Energy Tracking Large Enterprise Case Study

Example energy tracking data for a large food manufacturing plant is contained on the following pages. Table 1 presents the combined utility inputs for the facility during a one-year period and represents two electrical and one natural gas account. The table shows that the annual energy cost for electricity and natural gas is $10,527,231. The tracking software also has space for storing water usage and cost. The summary sheet presents the combined usage and cost for electrical and fossil energy. The usage and cost for individual utility accounts is presented in separate tables.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 1** | | | | | | | | | | |
| **FACILITY UTILITY SUMMARY REPORT** | | | | | | | | | | |
| **Processing Plant** | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |
| **MONTH** | **DAYS** | **ELECTRICITY USE (KWH)** | **ELECTRICITY COST ($)** | **FOSSIL FUEL USE (MMBTU)** | **FOSSIL FUEL COST ($)** | **WATER USE (KGAL)** | **WATER COST ($)** | **TOTAL ENERGY (MMBTU)** | **TOTAL UTILITY COST ($)** | **AVERAGE COST ($/MMBTU)** |
|  |  |  |  |  |  |  |  |  |  |  |
| Nov-10 | 30 | 9,397,344 | $562,350 | 17,074 | $282,608 | 53,807 | $141,997 | 49,138 | $986,955 | $17.20 |
| Dec-10 | 30 | 9,118,128 | $589,990 | 19,060 | $261,965 | 52,278 | $140,850 | 50,171 | $992,805 | $16.98 |
| Jan-11 | 31 | 9,738,882 | $644,724 | 19,712 | $275,985 | 56,264 | $143,840 | 52,941 | $1,064,548 | $17.39 |
| Feb-11 | 27 | 9,031,250 | $610,810 | 19,473 | $203,499 | 54,705 | $142,670 | 50,288 | $956,979 | $16.19 |
| Mar-11 | 30 | 10,482,312 | $711,638 | 20,724 | $182,840 | 62,719 | $148,681 | 56,489 | $1,043,158 | $15.83 |
| Apr-11 | 29 | 9,520,374 | $678,753 | 16,329 | $145,842 | 54,649 | $142,628 | 48,812 | $967,223 | $16.89 |
| May-11 | 31 | 11,045,710 | $731,144 | 19,561 | $173,564 | 62,833 | $148,766 | 57,249 | $1,053,475 | $15.80 |
| Jun-11 | 29 | 11,689,324 | $769,323 | 18,067 | $136,079 | 60,760 | $147,212 | 57,951 | $1,052,613 | $15.62 |
| Jul-11 | 30 | 11,922,946 | $798,193 | 17,600 | $131,836 | 60,070 | $146,694 | 58,281 | $1,076,723 | $15.96 |
| Aug-11 | 30 | 12,537,956 | $855,154 | 18,268 | $161,690 | 64,495 | $150,013 | 61,048 | $1,166,858 | $16.66 |
| Sep-11 | 29 | 10,932,634 | $718,468 | 15,542 | $133,889 | 58,734 | $145,692 | 52,844 | $998,049 | $16.13 |
| Oct-11 | 30 | 10,058,302 | $664,546 | 17,642 | $102,340 | 60,739 | $147,196 | 51,961 | $914,082 | $14.76 |
|  |  |  |  |  |  |  |  |  |  |  |
| TOTALS | 356 | 125,475,162 | $8,335,093 | 219,052 | $2,192,137 | 702,053 | $1,746,239 | 647,173 | $12,273,468 | $16.28 |

The software used for tracking also presents monthly bar charts for energy cost and consumption. Graphical illustrations clearly show trends as well as maximum and minimum.

**Table 2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ELECTRICITY ACCOUNT REPORT** | | | | | | | |
| **000002754 (Fresh Processing)** | | | | | | | |
| **MONTH** | **DAYS** | **ELECTRICITY USE (KWH)** | **ACTUAL DEMAND** | **BILLING DEMAND** | **TOTAL COST** | **₵/KWH** | **COST PER DAY** |
|  |  |  |  |  |  |  |  |
| Nov-10 | 29 | 2,549,567 | 5,296 | 5,296 | $ 152,521 | 5.982 | $5,259 |
| Dec-10 | 30 | 2,409,372 | 5,036 | 5,036 | $ 155,973 | 6.474 | $5,199 |
| Jan-11 | 30 | 2,554,661 | 5,202 | 5,202 | $ 169,387 | 6.631 | $5,646 |
| Feb-11 | 27 | 2,355,811 | 4,972 | 4,972 | $ 159,400 | 6.766 | $5,904 |
| Mar-11 | 30 | 2,740,342 | 5,069 | 5,069 | $ 186,117 | 6.792 | $6,204 |
| Apr-11 | 29 | 2,414,319 | 5,170 | 5,170 | $ 176,718 | 7.320 | $6,094 |
| May-11 | 30 | 2,781,832 | 5,213 | 5,213 | $ 183,672 | 6.603 | $6,122 |
| Jun-11 | 29 | 2,849,674 | 5,461 | 5,461 | $ 187,627 | 6.584 | $6,470 |
| Jul-11 | 30 | 2,955,478 | 5,562 | 5,562 | $ 197,720 | 6.690 | $6,591 |
| Aug-11 | 30 | 3,109,820 | 5,569 | 5,569 | $ 211,559 | 6.803 | $7,052 |
| Sep-11 | 29 | 2,765,452 | 5,504 | 5,504 | $ 181,487 | 6.563 | $6,258 |
| Oct-11 | 30 | 2,762,716 | 5,447 | 5,447 | $ 180,831 | 6.545 | $6,028 |
|  |  |  |  |  |  |  |  |
| TOTALS | 353 | 32,249,044 |  |  | $2,143,012 | 6.646 | $6,069 |
|  |  |  |  |  |  |  |  |

