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# NATIONAL CARWASH SOLUTIONS



GRIMES

### COMPANY PROFILE:

National Carwash Solutions (NCS) is North America's leading carwash equipment, services and cleaning solutions provider in the vehicle care industry. Headquartered in Grimes, Iowa, with approximately 250 employees and more than 2,000 employees in the United States and Canada, NCS is committed to quality, service, and innovation. NCS is home to many world class brands, all providing unique assistance to the sale, service, and innovation of car wash technology. NCS believes that through spectacular performance and incomparable customer service, they can make a positive difference in the lives of their customers.

### PROJECT BACKGROUND

National Carwash Solutions requested the service of a P2 intern to assess their compressed air system to improve energy efficiency and reduce annual electrical energy use. The intern was able to provide a baseline of the compressor's annual energy use as well as the monetary cost of operation. The intern then supplied recommendations to reduce these values with maintenance, repairs, compressor setting adjustments, and a preventative maintenance plan.

### INCENTIVES TO CHANGE

Environmental sustainability is a priority at NCS, driving a new environmental, social, and governance (ESG) strategy to move the company toward its sustainability goals. With an emphasis on environmental strategies, NCS is seeking a template to create standardized ESG policies for its manufacturing plants. In addition to reducing energy use at the Grimes plant, this project could establish a platform for replication of improvements across all NCS facilities.



### RESULTS

**Decrease Compressor Pressure:** The compressor that is in use at the facility runs between two pressure setpoints of 100 and 110 pounds per square inch (psi). Upon investigating the rated pressure ranges of the tools used in the facility connected to the compressed air system, it was concluded that the pressure range was too high and causing unnecessary strain on the compressor and tools as well as unnecessary energy use. The rated pressure ranges of these different tools vary but the maximum pressure was found to be 100 psi. Using the user interface screen on the compressor, maintenance staff can reduce the pressure range to 90-100 psi. This would ensure the compressor provides adequate pressure to the tools while using less energy. The pressure should be reduced by 1 psi per day so there is no noticeable drop in pressure during the adjustment period.

**Repair Compressed Air Leaks:** Using an ultrasonic leak detector, the intern conducted a survey of the facility's compressed air lines to locate and quantify leaks. Leaks in a compressed air system typically account for 20-25 percent of the energy use of the compressor, causing the compressor to work harder than necessary to maintain pressure in the plant. Leaks were commonly found in air tool quick connects as well as hose or pipe threading. However, some leaks are in components that are difficult to access by NCS maintenance staff such as the pipes that run along the ceiling. Outsourcing



the service to a contractor would ensure every leak in the system is repaired correctly. Repairing all of the leaks will result in energy savings, increased efficiency, and reduce the wear and tear on the compressor.

**Variable Frequency Drive:** At the time of the assessment of the compressed air system, it was found that the compressor was running at a load/unload setting, without utilizing its variable frequency drive (VFD) feature. The compressor would run at full power to pump air until the pressure reached an upper setpoint and then would remain idle until the pressure decreased down to a lower setpoint. A VFD setting is more efficient because it works to maintain a specific pressure by varying the power output to reflect the demand in the facility. Since the compressor used at NCS is outfitted with a VFD, a simple switch in the settings would enable it.

**Compressed Air System Pipe Map:** Over the years, NCS has expanded their facility as well as their compressed air system to provide new areas of manufacturing with compressed air. Compressed air lines run along the ceiling of the plant along with all other utility pipes. From the ground, all of these pipes look similar. The intern created a piping and instrumentation diagram that is overlaid on a map of the facility to help identify and locate the compressed air lines. This provides the staff with a reference tool to be used for any maintenance needs including future leak audits and system repairs.

**Preventative Maintenance Plan:** Preventative maintenance is important for keeping the compressed air system running efficiently. The intern suggested that NCS seek the service of a contractor to do full service maintenance on the compressor



once a year and that in-house periodic maintenance checks be conducted every few weeks to address problems that may arise. The plan also suggests the purchase of pipe labels and an ultrasonic leak detector to assist in conducting recurring leak audits every six months. This plan will help the company keep the compressor running at optimum efficiency, which will save energy and money.

**Project Expansion:** The groundwork started by the P2 intern at the Grimes facility provides a template to construct compressed air management plans at the other NCS facilities and see companywide savings. The estimated savings were calculated from preliminary data sent from the other five facilities in the NCS network. The intern presented replicable recommendations to each of the five production facilities to gather feedback and inform the other sites of potential cost and energy savings.

## ENVIRONMENTAL AND ECONOMIC SAVINGS TABLE

PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
DECREASE COMPRESSOR PRESSURE	\$1,919	44,620 kWh	RECOMMENDED
REPAIR COMPRESSED AIR LEAKS	\$1,965	59,029 kWh	RECOMMENDED
VARIABLE FREQUENCY DRIVE	\$522	12,134 kWh	RECOMMENDED
COMPRESSED AIR SYSTEM PIPE MAP	\$1,200 (One-Time)	-	IMPLEMENTED
PREVENTATIVE MAINTENANCE PLAN	\$800 (One-Time) \$1,579	- 35,417 kWh	IN PROGRESS
PROJECT EXPANSION*	\$14,633	283,339 kWh	RECOMMENDED

\*Forecasted savings based on scaled recommendations

