POLARIS INDUSTRIES –INDIAN MOTORCYCLE

SPIRIT LAKE

COMPANY PROFILE

Founded in 1954 and headquartered in Medina, Minnesota, Polaris Industries has risen to become the global leader in powersports. Encompassing 35 different brands, Polaris manufactures off-road vehicles such as ATVs and snowmobiles, slingshots, motorcycles, boats, neighborhood electric vehicles, and aftermarket parts. With $8.2 billion in sales in 2021, Polaris employs 16,000 people, and serves more than 120 countries. The facility in Spirit Lake, Iowa, is 400,000 square feet and employs more than 450 people. Although a variety of products have been manufactured at this facility in the past, currently, the facility exclusively manufactures Indian Motorcycles. The facility operates one production shift and is the only Indian Motorcycle manufacturing plant in the United States.

Bergen Olsen

MAJOR: Mechanical Engineering
SCHOOL: The University of Iowa

PROJECT BACKGROUND

The intern was tasked with conducting an assessment to gather data and identify areas of opportunity to reduce electric and natural gas usage. This involved analysis of the compressed air systems, the production lines, and both the metal and liquid paint systems. The intern's responsibilities included establishing a baseline of electrical and natural gas use and providing recommendations resulting in economic and environmental savings while maintaining current production levels.

INCENTIVES TO CHANGE

Indian Motorcycle is moving toward development of an energy management plan to improve energy usage in the facility. This alignment furthers the corporate sustainability goals to increase renewable energy use, reduce electricity consumption, and reduce greenhouse gas (GHG) emissions. Polaris has established aggressive company-wide goals to reduce energy consumption and emissions by 30 percent each and to supply 75 percent of electricity usage from renewable resources, all by 2035.

RESULTS

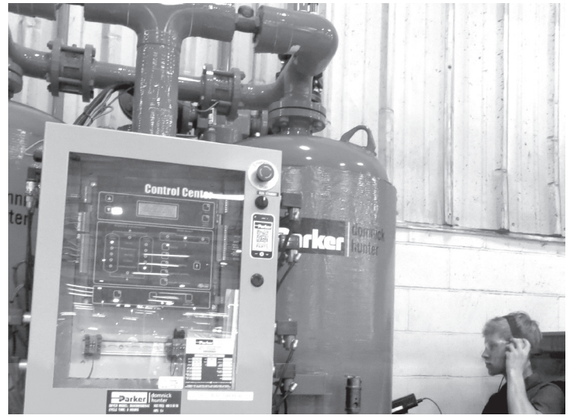
Install Light Occupancy Sensors: Lighting throughout the plant is currently supplied by high bay LED bulbs. Currently, only 28 percent of high-bay fixtures in the facility are equipped with occupancy sensors. The lights that do not have sensors remain on 24 hours per day, seven days per week. More than 80 percent of the high bay lights in the facility could be retrofitted with occupancy sensors while maintaining the same light levels. Sensors with infrared technology will not falsely activate due to non-human objects such as fans or conveyors. The light sensors could be purchased and installed by maintenance during off-production hours.

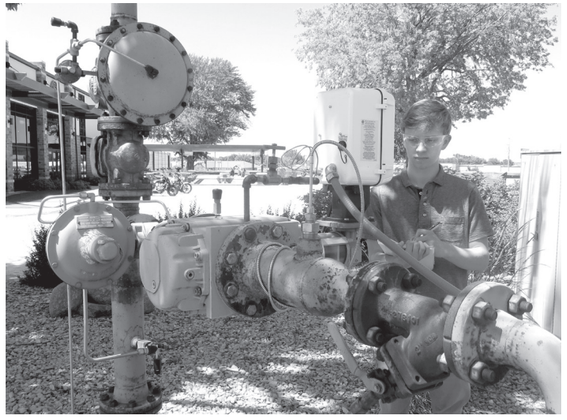
Reconfigure Baler Motor: Polaris operates a baler to collect and bale their recyclable cardboard. Within the baler is a photoelectric sensor that senses when the cardboard level is high enough to compact. The hydraulic pump for the baler is only required to run when compaction needs to occur, which averages a few times an hour, but in actuality the pump runs continually throughout production. By retrofitting the baler with a controller and contactor, motor operation will be limited to only when the photoelectric sensor signals there is enough cardboard to compact. This recommendation will have minimal impact on operator duties as it does not require any training or modification to working routines.

Repair Compressed Air Leaks: Polaris uses compressed air throughout their production process. Air leaks in the compressed air system can result in unnecessary electric costs as the compressors work overtime to replace the leaking air. Using an ultrasonic leak detector, compressed air leaks were found throughout the facility at various quick connects, regulators, and pneumatic tool hoses. A map of the leaks was created and each leak was tagged for repair. Repairing the leaks will reduce the electricity costs associated with air use by approximately 10 percent. Leak repair can be done in-house during off-shift hours by the maintenance team.

Install Natural Gas Flow Meters: Sub-metering allows for analysis of data and identification of inefficiencies leading to an optimization of usage through system or process changes. There are six natural gas sub-meters within Polaris' production facility, but they are not currently recording data. Adding an input/output module and an Ethernet cord for the panel box of each meter will bring it online and allow them to begin recording data. Additionally, moving one of the meters from an unused line to the liquid paint supply line would be a more value-added location and provide accurate measurement of the total natural gas consumed by the liquid paint system. The natural gas flow meters can be updated and reconfigured by maintenance during off-production hours. Data collection may begin shortly after installation.

Install Compressed Air Flow Meters: Installing flow meters on compressed air lines provides a facility with more specific data that can be used to identify and correct inefficient processes. Flow meters can also help identify system leaks. Installing two meters to monitor the compressed air usage by Polaris' paint system, the largest user of compressed air in the facility, will form an understanding of usage while maintaining a low cost of implementation. The compressed air meters can be purchased and then installed by maintenance staff. Once installed, data will be available for review and adjustments can be made to the system to help maintain optimum efficiency.





PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
INSTALL LIGHT OCCUPANCY SENSORS	$28,500	260,000 kWh	RECOMMENDED
RECONFIGURE BALER MOTOR	$7,300	66,300 kWh	IN PROGRESS
REPAIR COMPRESSED AIR LEAKS	$11,560	105,090 kWh	RECOMMENDED
INSTALL NATURAL GAS FLOW METERS	$19,600	26,800 therms	RECOMMENDED
INSTALL COMPRESSED AIR FLOW METERS	$1,425	12,950 kWh	RECOMMENDED