



## CASE STUDY

# Power Monitoring Study Demonstrates Potential to Reduce Peak Power Costs & Electricity Consumption for Acro Industries

Acro Industries is a privately held manufacturing firm headquartered in Rochester, NY, with more than 150,000 square feet of manufacturing facilities. The company uses a wide range of technologies to provide services in engineering design, CNC laser machining, metal fabrication and forming, stamping, and expert welding. Acro contracts projects for a wide variety of tight-tolerance, high-performance products across the medical, aerospace, rail, imaging, and energy industries. Although this extensive repertoire of capabilities requires a considerable energy demand, there are many opportunities in manufacturing systems to improve energy strategies and therein achieve substantial cost savings.

### Client Challenge

The NY Center of Excellence in Advanced & Sustainable Manufacturing (COE-ASM) at RIT has developed a strategic relationship with Acro Industries that provides COE-ASM with a testbed for the development and proof-of-concept of new technology for the manufacturing shop floor. This collaboration provides both organizations with cooperative solutions to emerging challenges. Technical teams at COE-ASM developed a new generation of energy monitoring software designed to enable peak power analysis through advanced data collection and analysis, but needed an independent trial to evaluate its efficacy. Leadership at Acro Industries saw this as an opportunity to obtain a thorough external assessment of its production systems and, accordingly, identify areas in which cost savings might be achieved. The collaborative project sought to evaluate the patterns of energy use at Acro Industries and therefrom identify potential areas of improvement in process efficiency, system coordination, or production floor procedure.



### COE-ASM Work Performed

COE-ASM technical team installed two power meters in the Acro facility's main load management panel that collected minute-by-minute data on energy use throughout the facility. Using a software and hardware system developed in-house at the COE-ASM, collected data was automatically and wirelessly transferred to the COE-ASM team at RIT each hour. Additional monitoring was conducted in order to determine contributions of individual machines or cells to power and energy consumption.

### CLIENT CHALLENGE

- Acro Industries sought independent assessment of manufacturing systems in pursuit of cost-savings
- COE-ASM needed a practical application to validate the performance of a new systems monitoring software

### COE-ASM WORK PERFORMED

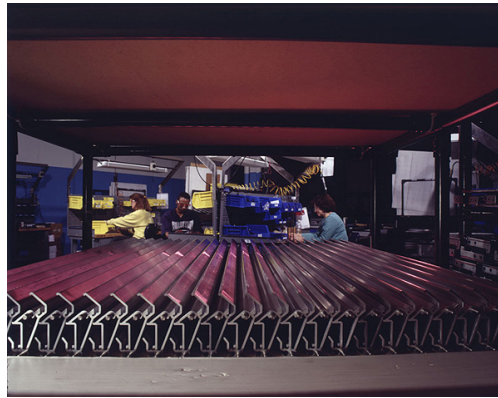
- Applied in-house monitoring tools to 150,000 sq. ft. manufacturing facility to collect production systems data
- Developed data transfer tool for remote monitoring and pattern recognition
- Analyzed energy use and peak load data and developed production scheduling and operational enhancements

### RESULTS

- Identified significant opportunity to reduce energy consumption during peak-demand periods
- Developed easy-to-implement production scheduling shifts to save over 7% on monthly energy bills
- Discovered "vampire loads" for targeted elimination, reducing non-productive energy use



This system enabled unique monitoring capabilities that provided valuable insight into potential cost-saving activities. COE-ASM designed the system software to track energy use in every machine, instrument, and digital monitor throughout the facility. Combined with Acro's job tracking system, a unique procedure by which production operators document the type and stage of each process, analysis of energy data was able to determine relationships between specific products or processes and notable energy use.



## Results

The system allows analysis of temporal and spatial (cell-by-cell or machine-by-machine) patterns of power consumption. By studying energy consumption patterns, COE-ASM was able to work with Acro Industries production teams to develop strategies to reduce consumption during peak power periods. As even a short period of high power use during peak demand hours can have a significant impact on monthly electric costs, new insight informing strategies to manage and reduce monthly power peaks were especially valuable. COE-ASM engineers estimated that shifting production activities requiring especially energy-intensive processes to off-peak hours could reduce Acro Industries' peak power costs by approximately 11% almost immediately. This analysis provided useful insight for Acro leadership, allowing them to envision how optimized production schedules can meet consistent demand while realizing significant potential cost reductions.

This monitoring system, and the analytics it enabled, was also able to provide data on the frequency and intensity of "vampire loads;" an industry term for measurable energy consumption when there were no ongoing production jobs. With the new monitoring tools, COE-ASM analysis identified significant energy consumption during times of light production, during off-shifts, and over weekends that would have otherwise gone unnoticed. The presence of these loads suggested that machine and system shut-down procedures (or set-point setbacks) could be better monitored and managed to minimize consumption during non-production periods, avoiding non-value-added expenditures of energy. Based on these findings, Acro leadership was able to reevaluate its operator-controlled shut-down procedures, identifying potential estimated energy consumption savings that would amount to 6% of the company's annual total.

Energy monitoring and peak power reduction strategies continue to be valuable tools in manufacturing cost avoidance, as well as meaningful components of a corporate sustainability profile. Overall, findings at Acro Industries revealed potential for 7.5% savings in the company's monthly energy bill that could be achieved with simple, inexpensive, and easy-to-implement modifications to work scheduling and operational procedures. Beyond savings for Acro, this partnership also enabled COE-ASM to demonstrate the performance and efficacy of energy monitoring systems in high-intensity applications, adding a new tool to the range of COE-ASM capabilities that can help achieve meaningful savings for NYS manufacturers. Encouraged by these results, the COE-ASM is currently working on a third generation, low-cost system that will be able to determine the power demand status of individual machines within a system in real-time, allowing for even greater system optimization.

## The Center of Excellence in Advance & Sustainable Manufacturing (COE-ASM)

is a specialized applied research and development center dedicated to helping emerging and existing NYS manufacturers to enhance productivity and become more competitive through innovation and technology in sustainable products and processes. COE-ASM is located at the Golisano Institute for Sustainability and is a New York State Center of Excellence, a NYSTAR partnership.



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