



# Manufacturing Cost Annual

**California 2013 Data**

# Table of Contents

## Manufacturing Cost Overview

Introduction .....	3
Manufacturing Cost Overview .....	4

## Butter

Butter Study .....	5
Butter Manufacturing Costs.....	6

## Nonfat Dry Milk

Nonfat Dry Milk Study .....	8
Nonfat Dry Milk Manufacturing Costs.....	9

## Cheese

Cheese Study.....	11
Cheese Manufacturing Costs.....	13

## Condensed Skim and Cream

Condensed Skim Overview.....	15
Cream Overview .....	16

## Plant Flowchart Diagrams

Butter and Nonfat Dry Milk Plant.....	17
Cheese Plant.....	17

CALIFORNIA



## Manufacturing Cost Annual

2013 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 2013 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. Consequently, although CDFA has the legal authority to collect cost information from the various types of milk processors, the majority of plants have found the information contained in the studies valuable and have cooperated voluntarily.



# Introduction

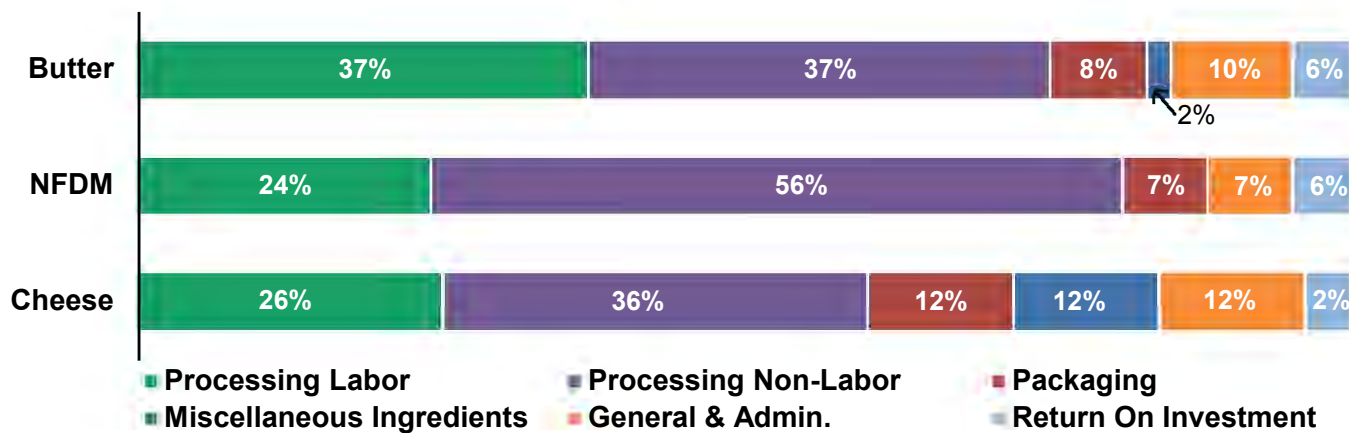
## Manufacturing Cost Overview

The weighted average manufacturing cost of a product includes six categories as presented in Figure 1. To obtain a weighted average cost, an individual plant cost is weighted by the plant's production volume relative to the total volume of all the plants included in a study.

- Processing labor costs are derived from plant wages, plant salaries, 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, 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.
- Other 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 631.40 million pounds of butter during the period January 2013 through December 2013, representing 99.53 percent of the butter processed in California. Production included both bulk and cut butter; however, published costs are for the processing of bulk butter (25kg and 68lb 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 2013, the low cost group included three plants, the high cost group, four. 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 2013  
With Comparison to the same time period Prior Year (2012)

- Manufacturing cost data were collected and summarized from seven California butter plants. The seven plants processed 631.40 million pounds of butter during the 12-month study period, January through December 2013, representing 99.53% 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 2013**

Categories	Low Cost Group	High Cost Group	Range of Costs		CURRENT Weighted Average Cost All Plants Jan-Dec 2013	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2012	Actual Difference Current Less Prior Year
			Minimum	Maximum			
<i>Dollars Per Pound of Butter</i>							
Number of Plants	3	4	7	7	7	7	0
Processing Labor	\$0.0657	\$0.0627	\$0.0341	\$0.0842	<b>\$0.0642</b>	\$0.0572	\$0.0070
Processing Non-Labor	\$0.0577	\$0.0709	\$0.0532	\$0.1084	<b>\$0.0643</b>	\$0.0701	-\$0.0058
Packaging	\$0.0138	\$0.0134	\$0.0120	\$0.0153	<b>\$0.0136</b>	\$0.0130	\$0.0006
Misc. Ingredients	\$0.0027	\$0.0029	\$0.0026	\$0.0033	<b>\$0.0028</b>	\$0.0026	\$0.0002
General & Administrative	\$0.0138	\$0.0216	\$0.0046	\$0.0284	<b>\$0.0177</b>	\$0.0167	\$0.0010
Return on Investment	\$0.0081	\$0.0114	\$0.0026	\$0.0221	<b>\$0.0098</b>	\$0.0092	\$0.0006
<b>Average Total Cost</b>	\$0.1618	\$0.1829	--	--	<b>\$0.1724</b>	\$0.1688	\$0.0036
<b>Volume in Group (Lbs.)</b>	314,137,719	317,261,678	--	--	<b>631,399,397</b>	647,905,214	-16,505,817
<b>% Volume by Group</b>	49.80%	50.20%	--	--	<b>100.0%</b>	100.0%	--



# Butter Study

## Butter Manufacturing Costs

Processing labor costs of \$0.0642 per pound represented 37 percent of the total butter manufacturing cost. Analysis revealed packaging to be the most costly labor performed (Figure 2). General plant labor includes plant supervision and various general plant labor expenses.

