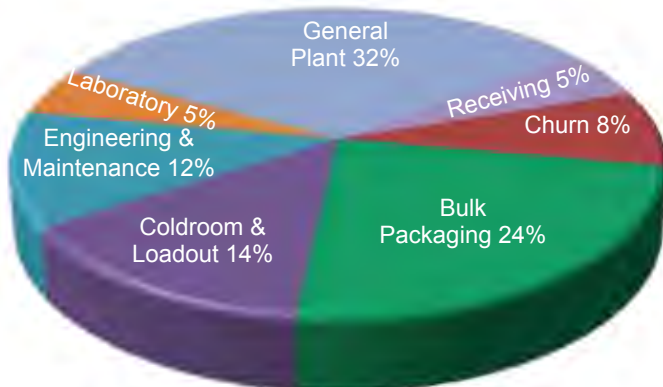
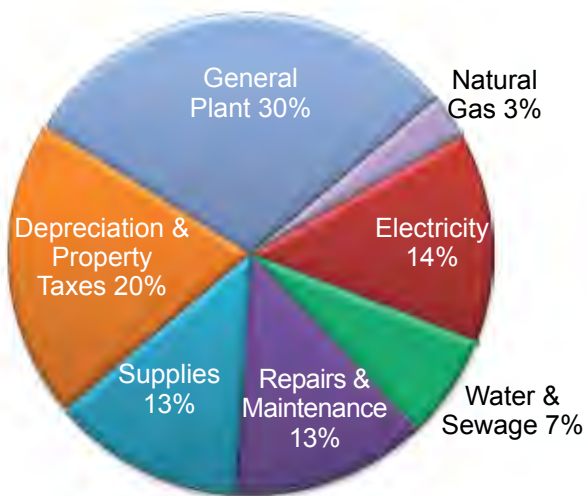
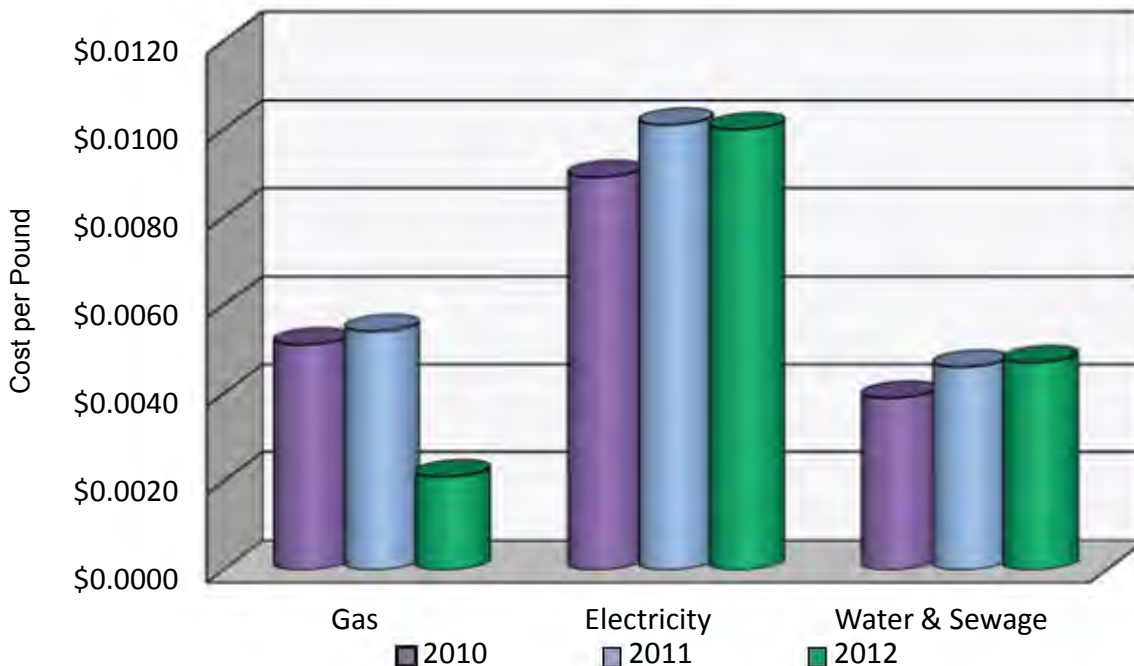


Figure 3. Butter Processing Non-Labor



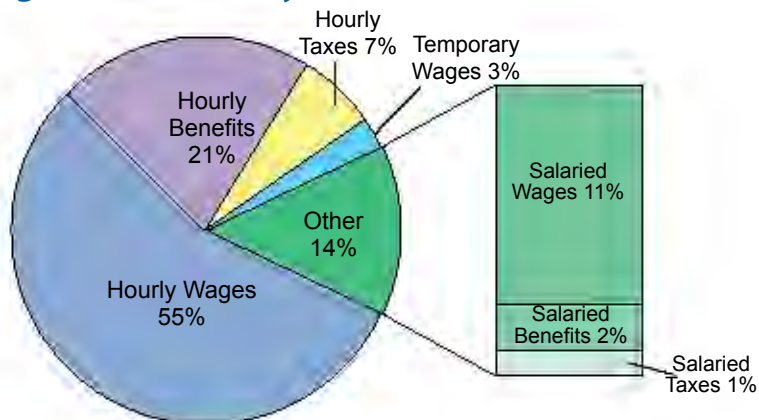
Processing non-labor costs of \$0.0701 per pound represented 41 percent of the total manufacturing cost. Furthermore, the combined utility costs for electricity, natural gas, water and sewage accounted for 24 percent of processing non-labor costs (Figure 3). An annual comparison of utility costs is presented below (Figure 4).

Figure 4. Butter Utilities Comparison



Butter Study

Figure 5. Butter Payroll Costs



Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers compensation). Figure 5 provides a breakdown of plant payroll costs by percentage.

