



# **Manufacturing Cost Annual**

**California 2011 Data**





CALIFORNIA

# Manufacturing Cost Annual

2011 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 2011 California Manufacturing Cost Annual includes data obtained from eight 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

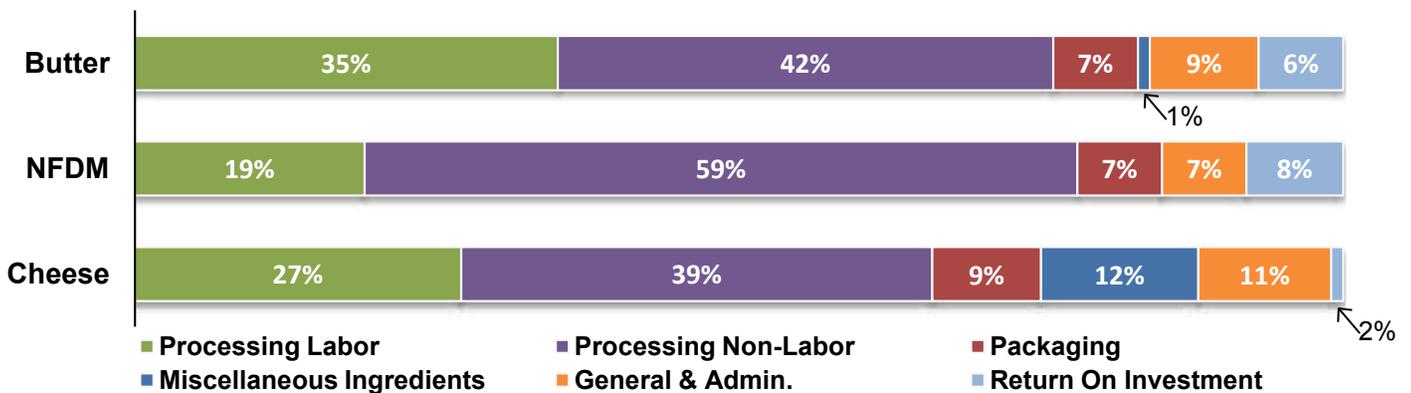
## Manufacturing Cost Overview

The weighted average manufacturing cost of a product 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 eight butter processing plants. The eight plants processed 617.01 million pounds of butter during the period January 2011 through December 2011, representing 99.13 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 2011, each 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 2011  
With Comparison to the same time period Prior Year (2010)

- Manufacturing cost data were collected and summarized from eight California butter plants. The eight plants processed 617.01 million pounds of butter during the 12-month study period, January through December 2011, representing 99.13% 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 2011**

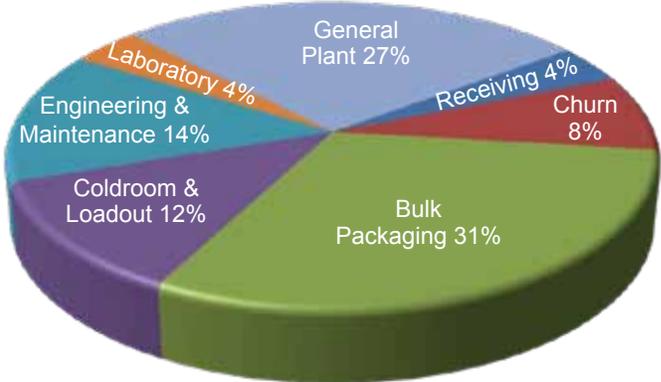
| Categories                         | Low Cost Group | High Cost Group | Range of Costs |          | CURRENT Weighted Average Cost All Plants Jan-Dec 2011 | PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2010 | Actual Difference Current Less Prior Year |
|------------------------------------|----------------|-----------------|----------------|----------|---|--|---|
|                                    |                |                 | Minimum        | Maximum  |   |  |   |
| <i>Dollars Per Pound of Butter</i> |                |                 |                |          |   |  |   |
| Number of Plants                   | 4              | 4               | 8              | 8        | 8   | 8  | 0   |
| Processing Labor                   | \$0.0688       | \$0.0479        | \$0.0303       | \$0.1076 | \$0.0613  | \$0.0598   | \$0.0015                                  |
| Processing Non-Labor               | \$0.0673       | \$0.0864        | \$0.0559       | \$0.1450 | \$0.0741  | \$0.0694   | \$0.0047                                  |
| Packaging                          | \$0.0123       | \$0.0109        | \$0.0107       | \$0.0134 | \$0.0118  | \$0.0116   | \$0.0002                                  |
| Misc. Ingredients                  | \$0.0025       | \$0.0023        | \$0.0019       | \$0.0030 | \$0.0024  | \$0.0021   | \$0.0003                                  |
| General & Administrative           | \$0.0139       | \$0.0214        | \$0.0043       | \$0.0670 | \$0.0166  | \$0.0222   | -\$0.0056                                 |
| Return on Investment               | \$0.0080       | \$0.0173        | \$0.0025       | \$0.0270 | \$0.0113  | \$0.0130   | -\$0.0017                                 |
| <b>Average Total Cost</b>          | \$0.1728       | \$0.1862        | --             | --       | <b>\$0.1775</b>                                       | \$0.1781   | -\$0.0006                                 |
| <b>Volume in Group (Lbs.)</b>      | 396,910,378    | 220,096,021     | --             | --       | <b>617,006,399</b>                                    | 552,378,895  | 64,627,504                                |
| <b>% Volume by Group</b>           | 64.30%         | 35.70%          | --             | --       | <b>100.0%</b>   | 100.0%   | --  |

# Butter Study

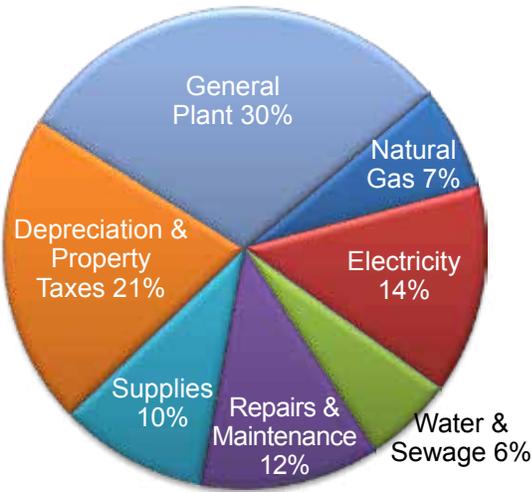
## Butter Manufacturing Costs

Processing labor costs of \$0.0613 per pound represented 35 percent of the total butter manufacturing cost. Analysis revealed packaging to be the most costly labor function performed (Figure 2).