Figure 2. Butter Processing Labor

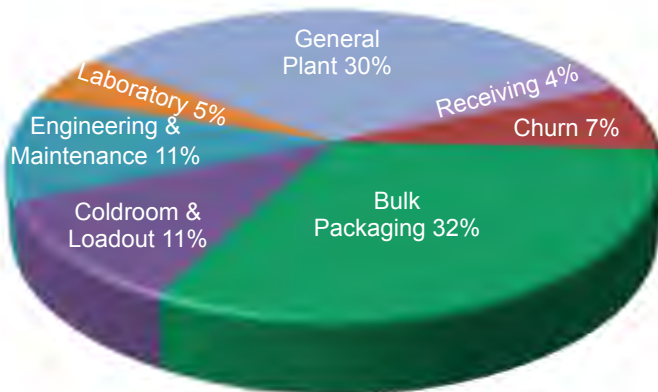
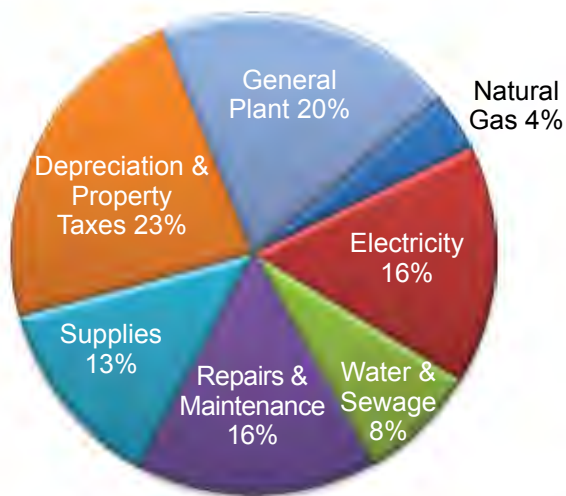
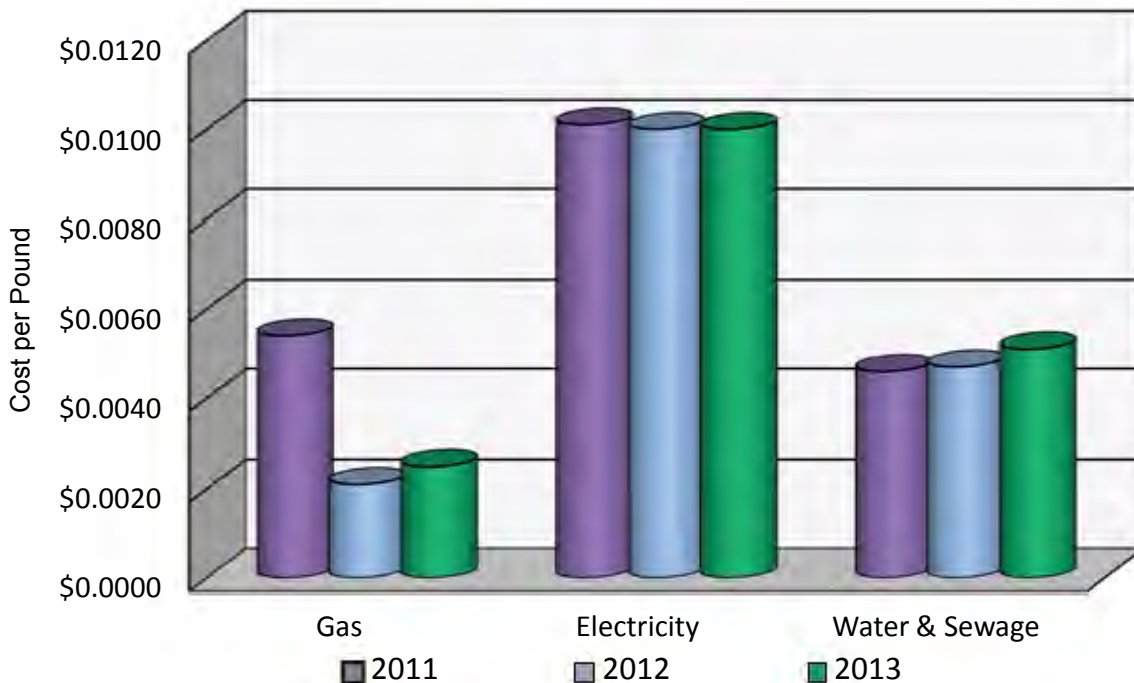


Figure 3. Butter Processing Non-Labor



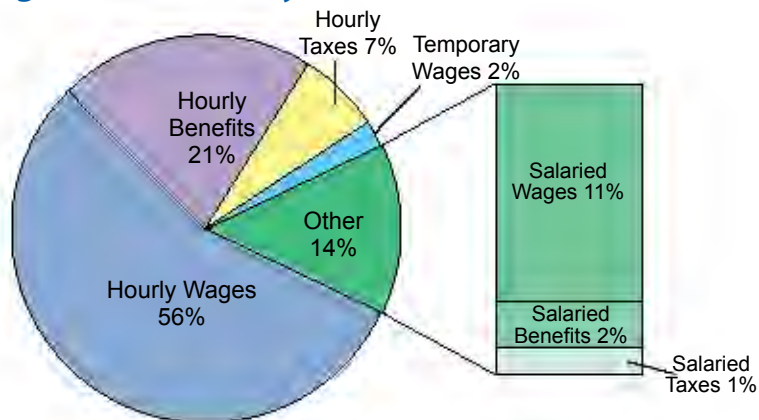
Processing non-labor costs of \$0.0643 per pound represented 37 percent of the total manufacturing cost. Furthermore, the combined utility costs for electricity, natural gas, water and sewage accounted for 28 percent of processing non-labor costs (Figure 3). Figure 4 below provides the changes in utility costs over a three-year period.

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.