Electrical account 2754 is for one major segment of the plant referred to as fresh processing. Fresh processing is the initial step in the manufacturing process. The bar chart for cost and consumption shows a rise in summertime usage due to the higher ambient temperatures and resulting greater load on the refrigeration systems.**Table 3**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ELECTRICITY ACCOUNT REPORT** | | | | | | | |
| **00002757 (Further Processing)** | | | | | | | |
| **MONTH** | **DAYS** | **ELECTRICITY USE (KWH)** | **ACTUAL DEMAND** | **BILLING DEMAND** | **TOTAL COST** | **₵/KWH** | **COST PER DAY** |
|  |  |  |  |  |  |  |  |
| Nov-10 | 29 | 2,149,105 | 5,230 | 5,230 | $ 128,654 | 5.986 | $4,436 |
| Dec-10 | 30 | 2,149,692 | 5,091 | 5,091 | $ 139,022 | 6.467 | $4,634 |
| Jan-11 | 30 | 2,314,780 | 5,116 | 5,116 | $ 152,975 | 6.609 | $5,099 |
| Feb-11 | 27 | 2,159,814 | 5,417 | 5,417 | $ 146,005 | 6.760 | $5,408 |
| Mar-11 | 30 | 2,500,814 | 5,721 | 5,721 | $ 169,702 | 6.786 | $5,657 |
| Apr-11 | 29 | 2,345,868 | 5,563 | 5,563 | $ 162,659 | 6.934 | $5,609 |
| May-11 | 30 | 2,741,023 | 5,857 | 5,857 | $ 181,900 | 6.636 | $6,063 |
| Jun-11 | 29 | 2,994,988 | 6,041 | 6,041 | $ 197,034 | 6.579 | $6,794 |
| Jul-11 | 30 | 3,005,995 | 6,292 | 6,292 | $ 201,376 | 6.699 | $6,713 |
| Aug-11 | 30 | 3,159,158 | 6,447 | 6,447 | $ 216,018 | 6.838 | $7,201 |
| Sep-11 | 29 | 2,700,865 | 6,209 | 6,209 | $ 177,747 | 6.581 | $6,129 |
| Oct-11 | 30 | 2,266,435 | 5,531 | 5,531 | $ 151,442 | 6.682 | $5,048 |
|  |  |  |  |  |  |  |  |
| TOTALS | 353 | 30,488,537 |  |  | $2,024,534 | 6.630 | $5,733 |

Electrical account 2757 is for another segment of the plant referred to as further processing. Further processing is the step following fresh processing and involves cutting fresh bulk meat product into manageable pieces, breading, cooking and flash freezing. As with the previous electrical account, metered consumption and billed cost rise in the summer as outside temperatures increase putting more load on the refrigeration system.**Table 4**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NATURAL GAS ACCOUNT REPORT** | | | | | |
| **00002755** | | | | | |
| **MONTH** | **DAYS** | **TOTAL MCF** | **TOTAL COST** | **$/MMBTU** | **NYMEX $/MMBTU** |
|  |  |  |  |  |  |
| Nov-10 | 32 | 16,577 | $282,608 | $16.55 | $3.292 |
| Dec-10 | 31 | 18,505 | $261,965 | $13.74 | $4.267 |
| Jan-11 | 33 | 19,138 | $275,985 | $14.00 | $4.216 |
| Feb-11 | 28 | 18,906 | $203,499 | $10.45 | $4.316 |
| Mar-11 | 31 | 20,120 | $182,840 | $8.82 | $3.793 |
| Apr-11 | 28 | 15,853 | $145,842 | $8.93 | $4.240 |
| May-11 | 33 | 18,991 | $173,564 | $8.87 | $4.377 |
| Jun-11 | 29 | 17,541 | $136,079 | $7.53 | $4.326 |
| Jul-11 | 30 | 17,087 | $131,836 | $7.49 | $4.357 |
| Aug-11 | 32 | 17,736 | $161,690 | $8.85 | $4.370 |
| Sep-11 | 29 | 15,089 | $133,889 | $8.61 | $3.857 |
| Oct-11 | 29 | 17,128 | $102,340 | $5.80 | $3.759 |
|  |  |  |  |  |  |
| TOTALS | 365 | 212,671 | $2,192,137 | $9.97 |  |

The natural gas account shows usage that is relatively stable throughout the year. The gas cost displayed a steady decrease during the tracking period as a result of falling gas commodity costs. Commodity prices are presented in the gas cost vs. NYMEX price in the bottom chart.

**Table 5**

|  |  |  |  |
| --- | --- | --- | --- |
| Resource | Energy Rates\* | | |
| Electricity | $0.0605 | per kWh Energy | |
| $2.00 | per kW-month Demand | |
| Natural Gas | $10.00 | per MMBtu | |
|  |  |  |  |
| \*Applicable sales taxes were included in these costs. | | | |

Table 5 presents information on marginal energy cost. Marginal costs are derived from utility rate schedules or energy commodity contracts. This data is useful in properly analyzing the cost savings from energy opportunities.