

Equipment Capital Budget Project

Dear Director,

I am writing to you regarding our desired purchase for a new convection oven. It is imperative that we purchase a new oven for many reasons, the main ones among which are:

1. To expand on our "Green" movement for energy conservation
2. To lower our annual energy costs
3. To produce quality products for our growing clientele

The opportunities for new convection ovens seemed endless upon initial research, so I chose to narrow my search down to models that I found to be energy efficient. I looked at both gas and electric full size convection ovens to replace the current oven we have in our facility.

I chose two models to compare to the other models of it's kind- a base model and "Energy Star" energy efficient model for both gas and electric. The gas model I chose was the **American Range MSD-1-GG**, and the electric oven I chose was the **Moffat G32D4**.

Initial Cost of Purchase

Of these six models, the rankings for highest to lowest prices of initial costs are as follows:

1. Gas Energy Star - \$5952
2. Electric Energy Star - \$5052
3. American Range MSD-1GG (Gas)- \$4915
4. Base Efficiency Gas - \$3749
5. Moffat G32D4 Electric - \$3210
6. Base Efficiency Electric - \$2333

As noted, the energy star ovens are the most expensive (both gas and electric). The energy star ovens are followed by the other gas ovens (base and American Range) and the least expensive ovens for initial cost alone are the electric ovens (both Mofatt G32D4 electric and base efficiency electric). Although the energy star ovens are more expensive than the base efficiency ovens, the maintenance costs and energy costs will ultimately change our perspective on this number as we see it now.

Initial costs alone are only a small fraction of the total analysis necessary to pick out the best oven for our facility. In order to analyze which oven would best be suitable for our growing student body, mission to conserve more energy and purpose of leading the "Green Movement", it is imperative that we analyze the performance of each oven in terms of efficiency and capacity.

Performance (efficiency and capacity)

Energy Efficiency

Of the six models, the rankings in terms of Heavy Load Energy Efficiency are as follows from highest to lowest energy efficiency:

1. Moffat E32D4 Electric – 75.5%

2. Energy Star Electric – 73%
3. Base Efficiency Electric – 65%
4. Energy Star Gas – 45%
5. American Range MSD 1GG (Gas) – 44.2%
6. Base Efficiency Gas – 30%

In terms of energy efficiency, it is clear among these rankings that the Gas convectional ovens are much less energy efficient than the electric ovens. In terms of energy efficiency alone, it would be more beneficial in contributing to our “Green Movement” and mission for overall energy conservation, that we purchase an electric oven.

Production Capacity

Of the six models, production capacity is ranked from highest to lowest in terms of lb/hr.

1. American Range MSD 1-GG – 84.5 lb/hr
2. Energy Star Gas – 83 lb/hr
3. Energy Star Electric – 82 lb/hr
4. Moffat E32D4 Electric – 72.1 lb/hr
5. Base Efficiency Electric – 70 lb/hr
6. Base Efficiency Gas – 70 lb/hr

In terms of how many pounds the oven can produce per hour, it is clear that the American Range MSD 1-GG and the Energy Star gas and electric models are neck in neck for the top most productive ovens. The Moffat E32D4 Electric oven, base Efficiency electric and base efficiency gas ovens are the least productive in terms of yielding pounds/hr. Given that our student population is growing, we should choose the most energy efficient model that can also be maximally productive.

Lifetime Costs (Energy, Maintenance, Total)

Lifetime Cost for Energy

Lifetime energy costs of both the gas and electric ovens are as follows from highest to lowest:

1. Base Efficiency Electric Oven- \$19020
2. Energy Star Electric - \$14676
3. Base Efficiency Gas - \$12624
4. Moffat E32D4 - \$11688
5. American Range MSD 1-GG - \$8364
6. Energy Star Gas - \$8340

For lifetime energy costs, we can see through this list that the least expensive oven for the entire oven’s lifetime would be the American Range MSD 1-GG Gas and Energy Star Gas Ovens. The most expensive ovens would be the Base Efficiency electric oven and the Energy Star electric ovens. The most moderately priced electric oven in terms of lifetime cost would be the Moffat E32D4, as it ranks just below the Base Efficiency Gas oven in lifetime energy costs.

Lifetime Maintenance Costs

The rankings for lifetime maintenance for the six ovens are as follows from highest to lowest total maintenance costs:

1. Base Efficiency Electric - \$19020
2. Energy Star Electric - \$14676
3. Base Efficiency Gas - \$12624
4. Moffat E32D4 Electric - \$11688
5. American Range MSD 1-GG Gas - \$8364
6. Energy Star Gas - \$8340

As noted above, the electric ovens are generally the most expensive to maintain over the lifetime of the oven. However, the Moffat E32D4 oven, which is also electric, is comparable and even less expensive than the Base Efficiency Gas Oven. The two other gas ovens used in this comparison (American Range MSD 1-GG Gas and Energy Star Gas) are very similar in price and both the least expensive in terms of overall maintenance costs.