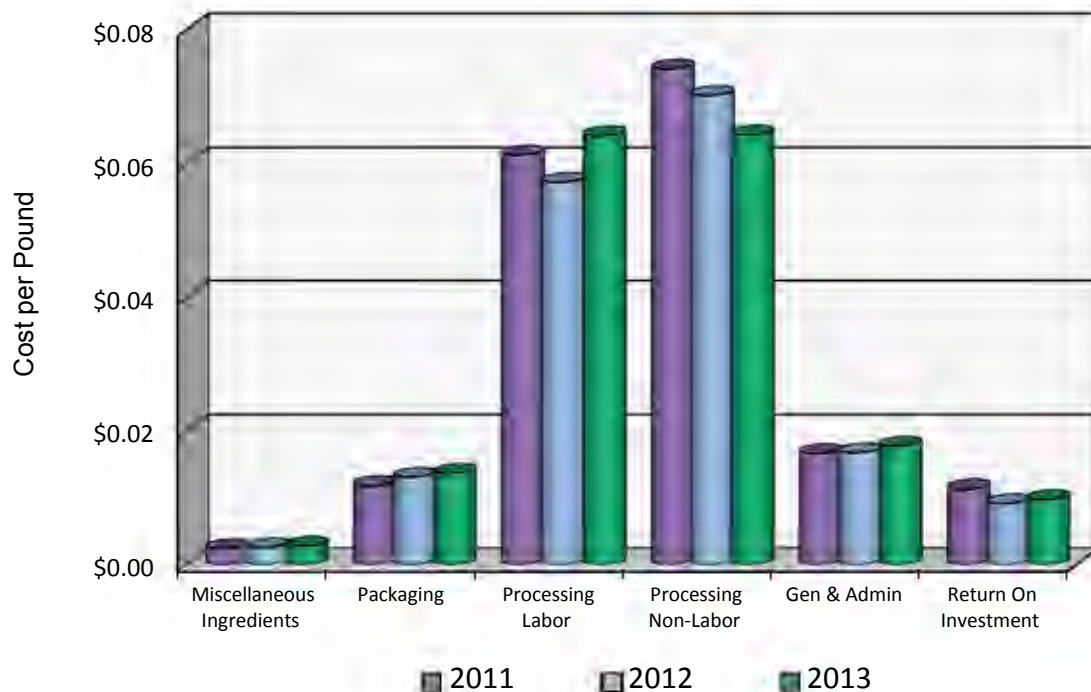
Packaging cost of \$0.0136 per pound represented 8 percent of the total manufacturing cost. Bulk packaging includes all non-reusable items used in the packaging of bulk butter, such as boxes, bags, cartons, liners, tape, glue, and stretch wrap.

Miscellaneous ingredient costs increased 8 percent in 2013. The weighted average cost of \$0.0028 per pound represented 2 percent of the total manufacturing cost.

ROI costs increased 7 percent to \$0.0098 per pound due in large part to a 3.38 percent increase in the Moody's "BAA" corporate bond index.

The cost of manufacturing butter increased to \$0.1724 from \$0.1688 per pound the year prior. Figure 6 provides a comparison for each category of cost over a three-year period.

**Figure 6. Butter Manufacturing Costs Comparison**



# Nonfat Dry Milk Study

The 2013 NFDM study included nine plants whose combined production was 565.44 million pounds, representing 96.30 percent of the NFDM processed in California. Although 2013 NFDM production volume decreased significantly from the prior year, there was very little change in the cost of its processing. This was due in large part to a significant increase in skim milk powder production and its contribution to overall powder production volume.

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 2013, 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 2013  
With Comparison to the same time period Prior Year (2012)

- Manufacturing cost data were collected and summarized from nine California NFDM plants. The nine plants processed 565.44 million pounds of NFDM during the 12-month study period, January through December 2013, representing 96.30% of the NFDM processed in California.
- The volume includes NFDM, both animal and human consumption. NFDM for human consumption represented 99.30% of the 565.44 million pounds of NFDM processed, and NFDM for animal consumption represented 0.70%.
- 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 2013**

Categories	Low Cost Group	Medium Cost Group	High Cost Group	Range of Costs		CURRENT Weighted Average Cost All Plants Jan-Dec 2013	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2012	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	\$0.0446	\$0.0483	\$0.0688	\$0.0288	\$0.1034	<b>\$0.0484</b>	\$0.0414	\$0.0070
Processing Non-Labor	\$0.0962	\$0.1201	\$0.1632	\$0.0936	\$0.2317	<b>\$0.1122</b>	\$0.1162	-\$0.0040
Packaging	\$0.0146	\$0.0146	\$0.0136	\$0.0134	\$0.0151	<b>\$0.0145</b>	\$0.0142	\$0.0003
General & Administrative	\$0.0100	\$0.0161	\$0.0156	\$0.0066	\$0.0240	<b>\$0.0130</b>	\$0.0147	-\$0.0017
Return on Investment	\$0.0059	\$0.0200	\$0.0066	\$0.0030	\$0.0275	<b>\$0.0116</b>	\$0.0134	-\$0.0018
<b>Average Total Cost</b>	\$0.1713	\$0.2191	\$0.2678	--	--	<b>\$0.1997</b>	\$0.1999	-\$0.0002
<b>Volume in Group (Lbs.)</b>	284,458,733	227,495,835	53,489,105	--	--	<b>565,443,673</b>	808,057,584	-242,613,911
<b>% Volume by Group</b>	50.31%	40.23%	9.46%	--	--	<b>100.0%</b>	100.0%	--



# Nonfat Dry Milk Study

## Nonfat Dry Milk Manufacturing Costs

Processing labor costs were \$0.0484 per pound, 17 percent higher than in 2012. The weighted average cost for 25-kg bag packaging labor was \$0.0069 per pound, representing 14 percent of processing labor costs (Figure 7).