Packaging cost of \$0.0130 per pound represented 8 percent of the total manufacturing cost. Bulk packaging includes all non-reusable items used in the packaging of bulk butter, such as boxes, bags, cartons, liners, tape, glue, and stretch wrap.

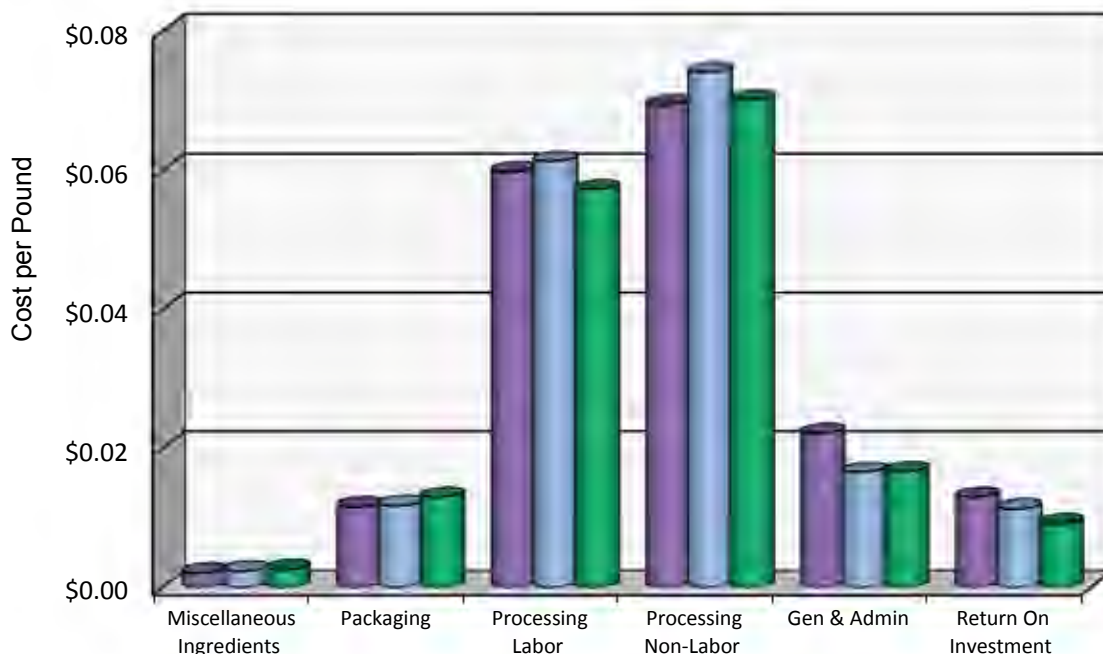
Miscellaneous ingredient costs increased 8 percent in 2012. The weighted average cost of \$0.0026 per pound represented 2 percent of the total manufacturing cost.

General and administrative costs of \$0.0167 per pound represented 10 percent of the total manufacturing cost.

ROI costs decreased 19 percent to \$0.0092 per pound due in large part to a 12.87 percent decrease in the Moody's BAA corporate bond index.

The cost of manufacturing butter decreased to \$0.1688 from \$0.1775 per pound the prior year. Figure 6 provides us a comparison for each category of cost over a three-year period.

Figure 6. Butter Manufacturing Costs Comparison



Nonfat Dry Milk Study

The 2012 NFDM study included nine plants whose combined production was 808.06 million pounds, representing 96.85 percent of the NFDM processed in California. Of the 808.06 million pounds produced, 99.65 percent was sold for human consumption, 0.35 percent was sold as animal feed.

To avoid revealing plant specific information, each plant was assigned to either a low cost group, medium cost group, or high cost group based on its total manufacturing cost. In 2012, each cost group included three plants. Table 2 lists the weighted average cost per pound for each category of the manufacturing cost.

Table 2. Nonfat Dry Milk Manufacturing Costs

CURRENT Study Period: January through December 2012
With Comparison to the same time period Prior Year (2011)

- Manufacturing cost data were collected and summarized from nine California NFDM plants. The nine plants processed 808.06 million pounds of NFDM during the 12-month study period, January through December 2012, representing 96.85% of the NFDM processed in California.
- The volume includes NFDM, both animal and human consumption. NFDM for human consumption represented 99.65% of the 808.06 million pounds of NFDM processed, and NFDM for animal consumption represented 0.35%.
- The volume total includes all grades of NFDM packaged in any container size, but the costs reflect only costs for 25 kg and 50 lb. bags of NFDM.
- To obtain the weighted average, individual plant costs were weighted by their NFDM processing volume relative to the total volume of NFDM processed by all plants included in the cost study.

Breakdown of Nonfat Dry Milk Manufacturing Costs - January through December 2012

Categories	Low Cost Group	Medium Cost Group	High Cost Group	Range of Costs		CURRENT Weighted Average Cost All Plants Jan-Dec 2012	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2011	Actual Difference Current Less Prior Year
				Minimum	Maximum			
<i>Dollars Per Pound of NFDM</i>								
Number of Plants	3	3	3	9	9	9	9	0
Processing Labor	\$0.0416	\$0.0379	\$0.0772	\$0.0237	\$0.1079	\$0.0414	\$0.0363	\$0.0051
Processing Non-Labor	\$0.1062	\$0.1220	\$0.1352	\$0.0958	\$0.1994	\$0.1162	\$0.1150	\$0.0012
Packaging	\$0.0140	\$0.0145	\$0.0133	\$0.0129	\$0.0151	\$0.0142	\$0.0140	\$0.0002
General & Administrative	\$0.0102	\$0.0176	\$0.0208	\$0.0096	\$0.0240	\$0.0147	\$0.0135	\$0.0012
Return on Investment	\$0.0062	\$0.0196	\$0.0073	\$0.0031	\$0.0250	\$0.0134	\$0.0154	-\$0.0020
Average Total Cost	\$0.1782	\$0.2116	\$0.2538	--	--	\$0.1999	\$0.1942	\$0.0057
Volume in Group (Lbs.)	334,847,366	431,713,282	41,496,936	--	--	808,057,584	741,174,068	66,883,516
% Volume by Group	41.44%	53.43%	5.14%	--	--	100.0%	100.0%	--

Nonfat Dry Milk Study

Nonfat Dry Milk Manufacturing Costs

Processing labor costs were \$ 0.0414 per pound, 14 percent higher than in 2011. The weighted average cost for 25-kg bag packaging labor was \$ 0.0059 per pound, representing 14 percent of processing labor costs (Figure 7).

