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Subject Area	Energy and Environment

Optimization of Energy Usage in the Baking Process



Graph that depicts the power consumption and the presence of a product (secondary axis) vs the time (1-day period)

Introduction: With the need to continuously cut back on costs and reduce the amount of emissions, processes and production lines are regularly investigated, followed by recommendations for optimization. At the core of this project, data was collected from camera findings and overlaid onto the energy expenditures of several different oven lines. Based on the findings, it would indicate during what phase of the baking process there existed a potential for energy, and subsequently, cost savings. The three stages of interest that were examined were the preheat, the baking, and the empty phase. After the energy usage was divided up into its respective stages, a cost analysis was performed to see where the most could be saved.

Procedure / Result: As previously mentioned, the procedure involved setting up various cameras at the oven entrances and then comparing the camera data to the provided energy data. By overlaying these two data sets over a 2 week span at the different sites, it would give a good idea as to how efficiently the different oven lines ran. The camera data had to be meticulously scrutinized to determine at which point product entered and exited the oven. Together with the energy data, it would yield where there were pockets of time in which the oven was left on and had no product going through it. On top of the determination of these results, there was also care taken to examine the differences between gas or thermo-oil as the heating source and to what extent these would impact the overall cost. After these calculations were completed, values were assigned as to the extent to which the different phases could be optimized and these numbers were then incorporated into the final cost analysis. The results yielded that most ran efficiently but that out of the 8 lines looked at, 2-3 had the potential to be further investigated and ultimately, optimized.