Figure 7. NFDM Processing Labor

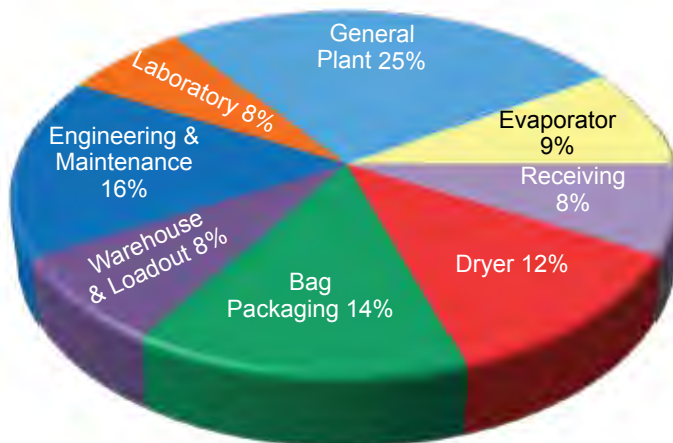
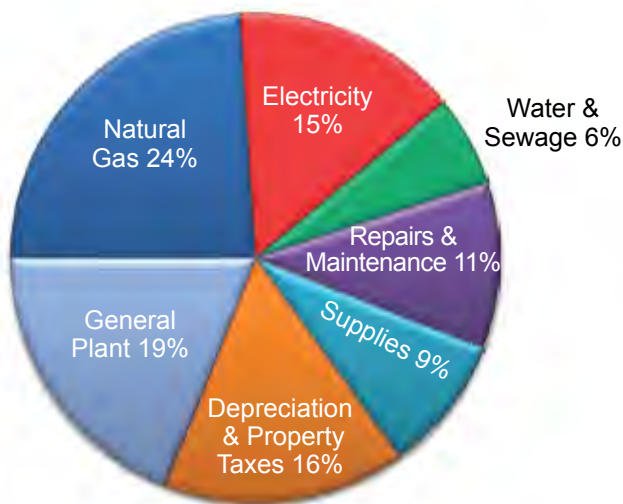
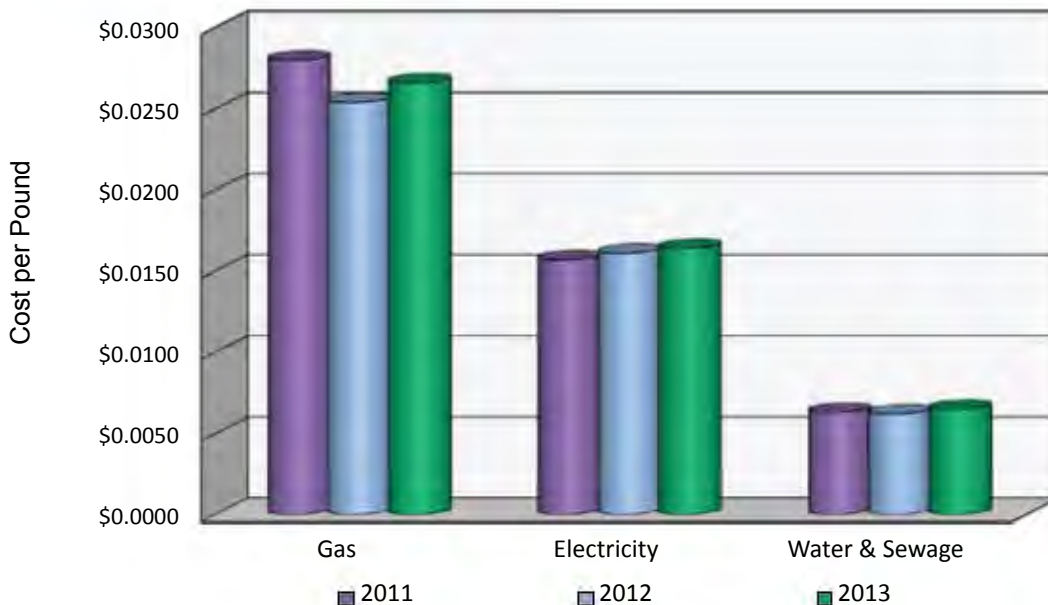


Figure 8. NFDM Processing Non-Labor



Processing non-labor costs of \$0.1122 per pound accounted for 56 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, so it comes as no surprise that natural gas costs were the largest processing non-labor expense (Figure 8). Figure 9 below provides the changes in utility costs over a three-year period.

Figure 9. NFDM Utilities Comparison



# Nonfat Dry Milk Study

Packaging costs of \$0.0145 per pound represented 7 percent of the total NFDM manufacturing cost. Sixty-three percent of the NFDM was packaged in 25-kg or 50-lb multi-wall bags; the remaining 37 percent was packaged in totes weighing between 1,100 to 3,200 lbs each (Figure 10).

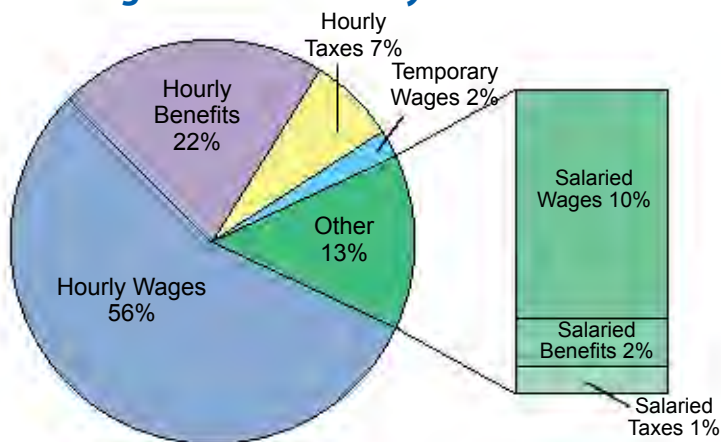
**Figure 10. NFDM Packaging Size**



General and administrative costs of \$0.0130 per pound represented 7 percent of the total 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. In 2013, ROI costs were \$0.0116 per pound.