**Figure 2. Butter Processing Labor**

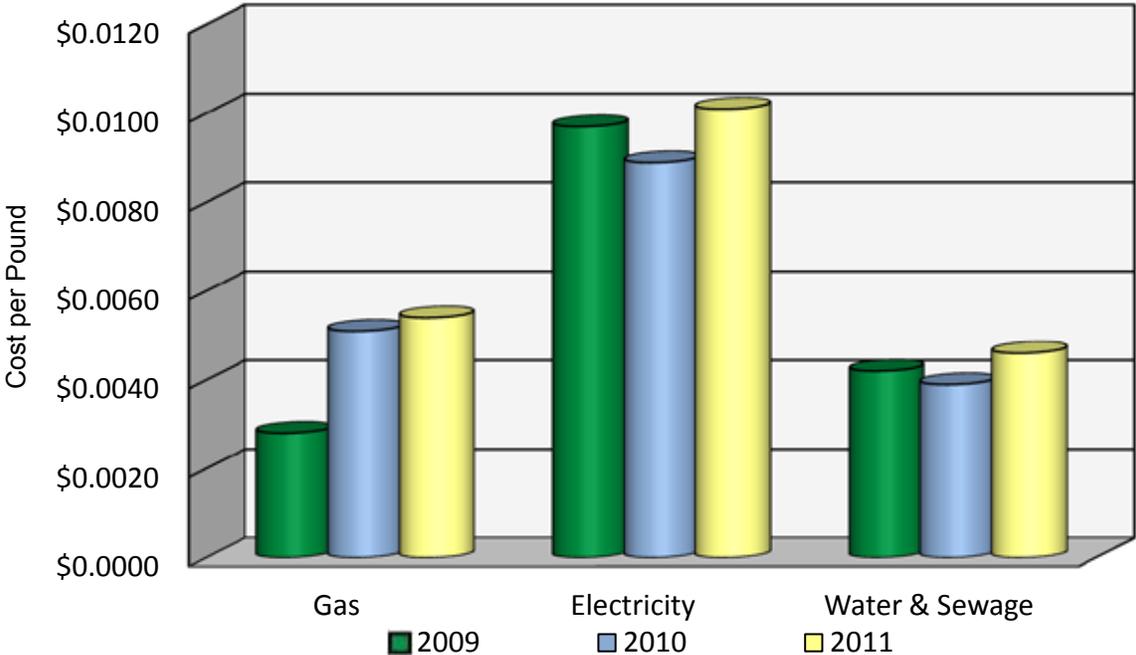


**Figure 3. Butter Processing Non-Labor**



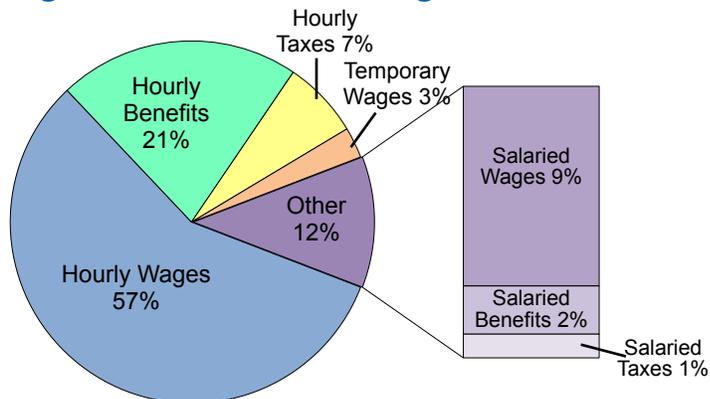
Processing non-labor costs of \$0.0741 per pound represented 42 percent of the total manufacturing cost. Furthermore, the combined utility costs for electricity, natural gas, water and sewage accounted for 27 percent of processing non-labor costs (Figure 3). An annual comparison of utility costs is presented below (Figure 4).

**Figure 4. Butter Utilities Comparison**



# Butter Study

**Figure 5. Butter Processing Labor**



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

Packaging costs of \$0.0118 per pound represented 7 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.

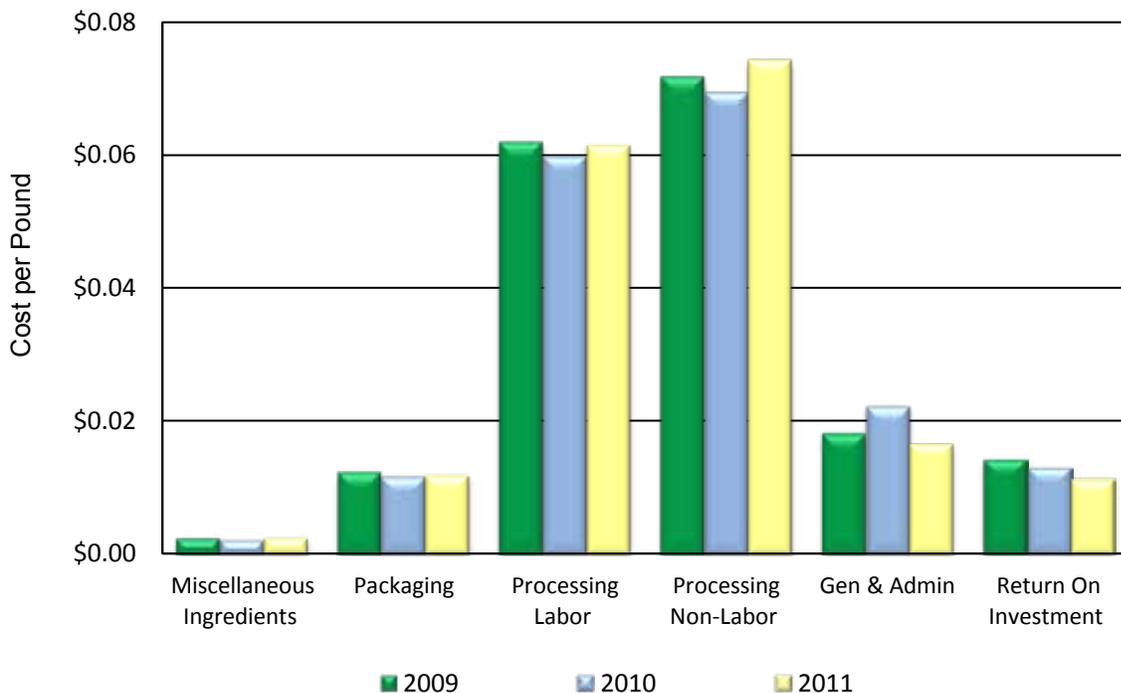
Miscellaneous ingredient costs increased 14 percent in 2011. The weighted average cost of \$0.0024 per pound represented 1 percent of the total manufacturing cost.