Figure 7. NFDM Processing Labor

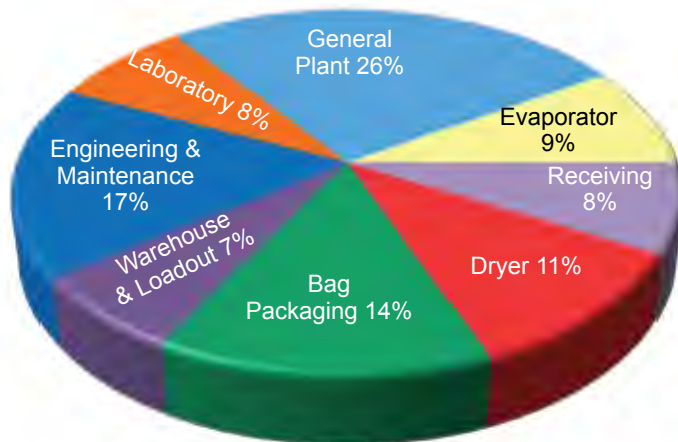
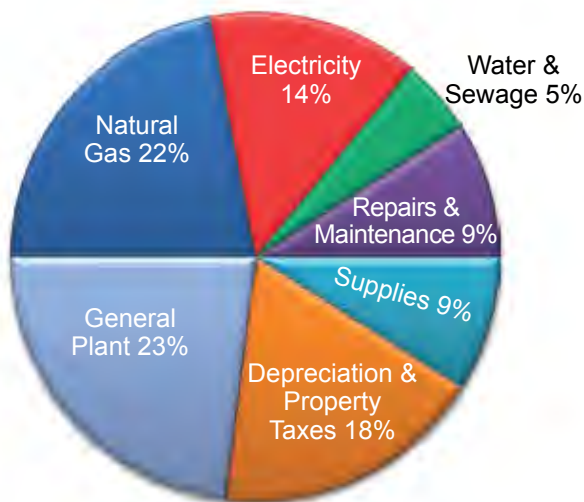
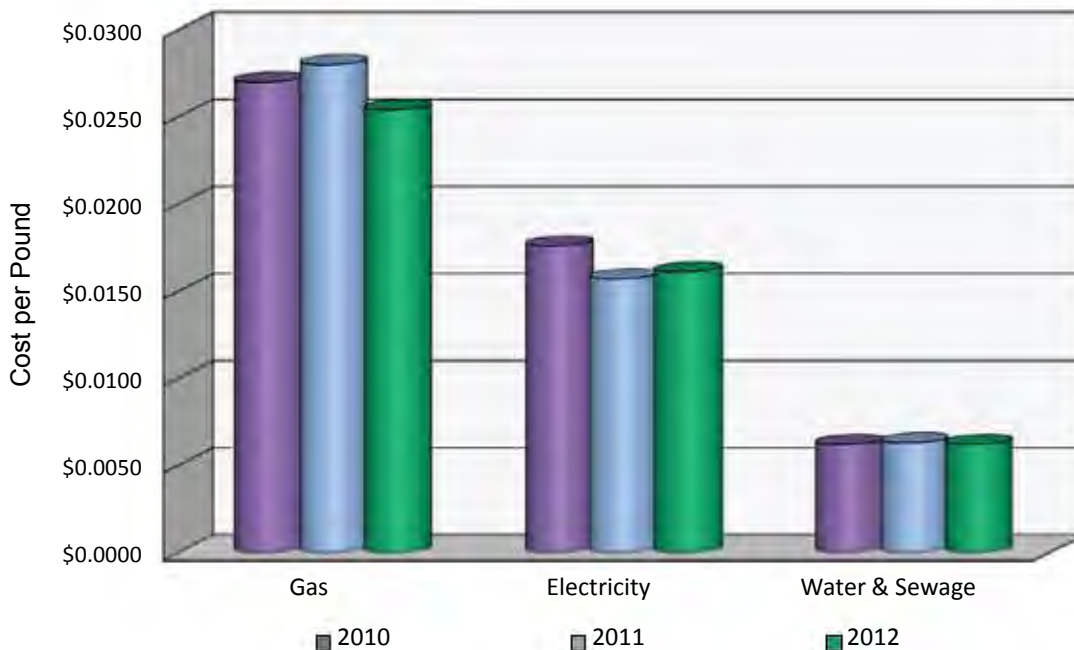


Figure 8. NFDM Processing Non-Labor



Processing non-labor costs of \$ 0.1162 per pound accounted for 57 percent of the NFDM manufacturing cost. The operation of both an evaporator and a dryer adds significantly to the utility costs of a powder processing plant. In 2012, the utilities cost was 41 percent of processing non-labor costs (Figure 8). An annual comparison of utility costs is provided below (Figure 9).

Figure 9. NFDM Utilities Comparison



Nonfat Dry Milk Study

Packaging costs of \$ 0.0142 per pound represented 7 percent of the total NFDM manufacturing cost. Seventy-three percent of the NFDM was packaged in 25-kg or 50-lb multi-wall bags; the remaining 27 percent was packaged in totes weighing between 1,100 to 3,200 lbs each (Figure 10).