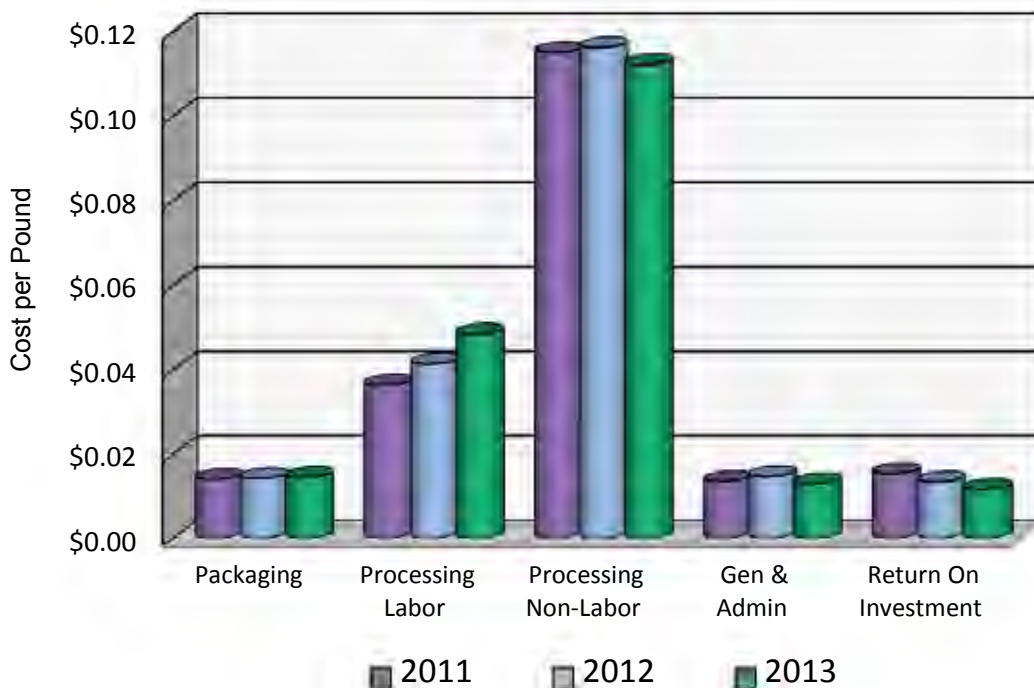
**Figure 11. NFDM Payroll Costs**



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 2013, the NFDM manufacturing cost decreased slightly to \$0.1997 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 2013, the cheese study included four processing plants. To avoid revealing plant specific information, the results gathered from all four plants were included in the calculation of one weighted average cost for each category of manufacturing expense (Table 3).

**Table 3. Cheese Manufacturing Costs**

CURRENT Study Period: January through December 2013  
With Comparison to the same time period Prior Year (2012)

- 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 12.11 lbs. of cheese per hundredweight of milk. The weighted average moisture was 37.20% and the weighted average vat tests were 4.28% fat and 9.38% SNF.

**Breakdown of Cheese Manufacturing Costs - January through December 2013**

Categories	Total Cost One Group	CURRENT Weighted Average Cost All Plants Jan-Dec 2013	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2012	Actual Difference Current Less Prior Year
<i>Dollars Per Pound of Cheese</i>				
Number of Plants	4	4	4	0
Processing Labor	\$0.0584	<b>\$0.0584</b>	\$0.0559	\$0.0025
Processing Non-Labor	\$0.0821	<b>\$0.0821</b>	\$0.0829	-\$0.0008
Packaging	\$0.0278	<b>\$0.0278</b>	\$0.0250	\$0.0028
Misc. Ingredients	\$0.0280	<b>\$0.0280</b>	\$0.0262	\$0.0018
General & Administrative	\$0.0286	<b>\$0.0286</b>	\$0.0235	\$0.0051
Return on Investment	\$0.0042	<b>\$0.0042</b>	\$0.0036	\$0.0006
<b>Average Total Cost</b>	\$0.2291	<b>\$0.2291</b>	\$0.2171	\$0.0120

# Cheese Study

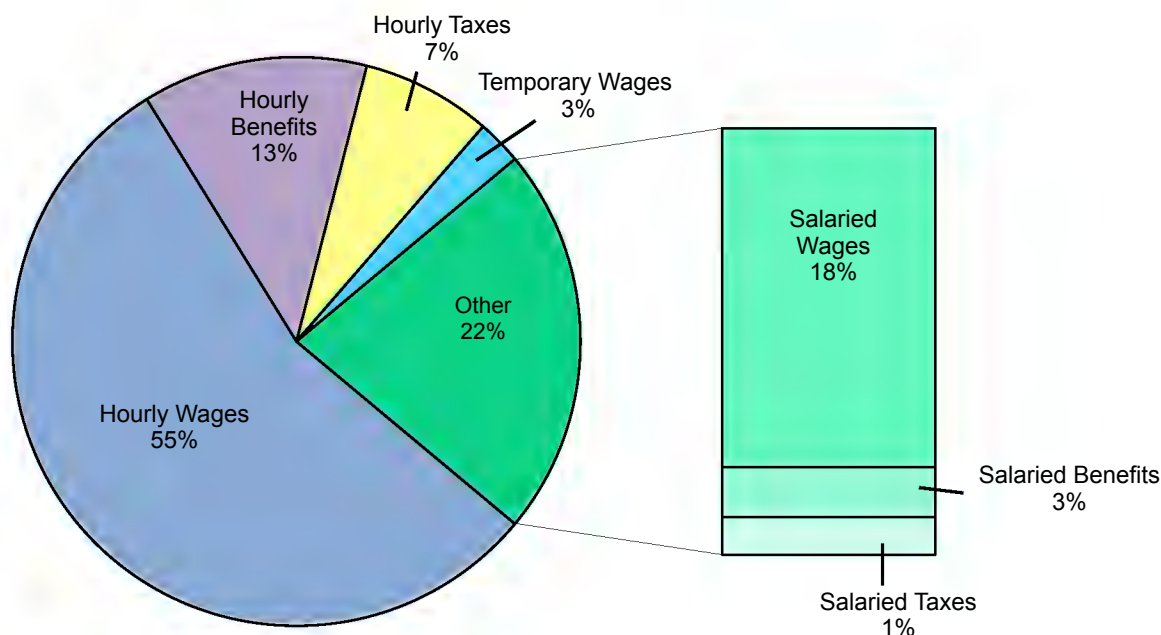
In addition to Cheddar and Jack cheeses, the plants processed various other types of cheese and cheese by-products. For all Cheddar cheese though, the weighted average vat yield was 12.11 pounds of cheese per hundredweight (cwt) of milk, the weighted average moisture was 37.20 percent, and the weighted average vat test was 4.28 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.)
2013	37.20	4.28	9.38	12.11
2012	37.25	4.20	9.38	12.17

