Energy Reduction and Ceramic Waste Reuse Assessment

Client
Victor Insulators, located in Victor, NY, specializes in high voltage insulators for power lines and electrical substations. The process at Victor Insulators starts at the raw materials to form the clay which requires ingredient mixing and progresses through molding or extruding, machining, drying, and firing the green pieces to form the final ceramic insulators.

Opportunity Areas
Victor Insulators requested assistance for the following areas they identified as priorities:
- High electricity costs
- High natural gas costs
- Large volumes of scrap ceramic

Objectives
It was imperative to determine the main sources of electricity use, natural gas use, and primary reasons for ceramic rejects/scrap and provide recommendations for improvement.

Work Performed
Utility bills for electricity and natural gas were summarized to determine the amount of seasonal variation vs. production energy use. Also, electricity data for clay and slip mixing motors was collected. Ventilation motor data and steam boiler natural gas use was provided by Victor Insulators. Ceramic scrap quantities and reasons for part rejection were collected. The cost of equipment for ceramic regrinding was tabulated for the purpose of determining the economics of reusing the fired scrap. One ceramic kiln was evaluated with an infrared camera to determine whether there were any localized heat losses due to cracks or damaged insulation.

Results
The electricity usage (billing data) and the combined motor data correlated well for all motors running 24 hours per day. Timing systems for the motors were proposed to reduce the overall electricity consumption either by automatically turning equipment off at the end of the shift or by cycling the equipment on and off. Timers resulted in a one year savings of $25,900 (247,860kwh saved). They were also able to reduce their ventilation costs by replacing an older ventilation blower with a high efficiency blower. They have saved approximately $28,900 in 6 months (277,000kwh saved). Both changes represent a 19% reduction in their annual electricity consumption (baseline of 4,259,400kwh/yr).

Regrinding ceramic scrap for reuse was not considered to be economical due to the high capital equipment costs.

Upgrading the kilns had the potential of reducing scrap and reducing natural gas use. The initial quote for upgrades was cost prohibitive.