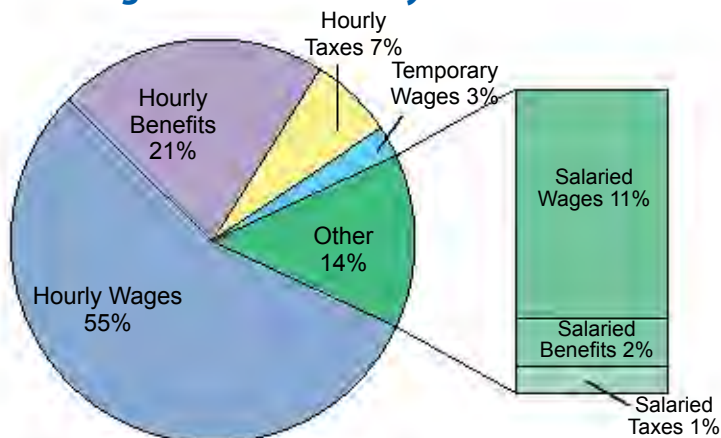
Figure 10. NFDM Packaging Size



General and administrative costs of \$ 0.0147 per pound accounted for 7 percent of the NFDM manufacturing cost.

The ROI allowance is calculated by subtracting accumulated depreciation from the original cost of assets; the remaining book value is then multiplied by the Moody's "BAA" corporate bond index. Indirect costs are allocated to the products based on the same methodology used in the depreciation expense calculation. In 2012, ROI costs were \$ 0.0134 per pound.

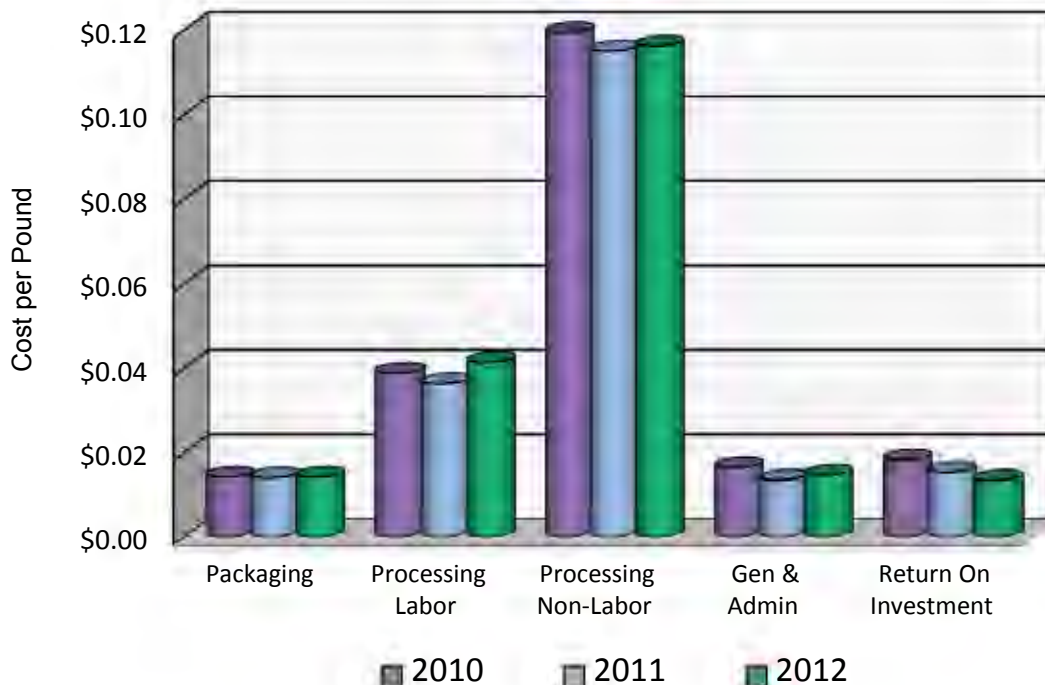
Figure 11. NFDM Payroll Costs



Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers compensation). Figure 11 provides a breakdown of plant payroll costs by percentage.

In 2012, the NFDM manufacturing cost increased 3 percent from the prior year to \$0.1999 per pound. Figure 12 shows the changes that have occurred in each category of cost over a three-year period.

Figure 12. NFDM Manufacturing Costs Comparison



Cheese Study

In 2012, the cheese study included four processing plants. To avoid revealing plant specific information, the results gathered from all four plants were included in one weighted average cost for each of the 40-lb block Cheddar cheese processing costs (Table 3).

Table 3. Cheese Manufacturing Costs

CURRENT Study Period: January through December 2012
With Comparison to the same time period Prior Year (2011)

- Manufacturing cost data were collected and summarized from four California cheese plants. Due to confidential reasons, total cheese volumes cannot be displayed.
- The volume total includes both Cheddar and Monterey Jack cheeses, but the costs reflect only costs for 40-lb. blocks of Cheddar.
- Two plants processed 500-lb. barrels or 640-lb. blocks. Packaging costs and packaging labor for 40-lb. blocks were substituted for these plants.
- To obtain the weighted average, individual plant costs were weighted by their cheese processing volume relative to the total volume of cheese processed by all plants included in the cost study.
- For all cheese: the weighted average yield was 12.17 lbs. of cheese per hundredweight of milk. The weighted average moisture was 37.25% and the weighted average vat tests were 4.20% fat and 9.38% SNF.

