

A Variety of Savings Opportunities for Boom Lift & Scissor Lift Manufacturer

The **Industrial Assessment Center (IAC)** at **West Virginia University (WVU)** discovered opportunities to decrease energy usage and enhance corporate competitiveness for JLG Industries Inc., a manufacturing facility located in McConnellsburg, Pennsylvania. The assessment team focused on the manufacturing process as well as the energy utilities feeding the processes. The recommendations at this facility may serve as a template for potential savings at similar plants.



JLG has been a world leader in designing and manufacturing of Boom lifts and Scissor lifts all over the world.

Photo from JLG.

Company Background

JLG Industries, Inc. facility located in McConnellsburg, PA is a leading manufacturer of Boom lifts and Scissor lifts. The products are more consistent and of higher quality.

Summary

As a result of the assessment, recommendations were made for improvement in several specific areas. Opportunities for saving energy were identified with respect to Replace Transformer-Rectifier Arc Welders with Inverter Arc Welders, Replace the High Intensity Discharge Bulbs with T5 Ganged Fluorescent Luminaries and Reflectors in the Plant Areas and Install Occupancy Sensors in Designated Areas, Replace the Existing Old Burners on the Boilers with New Energy Nozzles

Efficient Burners, Replace the Ordinary with Vortex Nozzles, Perform

Vibration Analysis on Equipment, Install Sequencer Control for the Existing Compressor in the Plant, Install Occupancy Sensors in Designated Areas, Adjust Air to Fuel Ratio for the Older Boilers, Install Air-Curtain on the Oven, Establish Repair / Replace Decision Policy through Motor Management System, Reduce Compressor Set point for All Compressors, Reduce Infiltration on Dock Doors, Install a Variable Speed Drive on the Dust Collector, Replace Drive Belts on Motors with Energy Efficient Cog Belts, Insulate Hot Surfaces on Old Boiler. Ten of the fifteen recommendations made by the team were implemented, resulting in the reduction of energy consumption by 1,144,123 kWh of electricity and 3,515 MMBtu of Natural Gas; an annual cost

savings of \$79,264.

Energy Conservation Analysis

In general, the management and employees of JLG Industries, Inc. are “energy conservation” oriented, and follow many good practices to save energy. For example, the plant uses LED and T5 fluorescent lighting, uses regenerative incinerator, mixes outside and inside air for air handling units and uses VFDs on pumps. The assessment team was pleased with the level of energy efficiency awareness amongst plant personnel and worked on identifying other ways to save energy by discussing energy efficiency opportunities.

The recommendations identified by the team were also discussed at the end of the day and the company’s personnel were encouraged to contact and interface with the WVU IAC for further discussion and/or clarification required with respect to the implementation of the assessment recommendations.

Benefits at glance

- The Implemented measures will result in annual cost savings of \$25,841.
- Average Payback is 11 months.
- Implemented recommendations will reduce carbon dioxide emissions by 935,934 pounds.

Lighting Replacements

The assessment team suggested T5 ganged fluorescent luminaries with reflectors in the place of Metal Halide (MH) fixtures. The plant personnel realized the value in the efficient usage of lighting with occupancy sensors. The light levels are estimated to be better than those currently utilized and hence are expected to contribute towards a productive workforce, while simultaneously saving energy. Upgrading lighting with electronic

ballasts, reflectors in the plant areas, and occupancy sensors in the office areas has increased the efficiency of the lighting system. In effect, these suggestions have significantly reduced energy usage.

Compressed Air Savings

Compressed air is a significant energy consumer in the facility. Reducing compressed air pressure repairing compressed air leaks, replacing regular nozzles with vortex nozzles reduced the demand for compressed air in the plant, thereby reducing the energy usage of the compressed air system.

Process Equipment

The old burners of the natural gas boilers has been replaced with new burners which in turn reduced the fuel consumption. Insulating the hot surfaces on old boiler has further reduced the energy consumed by the boiler.

Preventive Maintenance Savings

Electrical motors are widely used equipment in manufacturing facilities. The assessment team suggest to

perform a vibration analysis on the motors as a preventive maintenance, Establish Repair / Replace Decision Policy through Motor Management System, Replace Drive Belts on Motors with Energy Efficient Cog Belts. By performing vibration analysis and replacing drive belts on motors with cog belts has increased the efficiency of the motors and thereby reduced the energy usage of the motors.

Assessment Savings Tabulated

The following table presents the annual cost savings that will occur at the Automated Packaging System facility due to the implemented recommendations. Energy conservation opportunities identified in the assessment that were implemented will reduce annual electrical usage by 1,144,123 kWh per year and natural gas usage by 3,515 MMBtu per year. This translates into an annual cost savings of \$79,264 and an annual reduction in CO₂ emissions of 2,916,884 pounds.

Implemented Recommendations

Assessment Recommendations	Annual Conservation (MMBtu)	Annual Conservation (kWh)	Total Annual Savings (\$)	Capital Costs (\$)	Simple Payback (years)
Replace the High Intensity Discharge Bulbs with T5 Ganged Fluorescent Luminaries and Reflectors in the Plant Areas and Install Occupancy Sensors in Designated Areas		617,449	33,898	72,687	2.17
Replace the Existing Old Burners on the Boilers with New Energy Efficient Burners	3,067		15,212	35,900	2.42
Replace the Ordinary Nozzles with Vortex Nozzles		204,525	11,228	2,417	0.25
Perform Vibration Analysis on Equipment		190,851	9,595	1,000	0.17
Establish Repair / Replace Decision Policy through Motor Management System		57,996	3,084	665	0.25
Reduce Compressor Set point for All Compressors		49,126	2,697	300	0.17
Reduce Infiltration on Dock Doors	404		2,004	2,230	1.17
Install a Variable Speed Drive on the Dust Collector		14,021	770	2,150	2.83
Replace Drive Belts on Motors with Energy Efficient Cog Belts		10,155	558	0	0
Insulate Hot Surfaces on Old Boiler	44		218	470	2.17
Total	3,515	1,144,123	79,264	117,819	1.49

