Keep the Heat

Overview
The problem presented by the sponsor was that of waste heat recovery from electric and natural gas annealing furnaces used to heat treat metal parts that are produced in its Olean, NY facility. It was noted that while conducting the heat treatment using these furnaces, energy was lost in the form of heat to the environment. This project aimed to recover some of that lost heat in an attempt to decrease costs faced by the sponsor.

Objectives
Our team aimed to determine the best heat recovery option from the furnaces (or lack thereof) that would most closely meet the needs stipulated by the sponsor.

Approach
- Initial site visit to gain basic understanding of initial problem statement.
- Obtain qualitative list of needs with quantitative rankings denoting importance of needs.
- Obtain technical information from sponsor regarding furnace operations.
- Quantify and classify waste heat from furnace.
- Conduct secondary research on potential heat recovery options.
- Determine savings realized through each recovery option.
- Obtain estimate of capital costs for each recovery option
- Calculate project financials including NPV and payback period.
- Design favourable heat recovery option (recuperator) using CAD software to determine practicality.
- Aggregate data and present in 3 different stages (SOW, DSR, Final Report)

Outcomes
After conducting our research and calculations, it was determined that:
- The sponsor should not move forward with any attempt at heat recovery for the furnaces.
- The best options have a payback period exceeding that stipulated by the sponsor.
- Practicality would improve if furnaces operated with more frequency.