General and administrative costs of \$0.0166 per pound represented 9 percent of the total manufacturing cost.

Return on investment costs decreased to \$0.0113 per pound but at 6 percent, represented a significant portion of the manufacturing cost.

The cost of manufacturing butter decreased to \$0.1775 from \$0.1781 per pound the year prior. Figure 6 provides us a comparison for each cost category over a three-year period.

**Figure 6. Butter Manufacturing Costs Comparison**



# Nonfat Dry Milk Study

The 2011 nonfat dry milk (NFDM) study included nine plants whose combined production was 741.17 million pounds, representing 97.05 percent of the NFDM produced in California. Of the 741.17 million pounds produced, 99.58 percent was sold for human consumption, and 0.42 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 2011, 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 2011  
With Comparison to the same time period Prior Year (2010)

- Manufacturing cost data were collected and summarized from nine California NFDM plants. The nine plants processed 741.17 million pounds of NFDM during the 12-month study period, January through December 2011, representing 97.05% of the NFDM processed in California.
- The volume includes NFDM, both animal and human consumption. NFDM for human consumption represented 99.58% of the 741.17 million pounds of NFDM processed, and NFDM for animal consumption represented 0.42%.
- 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 2011**

| Categories                       | Low Cost Group | Medium Cost Group | High Cost Group | Range of Costs |          | CURRENT Weighted Average Cost All Plants Jan-Dec 2011 | PRIOR YEAR Weighted Avg Cost All Plants Jan-Dec 2010 | 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                 | \$0.0418       | \$0.0303          | \$0.0548        | \$0.0238       | \$0.1053 | \$0.0363  | \$0.0388   | -\$0.0025                                 |
| Processing Non-Labor             | \$0.1021       | \$0.1213          | \$0.1498        | \$0.0956       | \$0.2291 | \$0.1150  | \$0.1194   | -\$0.0044                                 |
| Packaging                        | \$0.0149       | \$0.0133          | \$0.0136        | \$0.0122       | \$0.0161 | \$0.0140  | \$0.0142   | -\$0.0002                                 |
| General & Administrative         | \$0.0100       | \$0.0158          | \$0.0187        | \$0.0048       | \$0.0256 | \$0.0135  | \$0.0164   | -\$0.0029                                 |
| Return on Investment             | \$0.0058       | \$0.0234          | \$0.0087        | \$0.0028       | \$0.0331 | \$0.0154  | \$0.0182   | -\$0.0028                                 |
| <b>Average Total Cost</b>        | \$0.1746       | \$0.2041          | \$0.2456        | --             | --       | <b>\$0.1942</b>                                       | \$0.2070   | -\$0.0128                                 |
| Volume in Group (Lbs.)           | 304,198,753    | 397,696,236       | 39,279,079      | --             | --       | <b>741,174,068</b>                                    | 875,039,750  | -133,865,682                              |
| % Volume by Group                | 41.04%         | 53.66%            | 5.30%           | --             | --       | <b>100.0%</b>   | 100.0%   | --  |

# Nonfat Dry Milk Study

## Nonfat Dry Milk Manufacturing Costs

Processing labor costs were \$0.0363 per pound, 6 percent lower than in 2010. The weighted average cost for 25-kg bag packaging labor was \$0.0044 per pound, representing 12 percent of processing labor costs (Figure 7).

Figure 7. NFDM Processing Labor

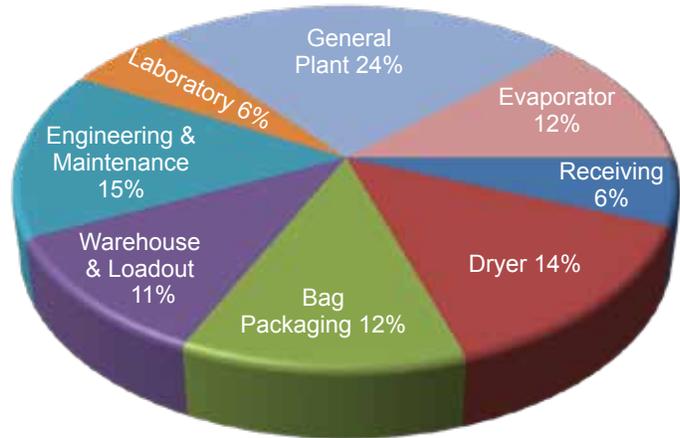
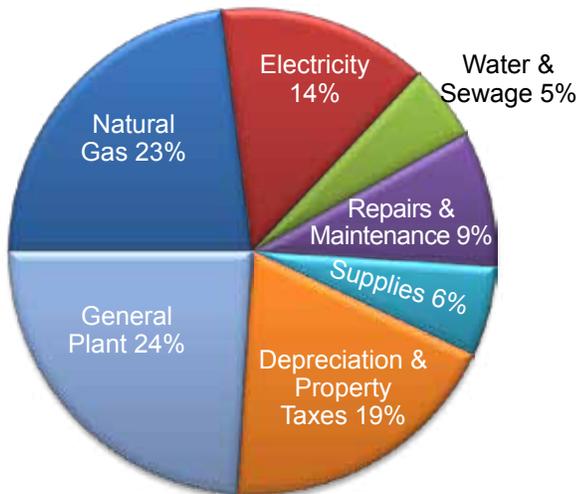
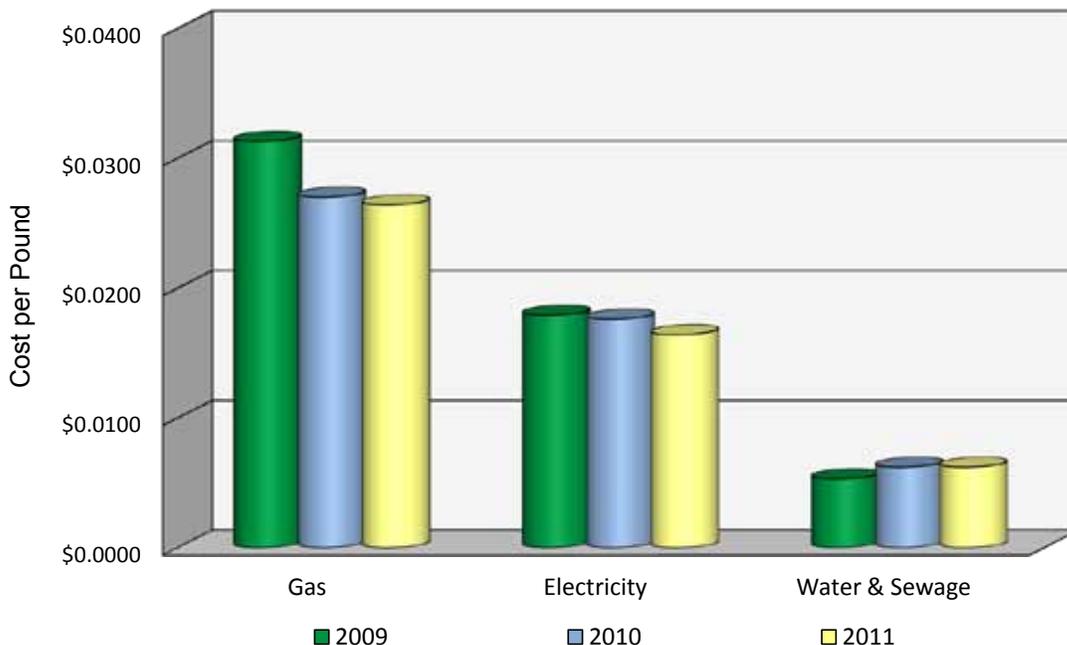