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.

**Figure 13. Cheese Payroll Costs**





# Cheese Study

## Cheddar Cheese Manufacturing Costs

Processing labor costs were \$0.0584 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 2013, engineering and maintenance costs represented 20 percent of the processing labor cost (Figure 14).

Figure 14. Cheese Processing Labor

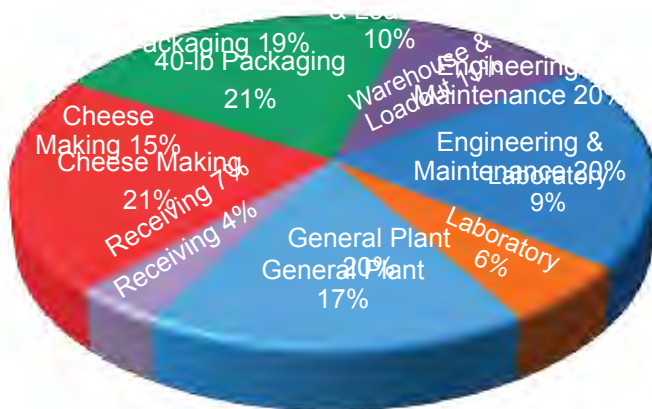
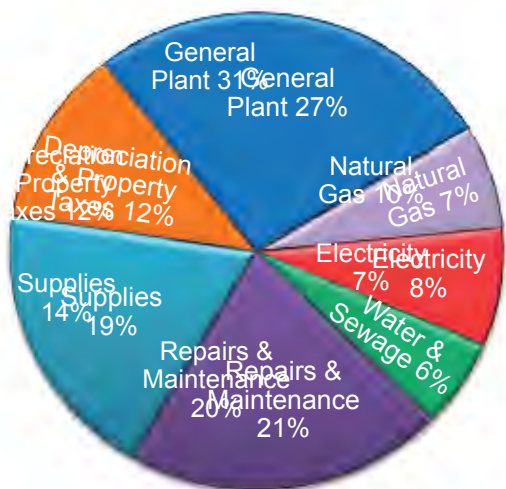
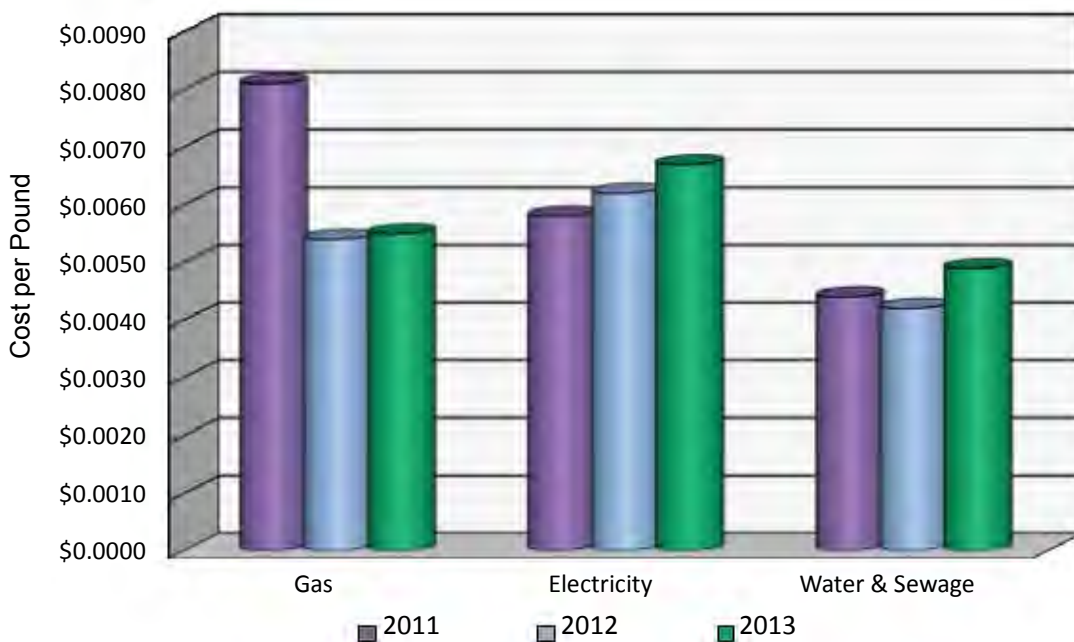


Figure 15. Cheese Processing Non-Labor



Processing non-labor costs of \$0.0821 per pound were 36 percent of the total manufacturing cost. Furthermore, the combined utility costs of gas, electricity, water and sewage accounted for 21 percent of processing non-labor costs (Figure 15). Figure 16 below provides the changes in utility costs over a three-year period.

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 \$0.0278 per pound.

