REDGUARD

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Company background

RedGuard is one of many brands under the Lange group. It was founded by Jeff Lange in 1998 in Wichita, Kansas, with the name A Box 4 U. At that time, they produced traditional modular office buildings and storage units. After the Texas BP oil refinery explosion in 2005, the government saw a need for more security in hazardous areas such as these oil refineries. A Box 4 U was rebranded as RedGuard and they began developing and manufacturing blast-resistant buildings. RedGuard currently manufactures modular office buildings, storage units and blast-resistant buildings that are sold to commercial and military customers both locally and internationally. RedGuard operates at a total of 11 locations across the United States and Canada.

Project background

Redguard hosted a Pollution Prevention Institute summer intern in 2019, 2022, 2023, and 2024. RedGuard has taken interest in pollution prevention projects because the company wants to reduce overall operation costs, reduce environmental impact and show environmental commitment. RedGuard decided to host another intern in 2025. The company wanted the intern to find ways to reduce its hazardous waste generation and to research possible avenues for solar generation systems at three of its locations.

Incentives to change

RedGuard is an ISO 9001:2015 certified company. Part of this qualification for this certification is to ensure that the company continually looks to improve their Quality Management System (QMS). Reducing waste and lowering environmental impact are ways that RedGuard can keep improving their QMS which helps them continue their certification. This not only helps with their ISO 9001 certification but also attracts customers who care about the environmental impact of their supplier.

PROJECTS REVIEWED FOR P2 POTENTIAL

Industrial painter training

RedGuard has experienced a high turnover rate in their painting team, which can lead to inefficiencies in the painting process. Also, its current in-house trainers have had no formal training. The intern found a state-of-the-art industrial painter training program with reports that show reductions in painting time and rework and an increase in transfer efficiency. This training would allow the in-house trainers to become more proficient in their teaching methods, which has the potential to decrease rework. The reported increase in transfer efficiency was evaluated for its potential reduction in paint overspray which would decrease the amount of paint consumption in the current painting process. Assuming the painting team achieves the found results from one two-day training session, RedGuard can reduce its hazardous material input (from paint) by 6,471lbs. The total savings including paint reduction, time and rework is $48,920 with a simple payback period of 35 days.

Paint mixing process improvement

RedGuard currently utilizes a hand-mixing process to mix two-part paint. The company purchases paint in kits that cannot be partially mixed, so the entire kit must be mixed and cannot be partially divided. For example, a full three-gallon kit will be mixed when only one gallon of paint is needed. The excess paint becomes hazardous waste and a waste of hazardous input material, as it cannot be used on another building due to the short hardening time. The intern evaluated multiple solutions and found a paint proportioning device would be the most beneficial. This device would increase the accuracy of the mix (reducing rework), use less cleaning solvent and eliminate the wasted paint from partially used kits. This would lead to a hazardous waste reduction of 5,906 lbs., hazardous material input reduction of 5,906 lbs., and Methyl Ethyl Ketone (solvent) use reduction of 2,201 lbs. The total savings of this device would be $90,644 with a simple payback period of 73 days. This includes the savings from a reduction in input material, hazardous waste disposal, rework and time.

Solar power system installation

One of RedGuard's greatest interests was possible options for the installation of solar power generation equipment at three of their locations. The intern compared several types of systems and found that a net-metering eligible system with three solar arrays at two of the locations was the most beneficial option. Net-metering is one of two programs that allow customer generators to receive payment for the energy they produce from their utility company. The cost of the solar system was evaluated with government incentives that reduced the capital cost of the project. The first-year savings from this project are $73,557 with a simple payback period of 5.5 years. These savings are expected to increase over time with expected increases in energy costs. Implementing solar generation systems would convert 780,870 kWh of electricity to renewable resources, which would cause a greenhouse gas emission reduction of 766 $MTCO_2e$.

Air and gas leak audit

RedGuard uses compressed air and various compressed gases in many of its processes. The compressing of air consumes a considerable amount of energy and the gases used by RedGuard can be expensive, so leaks in these systems are costly. Air leak audits were completed by the 2019 and 2023 interns, and RedGuard was interested in another investigation. The intern found 29 leaks at two locations. Most of these leaks were found in hose connections and caused minor energy costs, but there were two extremely costly leaks found in the gas hose and regulator connection of welding machines. While the intern was working at RedGuard, 26 of the leaks were repaired or had repairs scheduled. By fixing all leaks, RedGuard could save $51,083 and conserve 187,656 kWh of electricity, which would cause a greenhouse gas emission reduction of 182 $MTCO_2e$.

Poor power factor correction

The intern found one location with a poor power factor. Poor power factors show that buildings pull more power from the grid than they use. This adds to the overproduction of energy during peak demand seasons when utility companies sometimes turn to less clean means of production. The intern found that RedGuard is one of very few companies that are not charged more for its poor power factor, so they finished the project. The intern learned that this could change at any time, and it would be very costly. The intern recommends more research on this topic to understand the full solutions and effects so that RedGuard will be prepared if its current situation changes.

Paint booth lighting exchange

RedGuard's painting booth is partially installed with LED lighting. The intern completed an energy consumption comparison between the fluorescent and LED lighting currently installed in the paint booth to find the potential energy and cost savings from exchanging the rest of the fluorescents with LEDs. The intern also evaluated the energy savings of lighting that has already been converted to LEDs in the paint booth. Currently, 292 of 388 bulbs in the paint booth are fluorescent. If RedGuard were to exchange these with LEDs, there would be total savings of $2,079 per year and a simple payback period of one year. The potential energy conservation if RedGuard completes the exchange is 28,495 kWh, including the already exchanged LEDs. This would reduce greenhouse gas emissions by 49 $MTCO_2e$.

SUMMARY OF 2025 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
Industrial painter training	166 lbs. of HAPs, 1172 lbs. of VOCs, 6,472 lbs. of hazardous material input	$48,920	Recommended
Paint mixing process improvement	151 lbs. of HAPs, 3271 lbs. of VOCs, 5,906 lbs. of hazardous material input, 5,906 lbs. of hazardous waste	$90,644	Recommended
Solar power system installation	780,870 kWh converted, 766 $MTCO_2e$	$73,557	Recommended
Air and gas leak audit	187,656 kWh conserved, 182 $MTCO_2e$	$51,083	In Progress (90%)
Paint booth lighting exchange	28,495 kWh conserved, 49 $MTCO_2e$	$2,079	In Progress (25%)
Total	**317 lbs. of HAPs, 4,443 lbs. of VOCs, 12,378 lbs. of hazardous material input, 5,906 lbs. of hazardous waste, 216,151 kWh conserved, 780,870 kWh converted to renewable sources**	**$266,283**	
GHG reductions[1]	**996.5 metric tons CO_2e**		

[1]EPA P2 GHG Calculator with Cost, 29 November 2022 & EPA WARM Tool- Version 16, December, 2023