Figure 8. NFDM Processing Non-Labor



Processing non-labor costs of \$0.1150 per pound accounted for 59 percent of the NFDM manufacturing cost. The operation of both an evaporator and a dryer adds significantly to the utility costs of a NFDM processing plant. In 2011, the utilities cost was 42 percent of processing non-labor costs (Figure 8). An annual comparison of utility costs is provided below (Figure 9).

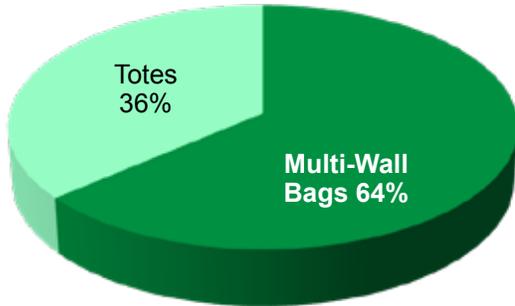
Figure 9. NFDM Utilities Comparison



# Nonfat Dry Milk Study

Packaging costs of \$0.0140 per pound represented 7 percent of the total NFDM manufacturing cost.

**Figure 10. NFDM Packaging Size**



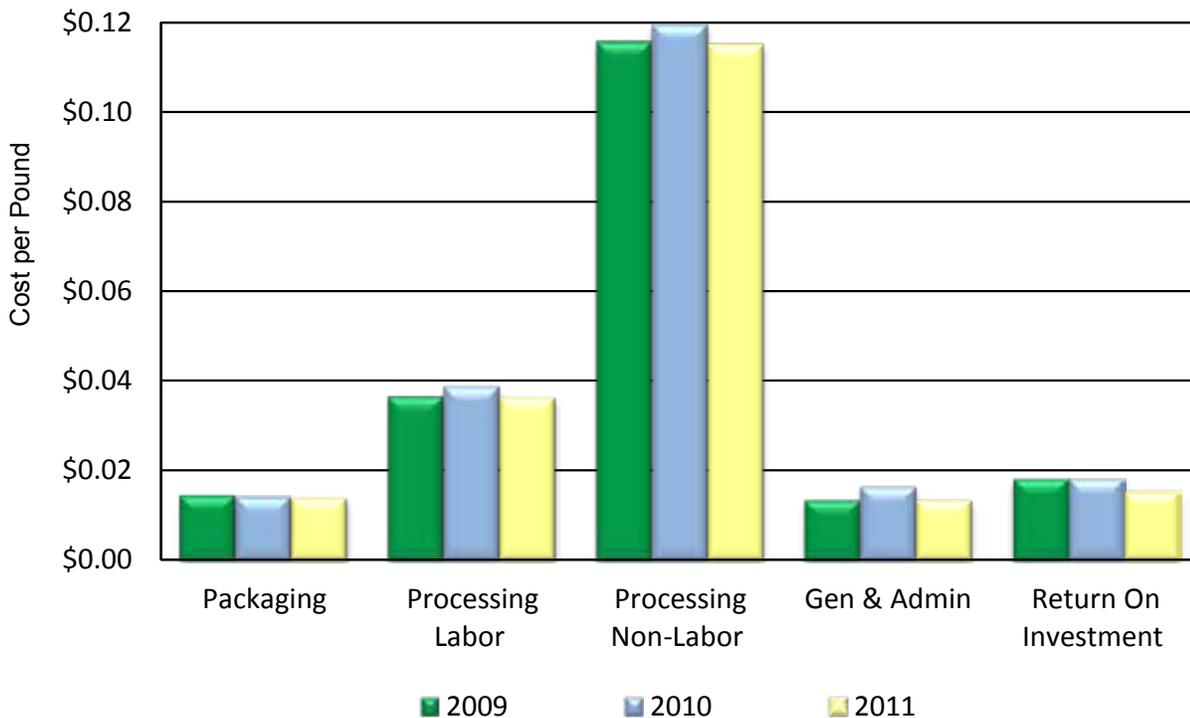
Sixty-four percent of the NFDM was packaged in 25-kg or 50-lb multi-wall bags; the remaining 36 percent was packaged in totes weighing between 1,100 to 3,200 lbs each (Figure 10).

General and administrative costs of \$0.0135 per pound accounted for 7 percent of the NFDM manufacturing cost.

The return on investment (ROI) allowance is calculated by subtracting accumulated depreciation from the original cost of assets. Next, the remaining book value is multiplied by the Moody's "BAA" corporate bond index. The resulting amount is then allocated to the products based on the same methods used to allocate the depreciation expense. In 2011, ROI costs were \$0.0154 per pound.

In 2011, the NFDM manufacturing cost decreased 6 percent from the prior year to \$0.1942 per pound. Figure 11 shows the changes that have occurred in each cost category over a three-year period.

**Figure 11. NFDM Manufacturing Costs Comparison**



# Cheese Study

In 2011, 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 figure for each category of 40 lb block Cheddar cheese processing cost (Table 3).