Breakdown of Cheese Manufacturing Costs - January through December 2012

Categories	Total Cost One Group	CURRENT Weighted Average Cost All Plants Jan-Dec 2012	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2011	Actual Difference Current Less Prior Year
<i>Dollars Per Pound of Cheese</i>				
Number of Plants	4	4	4	0
Processing Labor	\$0.0559	\$0.0559	\$0.0552	\$0.0007
Processing Non-Labor	\$0.0829	\$0.0829	\$0.0782	\$0.0047
Packaging	\$0.0250	\$0.0250	\$0.0177	\$0.0073
Misc. Ingredients	\$0.0262	\$0.0262	\$0.0254	\$0.0008
General & Administrative	\$0.0235	\$0.0235	\$0.0220	\$0.0015
Return on Investment	\$0.0036	\$0.0036	\$0.0044	-\$0.0008
Average Total Cost	\$0.2171	\$0.2171	\$0.2029	\$0.0142

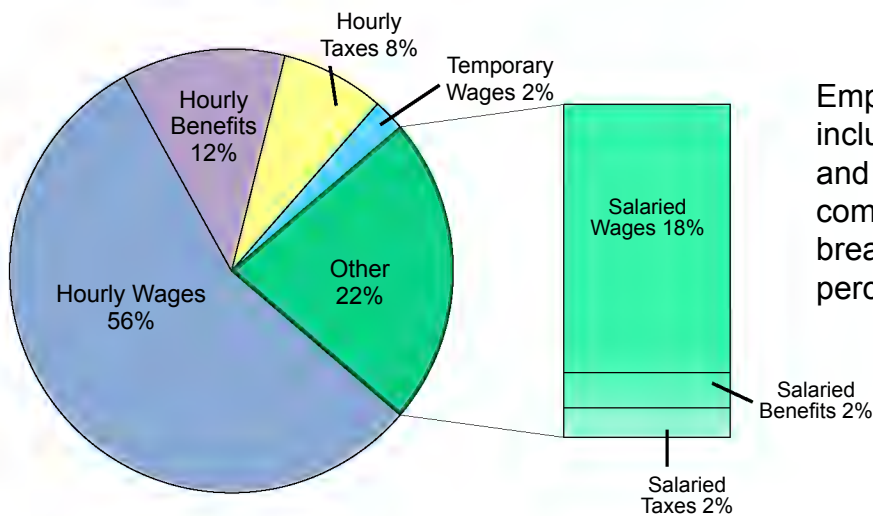
Cheese Study

In addition to Cheddar and Jack cheeses, the plants processed various other types of cheese and cheese by-products. For all Cheddar cheese, the weighted average vat yield was 12.17 pounds of cheese per hundredweight (cwt.) of milk, the weighted average moisture was 37.25 percent, and the weighted average vat test was 4.20 percent fat and 9.38 percent solids-not-fat (Table 4).

Table 4. All Cheddar Cheese Production Parameters Comparison

Year	Finished Moisture %	Vat Fat Test %	Vat SNF Test %	Vat Yield (Lbs.)
2012	37.25	4.20	9.38	12.17
2011	37.37	4.30	9.29	12.21

Figure 13. Cheese Payroll Costs



Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers compensation). Figure 13 provides a breakdown of plant payroll costs by percentage.

Cheese Study

Cheddar Cheese Manufacturing Costs

Processing labor costs were \$0.0559 per pound. For the plants that processed 500-lb barrels or 640-lb blocks, the weighted average packaging labor cost for 40-lb block Cheddar cheese was substituted. In 2012, engineering and maintenance costs represented 22 percent of the processing labor cost (Figure 14).

Figure 14. Cheese Processing Labor

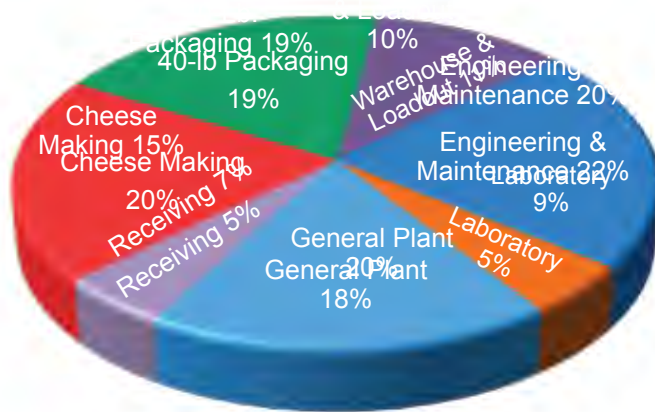
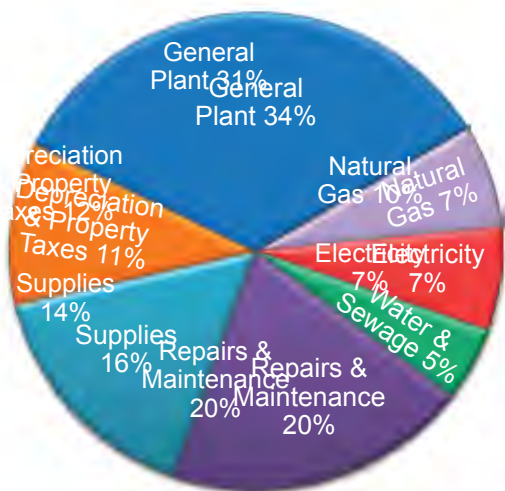
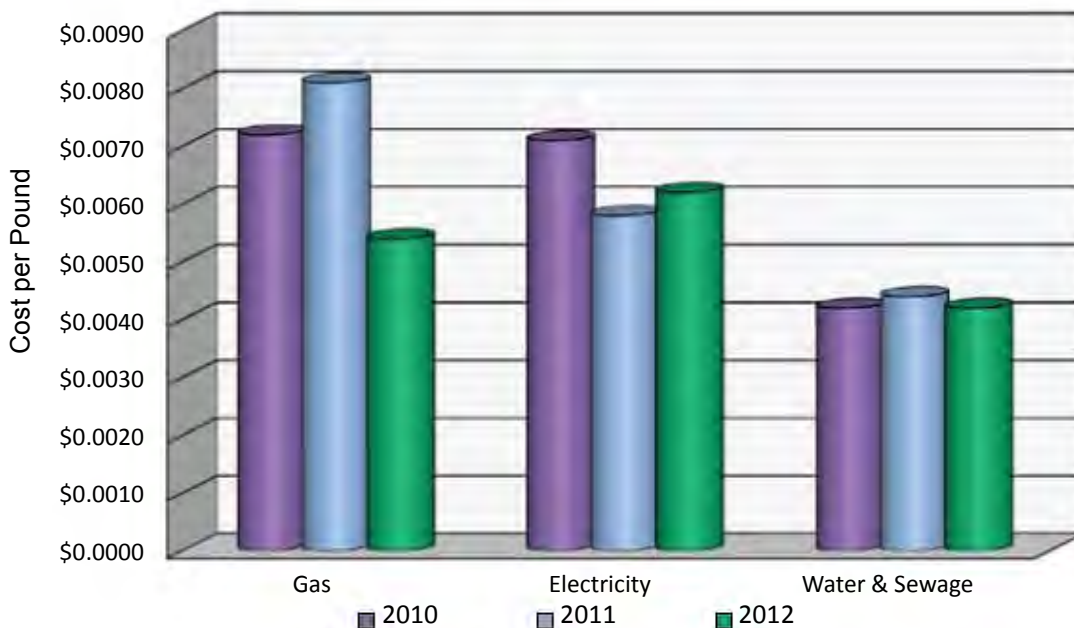


