**New Jersey Program for Manufacturing Excellence**

NJME is a technical assistance program for NJ industries that is operated through the Center for Advanced Energy Systems (CAES) at Rutgers, The State University of New Jersey.

Funded by the New Jersey Department of Environmental Protection's Office of Pollution Prevention and Right to Know, the purpose of the program is to improve the competitiveness and efficiency of New Jersey companies, while also reducing the impact on the environment. NJME accomplishes this by promoting energy efficiency and pollution prevention.

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# NJME Assists Leading Fiberfill Manufacturing Company in Energy Conservation and Increased Productivity Measures

**Summary:**

For over 50 years, Carlee Corporation has been spearheading the manufacturing of polyester high-loft nonwovens. Operating out of Rockleigh, New Jersey, Carlee has prime access to the New York Metropolitan and tri-state area markets. The **New Jersey Manufacturing Excellence** Program, operated by the Center for Advanced Energy Systems at Rutgers University, collaborated with Carlee to identify avenues for more efficient energy usage and increased productivity. Recommendations included using more energy efficient lighting, replacing motor belts, and ways to reduce production bottlenecking.

**Company Background:**

Established in 1951, Carlee Corporation started as an electronic quilting manufacturing company. Soon after, Carlee started making its own lightweight batting and selling excess supply to others and subsequently stopped producing electronic quilting. Currently, Carlee specializes in the production of high-loft polyester batting for a variety of applications, including acoustics, filtration, quilting, mattresses, and bedding accessories. Though NJME identified a modest annual energy cost savings of approximately $10,000, company liaisons stipulated that this reduction in expenses would still help boost profit margins in an unsteady economy.

**Assessment Approach:**

The NJME team of engineers conducted an assessment of Carlee in October 2007. Recommendations identified by the NJME team were assembled into a report and presented to plant managers in November 2007.

**Energy Conservation and Awareness:**

- During the assessment, the NJME team noticed that over 200 ft. of the steam line protruding from the boiler used in winter months was completely exposed to the ambient, creating energy losses. To reverse this, NJME suggested coating the line running through the production area with a layer of insulation, limiting the amount of waste heat and improving boiler efficiency.
- A proposal by NJME to convert the standard v-belts used in the facility's numerous motors to cog-type v-belts would yield immediate payback. Cog-type belts possess several advantages over the former, including higher lifelong motor efficiency and reduced slippage.

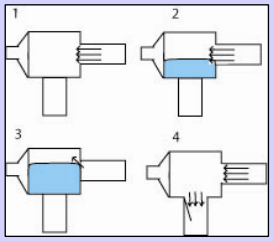
- NJME recommended that Carlee institute a preventative air leak maintenance program after realizing that at least two of the compressors were almost fully loaded, which would make leaks more pronounced and expensive.
- At the time of the site visit, the NJME team was notified by plant personnel that one of the process lines regularly experienced bottlenecking due to the clogging of fiberfill in the hopper before the condenser. NJME noted a simple solution of shortening the ducting between the hopper and the condenser, which would in effect minimize pressure losses and allow the material to flow more smoothly.

**Additional Assessment Recommendation**

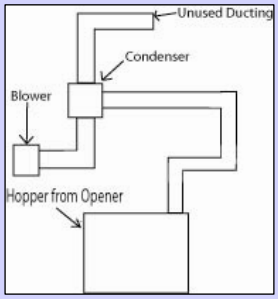
**Projects Identified:**

| AR # | Assessment Recommendation | Annual Resource Savings | Annual $C0_2$ Reduction (lbs) | Annual Cost Savings | Net Imp. Cost | Simple Payback Period (yrs) |
|---|---|---|---|---|---|---|
| 1 | Insulate Boiler Steam Line | 246 MMBtu | 28,800 | $3,072 | $2,391 | 0.8 |
| 2 | Utilize Energy Efficient Belts | 11,227 kWh | 7,971 | $1,291 | $0 | Immediate |
| 3 | Reduce Compressed Air Leaks | 11,827 kWh | 8,397 | $1,766 | $2000 | 1 |
| | **TOTAL** | **95,101 kWh** | **45,168** | **$6,129** | **$4,391** | **-** |

| Additional Assessment Recommendation |
|---|
| Remove Production Bottleneck by Re-ducting Product Line |




**Model of Condenser**




**Ducting Diagram**

**Results:**

Nineteen months after the report was submitted to the Carlee Corporation, NJME is proud to say that 3 of the assessment recommendations and one additional assessment recommendation have been implemented thus far, with the remaining being strongly considered. NJME's contact at the plant cited a financial falling out as the reason for not implementing the NJME team's other recommendations, however, when asked whether or not the ideas were still on the table, the contact declared that **"…they are definitely still in discussion."**

The contact added the he was particularly impressed with the team's understanding of fundamental engineering principles as articulated in the belt replacement recommendation and bottlenecking additional assessment recommendation. Newly purchased motors are made sure to have suggested cog-type v-belts, and the production process has improved since the production line arrangement has changed, he said.

Carlee informed NJME that it was pleased with the overall quality and comprehensiveness of the report, and that the technical aspects of the report were easy to follow and relay to fellow plant engineers. When asked if Carlee would recommend NJME to manufacturing counterparts throughout the state, the contact replied, **"absolutely."**