**Table 3. Cheese Manufacturing Costs**

CURRENT Study Period: January through December 2011  
With Comparison to the same time period Prior Year (2010)

- 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 12.21 lbs. of cheese per hundredweight of milk. The weighted average moisture was 37.37% and the weighted average vat tests were 4.30% fat and 9.29% SNF.

**Breakdown of Cheese Manufacturing Costs - January through December 2011**

| Categories                         | Total Cost One Group | CURRENT Weighted Average Cost All Plants Jan-Dec 2011 | PRIOR YEAR Weighted Average Cost All Plants Jan-Dec 2010 | Actual Difference Current Less Prior Year |
|------------------------------------|----------------------|---|--|---|
| <i>Dollars Per Pound of Cheese</i> |                      |   |  |   |
| Number of Plants                   | 4                    | 4   | 6  | -2  |
| Processing Labor                   | \$0.0552             | <b>\$0.0552</b>                                       | \$0.0481   | \$0.0071                                  |
| Processing Non-Labor               | \$0.0782             | <b>\$0.0782</b>                                       | \$0.0766   | \$0.0016                                  |
| Packaging                          | \$0.0177             | <b>\$0.0177</b>                                       | \$0.0228   | -\$0.0051                                 |
| Misc. Ingredients                  | \$0.0254             | <b>\$0.0254</b>                                       | \$0.0211   | \$0.0043                                  |
| General & Administrative           | \$0.0220             | <b>\$0.0220</b>                                       | \$0.0189   | \$0.0031                                  |
| Return on Investment               | \$0.0044             | <b>\$0.0044</b>                                       | \$0.0046   | -\$0.0002                                 |
| <b>Average Total Cost</b>          | \$0.2029             | <b>\$0.2029</b>                                       | \$0.1921   | \$0.0108                                  |
| <b>Volume in Group (Lbs.)</b>      |                      |   | 585,108,135  |   |

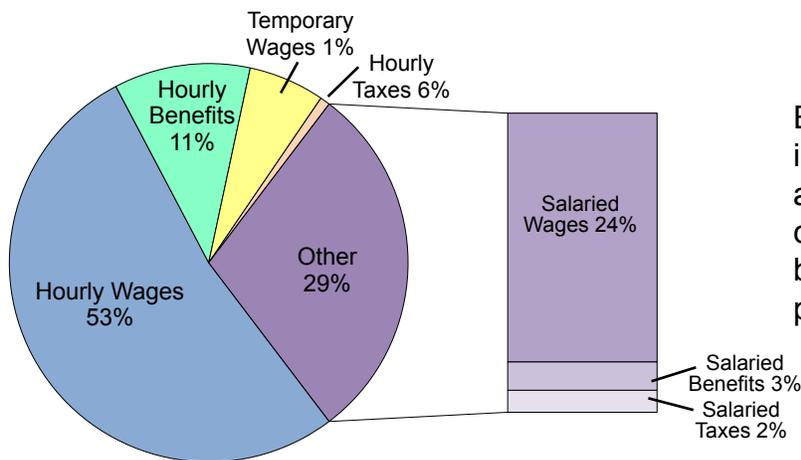
# Cheese Study

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 12.21 pounds of cheese per hundredweight (cwt) of milk, the weighted average moisture was 37.37 percent, and the weighted average vat test was 4.30 percent fat and 9.29 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.) |
|------|---------------------|----------------|----------------|------------------|
| 2011 | 37.37               | 4.30           | 9.29           | 12.21            |
| 2010 | 37.78               | 4.67           | 9.60           | 13.70            |

**Figure 12. Cheese Dry Milk Payroll Costs**



Employer paid expenses for payroll include gross wages, fringe benefits, and payroll taxes (includes workers comp). Figure 12 provides a breakdown of plant payroll costs by percentage.



# Cheese Study

## Cheddar Cheese Manufacturing Costs

Processing labor costs were \$0.0552 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. Notably, engineering and maintenance costs represented 20 percent of the processing labor cost (Figure 13).

Figure 13. Cheese Processing Labor

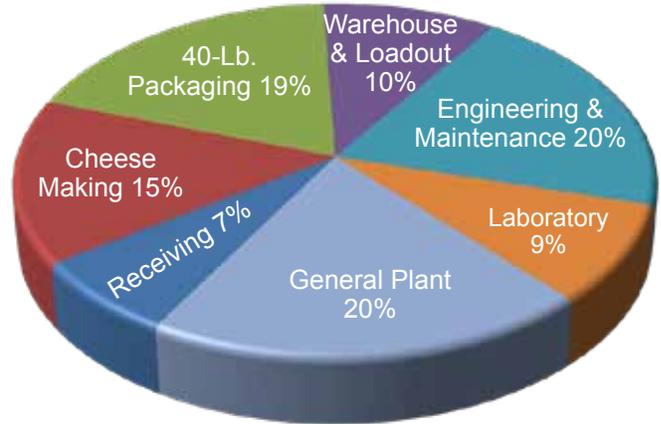
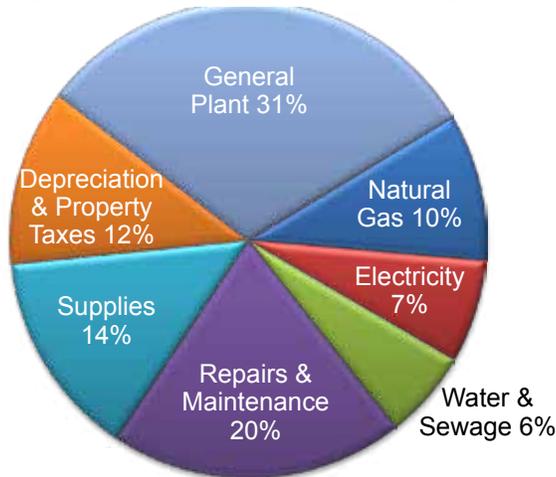
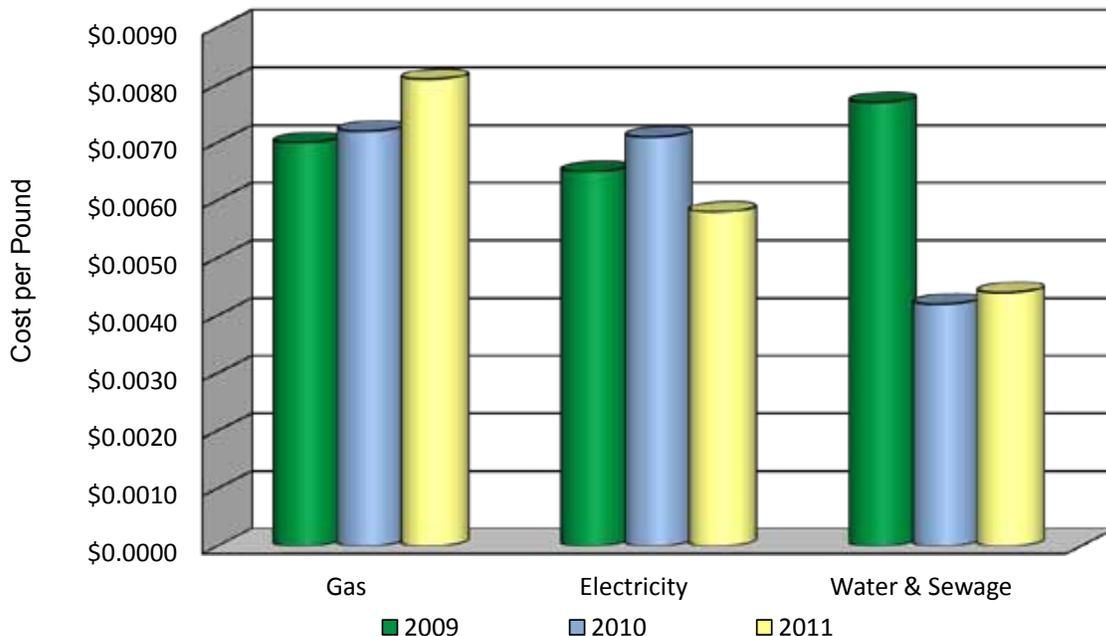