Figure 15. Cheese Processing Non-Labor



Processing non-labor costs of \$0.0829 per pound were 38 percent of the total manufacturing cost. Furthermore, the combined utility costs of gas, electricity, water and sewage accounted for 19 percent of processing non-labor costs (Figure 15). An annual comparison of utility costs is presented below (Figure 16).

Figure 16. Cheese Utilities Comparison



Cheese Study

Packaging costs included all non-reusable items, such as boxes, liners, tape, glue, and stretch-wrap. The weighted average packaging cost for 40-lb block Cheddar cheese was substituted for those plants producing 500-lb barrel or 640-lb block cheese. Packaging costs were \$0.0250 per pound.

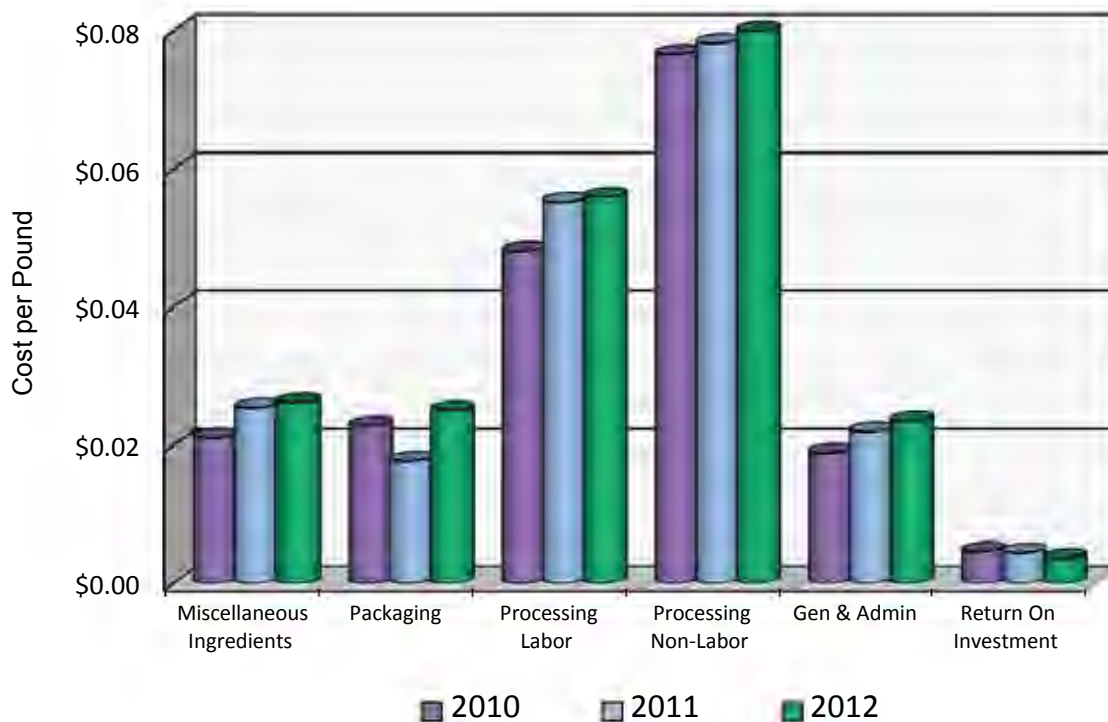
Miscellaneous ingredient costs for Cheddar cheese included salt, color, rennet, fortification costs, etc. The weighted average cost increased 3 percent to \$0.0262 per pound from 2011.

General and administrative costs of \$0.0235 per pound accounted for 11 percent of the manufacturing cost.

The ROI costs were \$0.0036 per pound, an 18 percent decrease from the prior year. ROI costs represented just 1 percent of the total manufacturing cost.

Overall, the cost of manufacturing cheese increased to \$0.2171 per pound from the prior year. Figure 17 illustrates the changes occurring in each category of cost over a three-year period.

Figure 17. Cheese Manufacturing Costs Comparison



Condensed Skim and Cream

The manufacturing cost of bulk dairy products, such as condensed skim and cream, are not as precise as packaged products like butter, NFD, and cheese. There are very few direct costs associated with bulk dairy products. Most, if not all, bulk dairy product costs are derived from the general plant costs allocated to them based on component hundredweight (cwt.).

Condensed Skim Overview

In 2012, the condensed skim study was completed on eight plants whose combined sales were 467.6 million pounds (Figure 18). The weighted average manufacturing cost of condensed skim increased 5 percent over the prior year to a cost of \$4.1982 per cwt. (Figure 19).