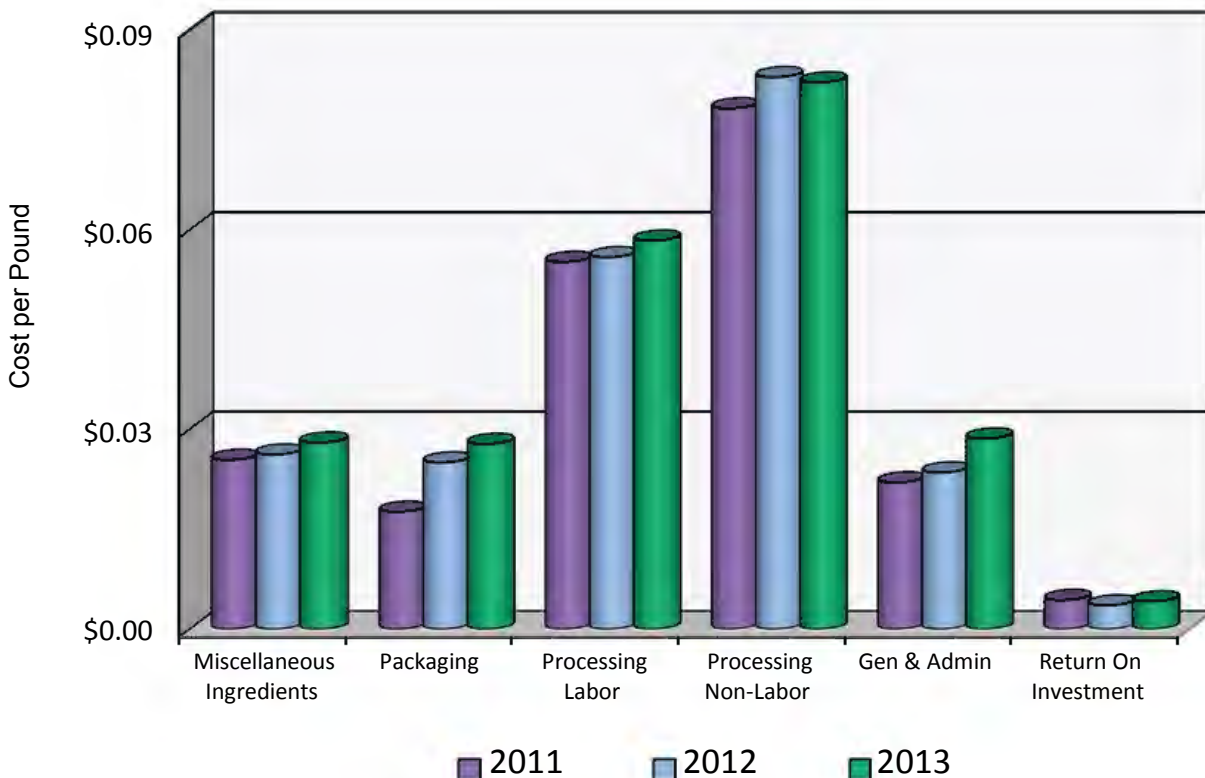
Miscellaneous ingredient costs for Cheddar cheese included salt, color, rennet, fortification costs, etc. In 2013, the weighted average cost increased 7 percent to \$0.0280 per pound.

General and administrative costs of \$0.0286 per pound accounted for 12 percent of the manufacturing cost.

Return on investment (ROI) costs increased 17 percent to \$0.0042 per pound and represented just 2 percent of the total manufacturing cost.

Overall, the 2013 cost of manufacturing cheese increased to \$0.2291 per pound. Figure 17 displays the type of changes occurring in each category of cost over a three-year period.

**Figure 17. Cheese Manufacturing Costs Comparison**



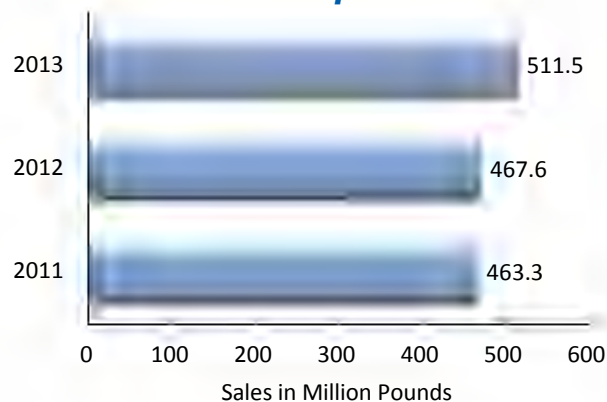
# Condensed Skim and Cream

The manufacturing cost of bulk dairy products, such as condensed skim and cream, are not as precise as packaged products like butter, NFDM, 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 2013, the condensed skim study was completed on eight plants whose combined sales were 511.5 million pounds (Figure 18). The weighted average manufacturing cost of condensed skim decreased 3 percent from the prior year to a cost of \$4.0639 per cwt. (Table 5).