Figure 14. Cheese Processing Non-Labor



Processing non-labor costs of \$0.0782 per pound were 39 percent of the total manufacturing cost. Furthermore, the combined utility costs of gas, electricity, water and sewage accounted for 23 percent of processing non-labor costs (Figure 14). An annual comparison of utility costs is presented below (Figure 15).

Figure 15. 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 \$0.0177 per pound.

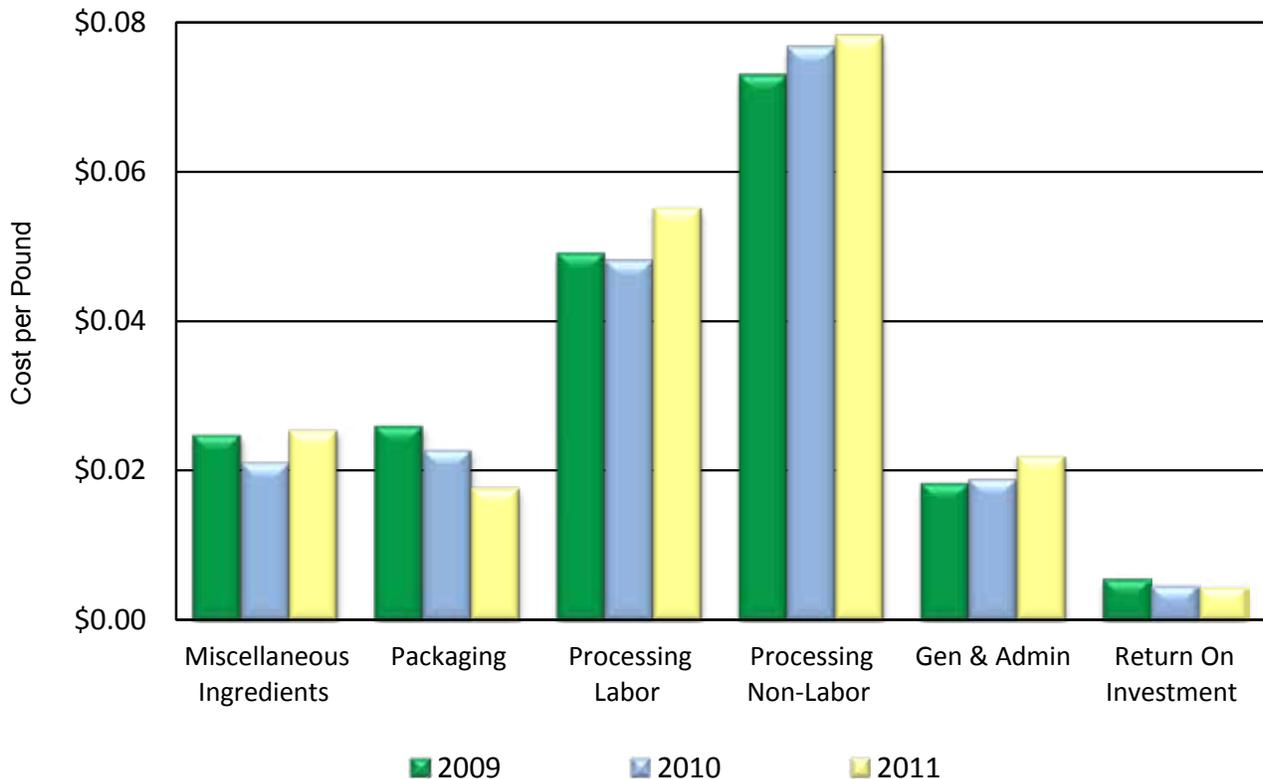
Miscellaneous ingredient costs for Cheddar cheese included salt, color, rennet, fortification costs, etc. The weighted average cost increased 20 percent to \$0.0254 per pound from 2010.

General and administrative costs of \$0.0220 per pound accounted for 11 percent of the manufacturing cost.

Return on investment (ROI) costs were \$0.0044 per pound, a 4 percent decrease from the prior year. ROI costs represented just 2 percent of the total manufacturing cost.

Overall, the cost of manufacturing cheese increased to \$0.2029 per pound from the prior year. Figure 16 illustrates the changes occurring in each category of cost over a three-year period.

