

**Intern:** Cooper Page  
**Major:** Industrial Engineering  
**School:** Kansas State University



## Company background

Ducommun provides engineered products and electronics, along with the manufacturing and assembly of aerospace structures for customers in commercial aircraft, military, space and other industries. Founded in 1849, with a present-day market capital of more than \$700 million, Ducommun employs around 2,500 people, 140 of those at the Parsons location. The Parsons location focuses on structural systems, involving processes like stretch-forming, thermal-forming, machining, chemical milling, subassemblies, precision fabrication and finishing processes.



Parsons, Kansas

## Project background

Ducommun's main focus regarding pollution prevention is the reduction of greenhouse gas, or GHG, emissions, specifically the goal of reducing GHG emissions by 25% before the year 2025. In 2022, indirect emissions from electricity accounted for about 73% of overall GHG emissions. Ducommun recommended five different projects, mainly focusing on reduction of electricity usage, and the intern explored two additional projects, including one started by previous interns. Four of these projects were recommended by the intern, and three needed further research.

## Incentives to change

Ducommun is continuously working toward greater sustainability. Many of Ducommun's performance centers have started implementing clean energy and energy reduction projects to reduce GHG emissions.

## PROJECTS REVIEWED FOR P2 POTENTIAL

### Heat loss reduction and reuse

The heat presses used for hot forming parts consume a large quantity of energy while expelling wasted heat directly into the facility. The intern researched solutions to reduce the amount of heat loss and reuse wasted heat. There are optional insulation blankets for the heat presses, but a small number of blankets are available, and most are of poor quality. Investing in new blankets and placing these blankets on all four sides of the press would limit heat loss. The heat waste produced by the heat presses can be reused in other processes like the chemical line or the ovens. A Rankine cycle could also be applied to this process to transform the heat waste into electricity. This project needs more research.

### Climate control in vacant areas

The room above the office is used for occasional events throughout the year. The intern estimates that the room is vacant for about 83% of the year, but is climate controlled year round. Turning off the climate control when the room is vacant would save 2,899 kWh and \$224 annually.

### Paint room climate control

The paint room is also climate controlled year round, because paint is stored in an adjoining area. A new design was constructed to close off the paint storage from the paint room so the climate control could be turned off when vacant. This design saves approximately 8,808 kWh, 836 therms, and \$1,096 per year. Further research is recommended for this project to determine better estimates of potential savings and reduce the payback period.

## PROJECTS REVIEWED FOR P2 POTENTIAL, CONTINUED

### Solar panels

Solar panels allow facilities to produce their own clean energy. After considering factors such as initial investment, space requirements and the company's goals, the intern recommended a large system that would be placed above parking and in field space currently owned by Ducommun and result in \$208,924 and 2.41 GWh saved per year.

### Hydropower

Ducommun has a few processes that require the use of water, including the waterjet and chemical lines. Producing clean energy through an in pipe hydro turbine is a great opportunity. One location, the cooling tower for the heat presses, was tested to find feasibility of a hydro system. This location did not provide a high enough flow rate or excess pressure, therefore was not recommended. The intern recommends looking into larger piping systems that would provide excess pressure to produce energy.

### Lighting

Fluorescent lighting is used throughout most of the facility. Switching to LEDs, adding motion sensors and removing redundant lighting would reduce energy usage. The intern estimated energy and cost savings for switching the lighting at various areas, adding motion sensors to some rooms, and removing redundant lighting. Fully implementing this project would save 412,637 kWh and \$41,264 per year.

### Unused appliances and devices

Various unused appliances and devices were found in two different areas of the facility. The old offices and the room above the current offices contain multiple appliances and devices that are unused, including a refrigerator, printer, amplifier, microwave and three other devices. Unplugging these appliances and devices would result in \$150 and 1,496 kWh of annual savings.

## SUMMARY OF 2023 P2 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings (\$/year)	Status
Heat loss reduction and reuse	N/A	N/A	More research needed
Climate control in vacant areas	2,899 kWh 2.8 MTCO <sub>2</sub> e	\$224	Recommended
Paint room climate control	8,808 kWh, 836 therms 13 MTCO <sub>2</sub> e	\$1,096	More research needed
Solar	2,410,000 kWh 2,336 MTCO <sub>2</sub> e	\$208,924	Recommended
Hydropower	79 kWh	\$8	More research needed
Lighting	412,637 kWh 400 MTCO <sub>2</sub> e	\$41,264	Recommended
Unused appliances and devices	1,496 kWh 1 MTCO <sub>2</sub> e	\$150	Recommended
<b>Total<sup>1</sup></b>	<b>2,825,536 kWh</b>	<b>\$250,562</b>	
<b>GHG reductions<sup>1,2</sup></b>	<b>2,740 metric tons CO<sub>2</sub>e</b>		

<sup>1</sup>Does not include projects "not recommended" or where "more research needed."

<sup>2</sup>EPA P2 GHG Calculator with Cost, 7 April 2016 & EPA WARM Tool—Version 14, Mar. 13, 2018