**Figure 18. Condensed Skim Sales Comparison**



**Table 5. Condensed Skim Manufacturing Costs**

CURRENT Study Period: January through December 2013  
With Comparison to the same time period Prior Year (2012)

### Breakdown of Condensed Skim Manufacturing Costs January through December 2013

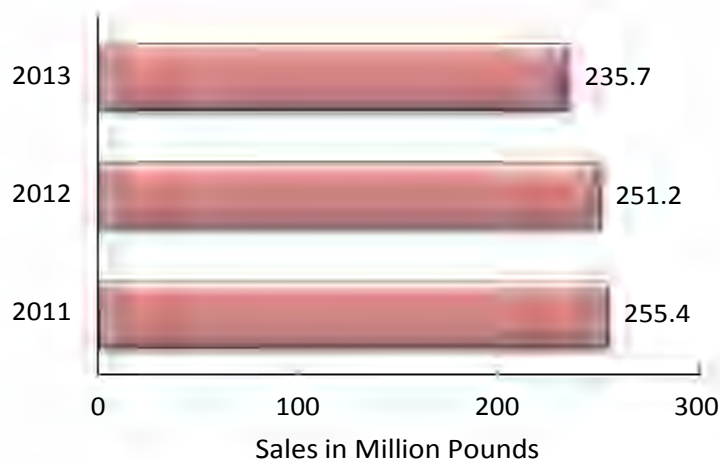
Categories	CURRENT Weighted Average Cost All Plants Jan-Dec 2013	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2012	Actual Difference Current Less Prior Year
<i>Dollars Per Pound of Condensed Skim</i>			
Number of Plants	8	8	0
Processing Labor	\$1.3353	\$1.3615	-\$0.0262
Processing Non-Labor	\$2.3336	\$2.4032	-\$0.0696
General & Administrative	\$0.2630	\$0.3129	-\$0.0499
Return on Investment	\$0.1320	\$0.1206	\$0.0114
<b>Average Total Cost</b>	<b>\$4.0639</b>	<b>\$4.1982</b>	<b>-\$0.1343</b>
Volume in Group (Lbs.)	511,497,053	467,618,665	43,878,388
% Volume by Group	100.0%	100.0%	--

# Condensed Skim & Cream

## Cream Overview

In 2013, the cream study included ten plants whose combined sales were more than 235.7 million pounds (Figure 20). The weighted average manufacturing cost of cream increased 12 percent to \$4.7547 per cwt. (Table 6).

**Figure 20. Cream Sales Comparison**



**Table 6. Cream Manufacturing Costs**

CURRENT Study Period: January through December 2013  
With Comparison to the same time period Prior Year (2012)

**Breakdown of Cream Manufacturing Costs  
January through December 2013**

Categories	CURRENT Weighted Average Cost All Plants Jan-Dec 2013	PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2012	Actual Difference Current Less Prior Year
	<i>Dollars Per Pound of Cream</i>		
Number of Plants	10	10	0
Processing Labor	\$1.5077	\$1.3349	\$0.1728
Processing Non-Labor	\$2.6628	\$2.3245	\$0.3383
General & Administrative	\$0.4065	\$0.4073	-\$0.0008
Return on Investment	\$0.1777	\$0.1782	-\$0.0005
<b>Average Total Cost</b>	<b>\$4.7547</b>	<b>\$4.2449</b>	<b>\$0.5098</b>
Volume in Group (Lbs.)	235,728,771	251,201,046	-15,472,275
% Volume by Group	100.0%	100.0%	--

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

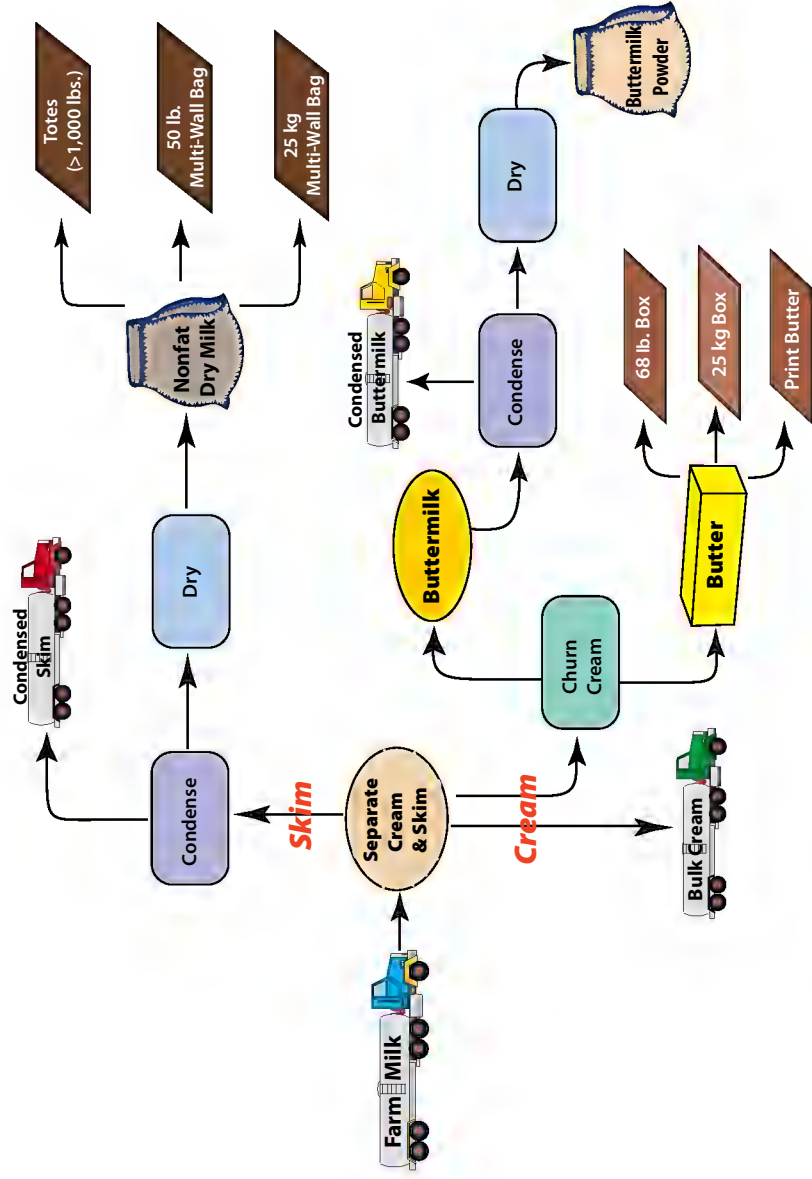


Figure 23. Simplified Flowchart of a Cheese Plant with By-Product Processing