**Figure 16. Cheese Manufacturing Costs Comparison**



# Condensed Skim & Cream

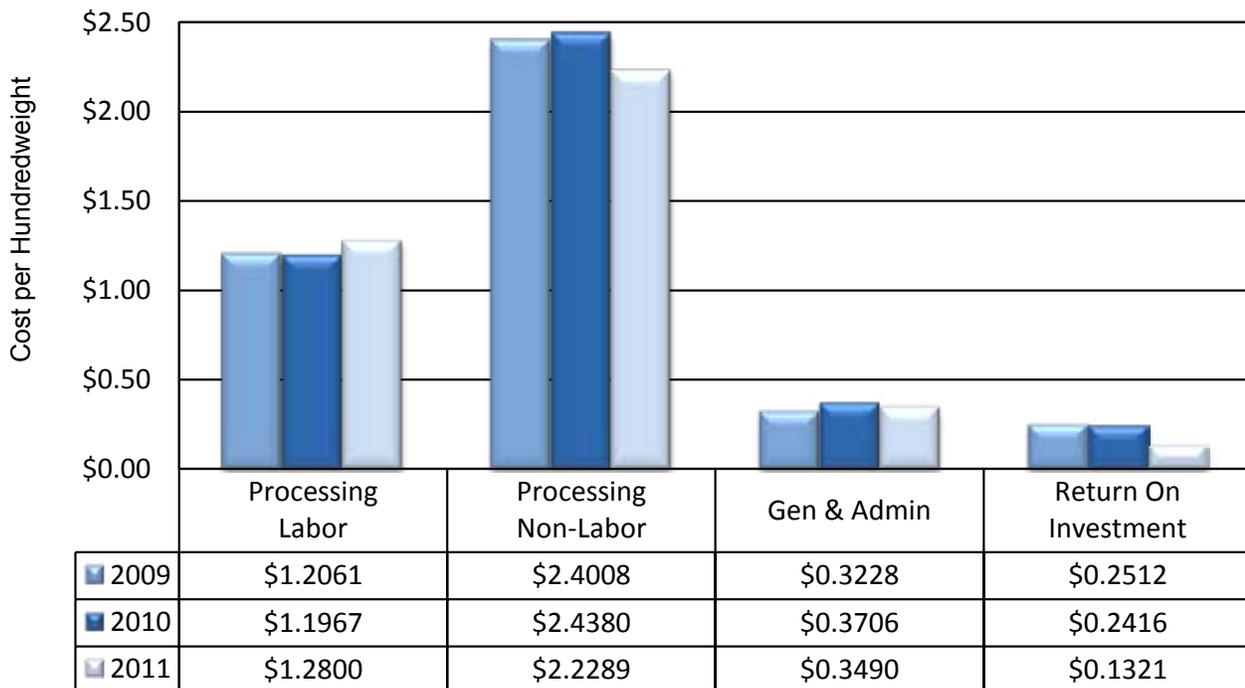
The manufacturing cost of bulk dairy products, such as condensed skim and cream, are not as precise as packaged products like butter, NFDM, and cheese. There are very few direct costs associated with bulk dairy products. Most, if not all, bulk dairy product costs are derived from the general plant costs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

Homogenization is a process where the fat particulates of milk are reduced in size to make a product more uniform in consistency and taste. Prior to being homogenized though, cream and condensed skim may be separated from milk and sold as a valuable commodity or utilized to make products such as butter, powder, or cheese.

## Condensed Skim Overview

In 2011, the condensed skim study was completed on nine plants whose combined sales were 463.3 million pounds. The weighted average manufacturing cost of condensed skim decreased 6 percent from the prior year to a cost of \$3.99 per cwt. (Figure 17).