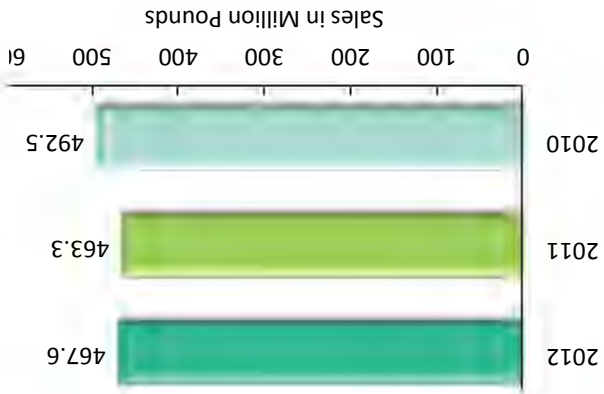


Figure 18. Condensed Skim Sales Comparison



Figure 19. Condensed Skim Manufacturing Costs Comparison

Condensed Skim & Cream

Cream Overview

In 2012, the cream study included ten plants whose combined sales were more than 251.2 million pounds (Figure 20). The weighted average manufacturing cost of cream increased 5 percent to \$4.2449 per cwt. (Figure 21).

Figure 20. Cream Sales Comparison

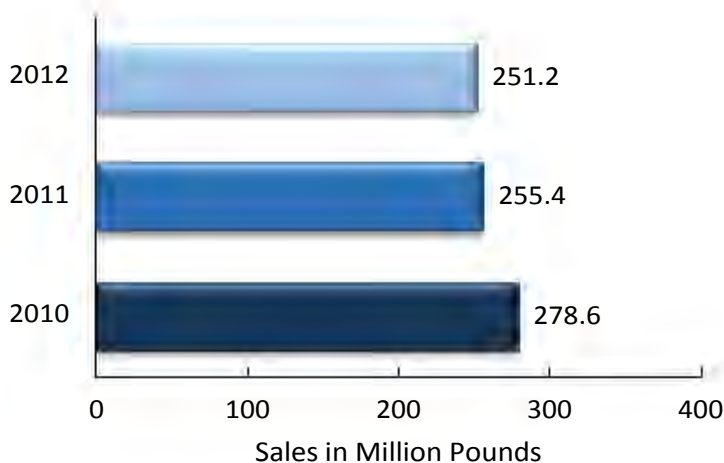


Figure 21. Cream Manufacturing Costs Comparison