Total Lifetime Costs

The total lifetime cost of each oven takes into account three factors: the initial cost of the oven, the lifetime energy cost, and the lifetime maintenance cost. Rankings from most to least expensive lifetime costs are as follows:

1. Base Efficiency Electric - \$22877
2. Energy Star Electric - \$20736
3. Base Efficiency Gas - \$18389
4. Moffat E32D4 - \$16278
5. Energy Star Gas - \$15344
6. American Range MSD 1-GG - \$14767

As noted above, the Electric oven models (base efficiency and energy star) are the most expensive. The Moffat E32D4 electric model, however, ranks just below the Base Efficiency Gas model, which makes it the least expensive over a lifetime than the base efficiency gas oven. The Energy star gas oven and the American Range MSD 1-GG gas ovens are the least expensive ovens in terms of overall cost.

Decision

Given the multiple factors of oven performance (energy efficiency and production capacity), and lifetime costs (maintenance, energy, and overall), the oven that would best suit our needs and mission as an organization would clearly be the **Moffat E32D4 Electric Oven**.

The gas ovens, although they would cost less, are at least 30% less energy efficient than the electric ovens. Purchasing a gas oven is not consistent with our mission as an organization that is striving to conserve maximal energy. This left us to compare the three electric convectional ovens.

The Moffat E32D4 oven is by far the least expensive electric oven. Coming in at a lifetime cost of only \$16,278, it is over \$4,000 less expensive than the Energy Star Electric (\$20,738) and Base Energy Efficiency Electric Oven (\$22,877). As an electric oven, the Moffat E32D4 is also comparable in price to the three gas ovens we compared, which range from \$14767 to \$18389 in total lifetime costs.

The Moffat E32D4 Electric oven is not only the least expensive electric oven and less expensive than the base efficiency gas oven, however it is also the most energy efficient model out of all six models. The Moffat E32D4 Model, although similar in price to the gas model ovens yields a 75.5% energy efficiency, which is over 30% more energy efficient than the most efficient gas model (Energy Star Gas- 45%). Thus, in order to fulfill our mission of being a leader in the Green Movement for Energy conservation and meet our growing student population needs, the Moffat E32D4 model would be the best choice.

Energy Cost Benefit for Growing Clientele

Given that UC Davis is constantly growing in terms of the student body numbers, it is essential that we choose an oven that will suit our growing needs in terms of production capacity. It is imperative to note that given our data, we are producing no more than around 100lb/day of oven-baked product. Given that we are choosing from the three electric models due to their high-energy efficiency, it was important to analyze the productivity of each of the electric ovens in relation to their overall costs. The Energy Star Electric model yields 82 lb/hr, which is just below the American Range Gas Model (84.5lb/hr) and Energy Star Gas Model (83 lb/hr). The Energy Star Electric model is the most efficient electric model and is 10lb/hr more efficient than the energy efficient Moffat Model which yields 72lb/hr. However, this high productivity of the Energy Star Electric is offset by the extremely high lifetime cost of the Energy Star Electric Oven. If we were to yield 100lb of product, the Energy Star Oven would need to be working for 1.21 hours. The Moffat Model, however, would need to work for 1.38 hours. This very minute difference between the numbers of hours the oven would have to work to yield 100lb of product accounts for a lifetime energy cost difference of nearly **\$3,000**. Thus, in order to yield only 12% more product per hour with the Energy Star Electric model, we would be paying \$3,000 more for the lifetime energy costs, as well as a total of nearly \$4,500 more for the total lifetime cost of the oven. The Moffat model will suit our growing population needs, yielding 72 lb/hr at a much less expensive price than an oven with similar energy efficiency that is more productive.

Energy Conservation for our Green Movement

As a school that prides itself in sustainability and cutting edge technology, it is imperative that we chose an oven model that can save energy and have a high percentage of energy efficiency. Choosing a less expensive oven that would increase our carbon footprint and waste unnecessary energy would not be consistent with our mission as a leading organization. The Moffat E32D4 model is the most energy efficient model at 75.5% energy efficiency. This ranks as the top model of all six ovens in terms of energy efficiency, and is more energy efficient than both the Energy Star and Base Energy efficient electric models. Additionally, we must note that the Moffat E32D4 model is the least expensive over the twelve-year lifetime of the electric models and comparable in price to the gas models as ranked above. Given that our organization prides itself in sustainable, cutting edge technology, an oven that yields 75.5% energy efficiency and keeps our costs down at the same time (as compared to the much more expensive electric models), would ultimately save us a large amount of money while simultaneously being equally productive as the five other ovens over its lifetime. This oven would have to be on for less than $\frac{1}{4}$ hour longer

than the Energy Star oven, yet would save us a total of \$3,000 in energy costs \$4,000 in total lifetime costs and yield the highest energy efficiency of all of the ovens.

Summary

The purpose of our organization is to produce the highest quality products in a timely manner to suit the needs of our growing student population as well as to conserve energy in the long-term to reduce our carbon footprint. The Moffat E32D4 model is not only the least expensive electric model, but is also the most energy efficient electric model. Given that we are producing around 100lb of product per day, and the oven would be operating for 12 hours per day across all six ovens, the Moffat Model would give us quality product in a timely manner while being the most energy efficient of all six models and would ultimately save us thousands of dollars over the 12 year lifespan. The dollars that we save when purchasing the Moffat E32D4 electric model will not only save us the energy costs that we need and conserve energy yearly and over it's lifespan, but will also allow money for scholarships for students in food service workers upward mobility.

Thank you for your time. The sooner we buy this oven, the sooner our workers and students will be happier, we save money, and we begin to reduce our carbon footprint by conserving energy.

Thank you,
Ceseana Marzouk