**Figure 17. Condensed Skim Manufacturing Costs Comparison**

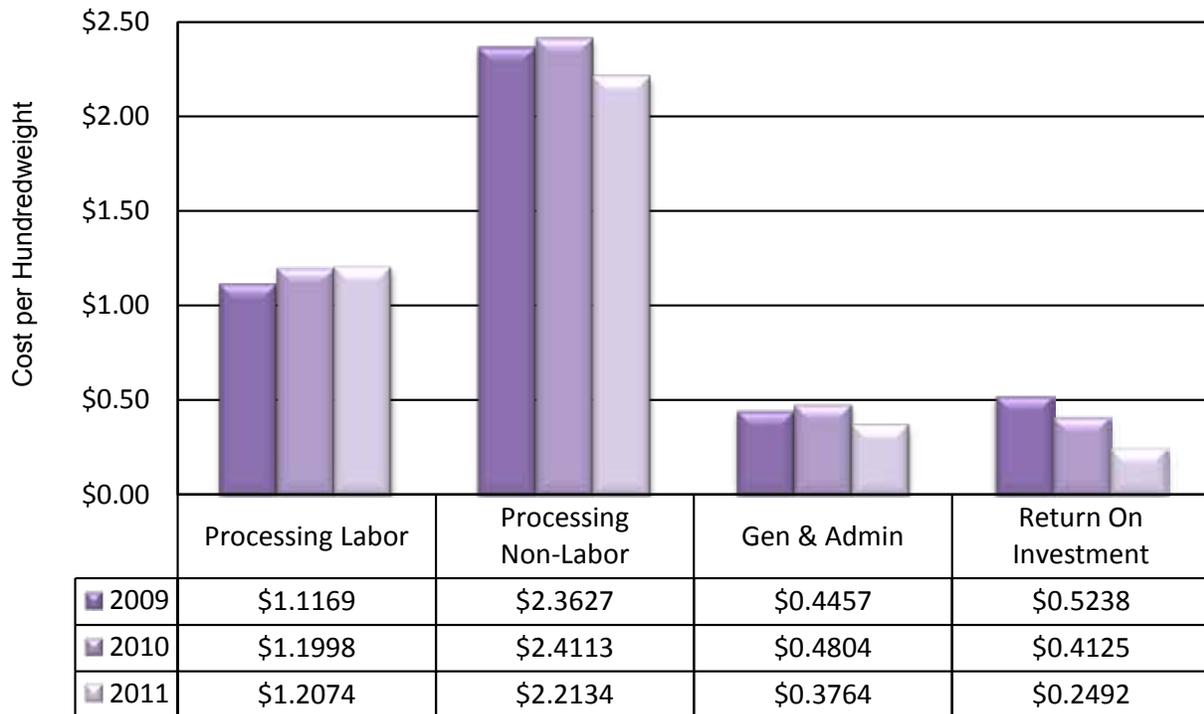


# Condensed Skim & Cream

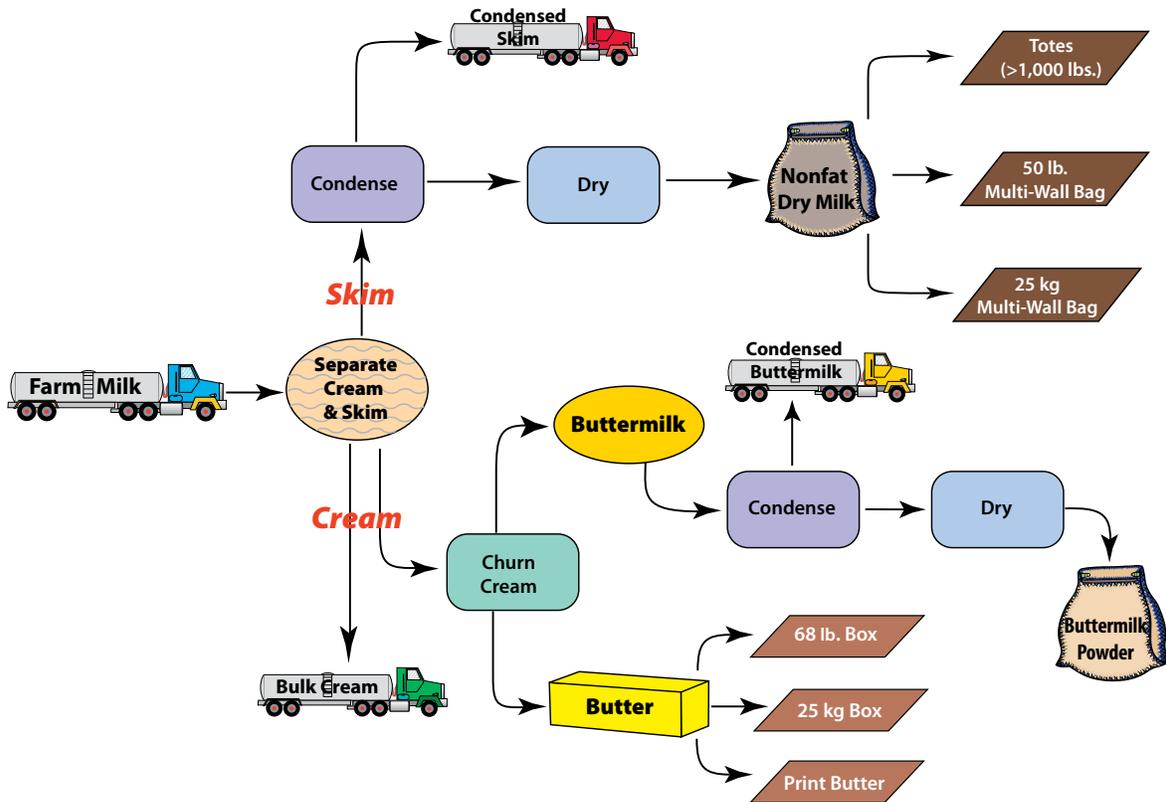
## Cream Overview

In 2011, the cream study included ten plants whose combined sales were 255.4 million pounds. The weighted average manufacturing cost of cream decreased 10 percent from the prior year to a cost of \$4.05 per cwt. (Figure 18).

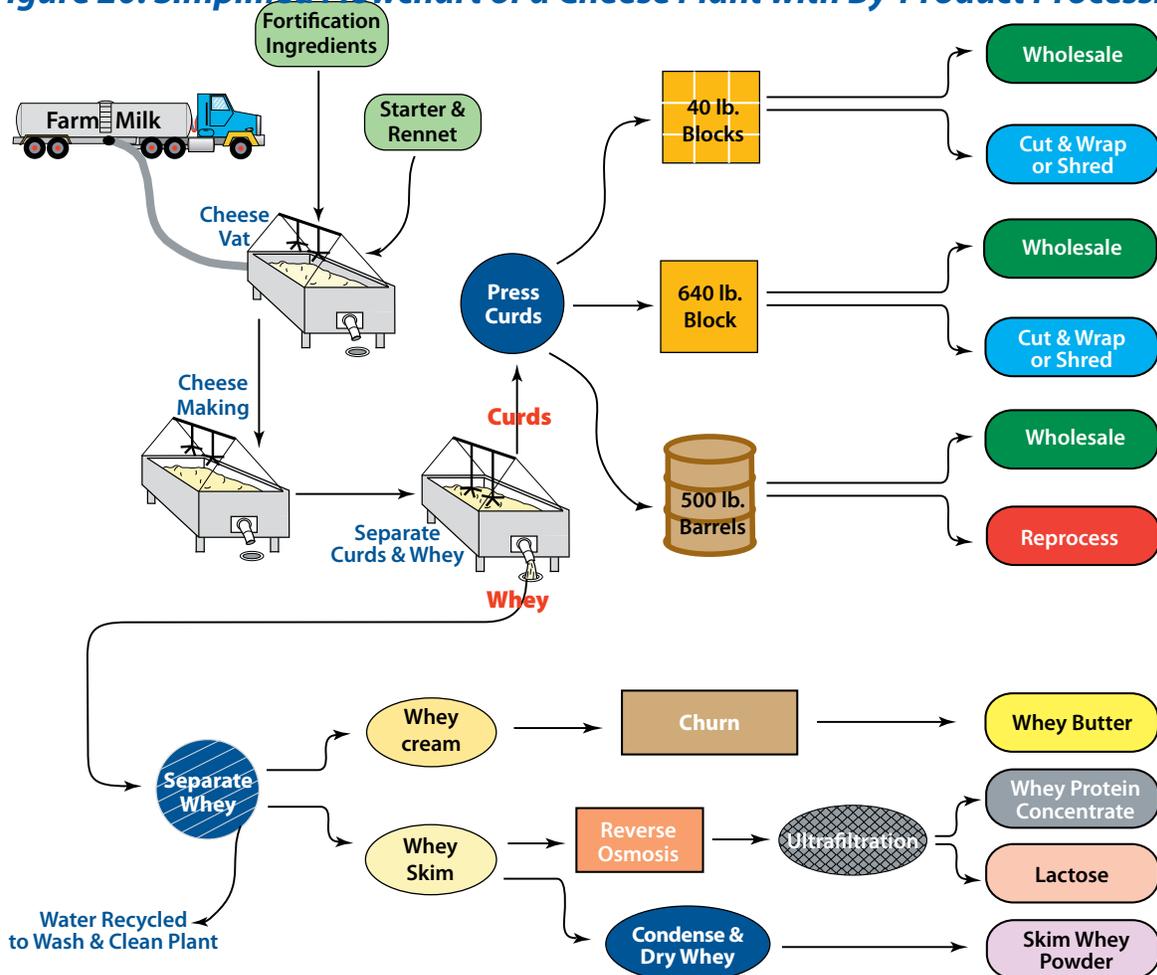
**Figure 18. Cream Manufacturing Costs Comparison**



**Figure 19. Simplified Flowchart of a Butter and Nonfat Dry Milk Plant**



**Figure 20. 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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