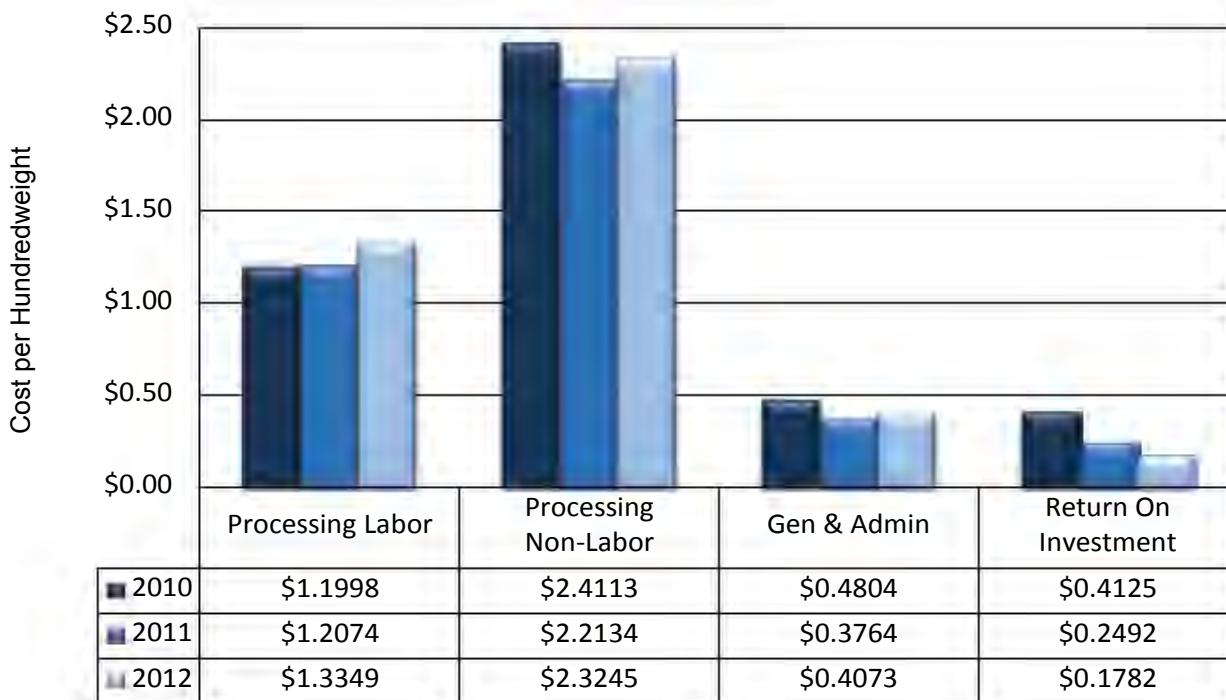


Figure 22. Simplified Flowchart of a Butter and Nonfat Dry Milk Plant

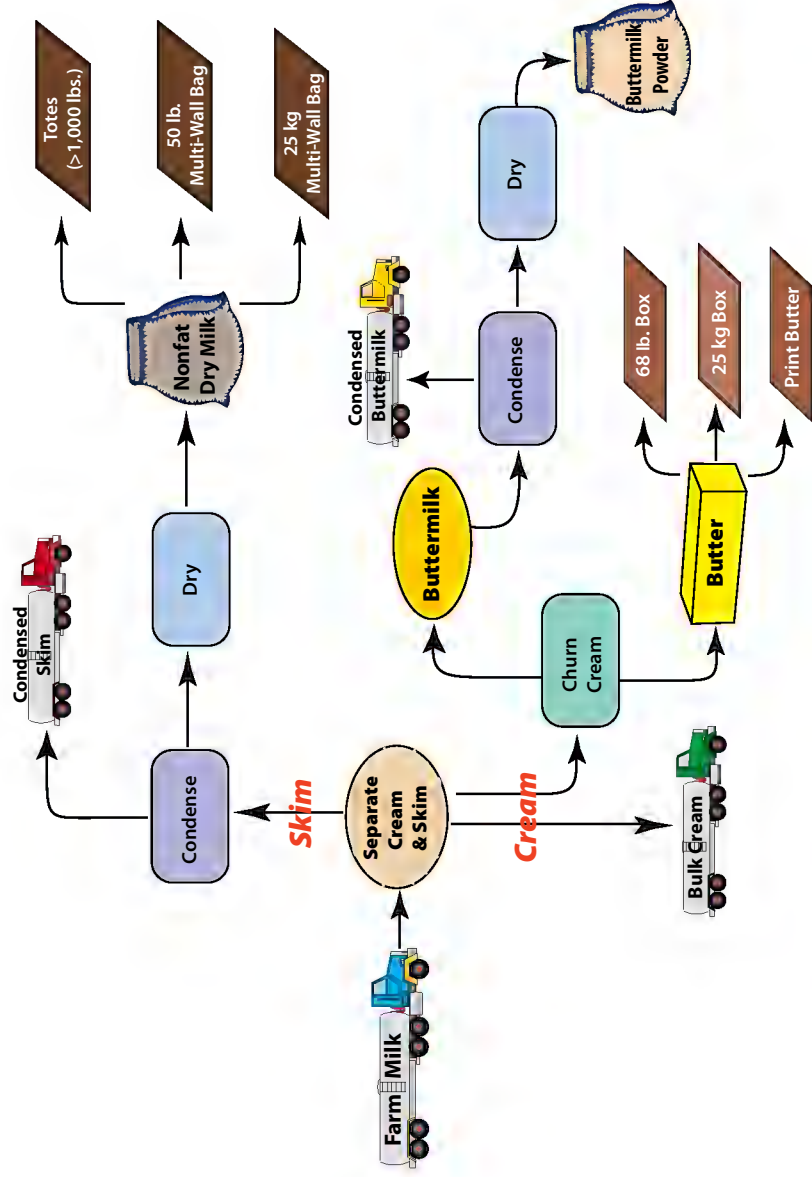
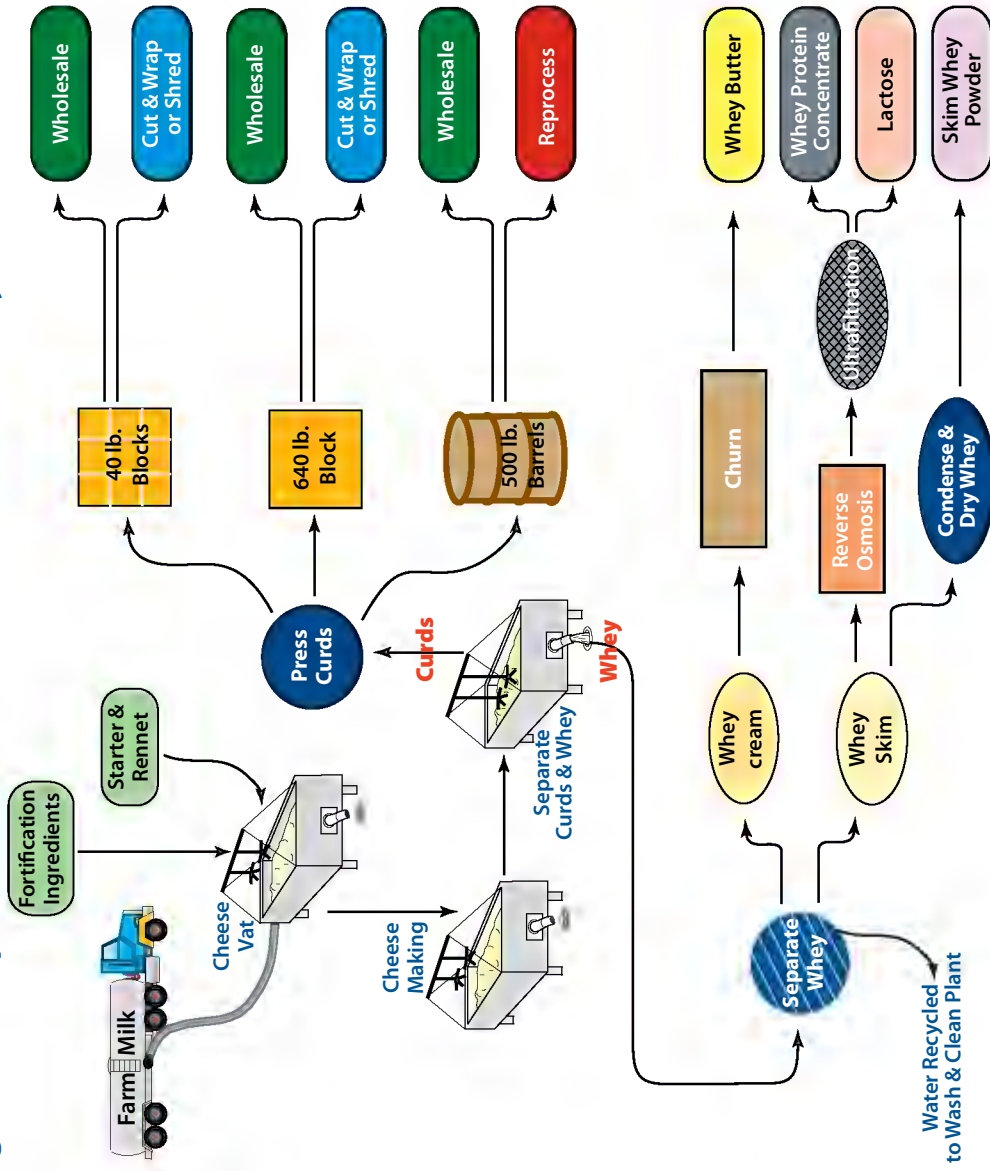


Figure 23. Simplified Flowchart of a Cheese Plant with By-Product Processing





Manufacturing Cost Unit Staff (pictured from left to right):

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*We welcome your comments on this Manufacturing Cost Annual.
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