



Capstone Design Project Abstract

Project Title:
Manufacturing Facility Energy Optimization

Sponsor: RESRG Automotive

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Faculty Mentor: Dr. Roger Hilten

RESRG Automotive is an automotive manufacturer primarily producing injection-molded parts. RESRG Automotive's Covington facility uses a significant amount of energy due to its injection-molding processes, compressed air system, and its legacy HVAC system, which is 30-40 years old and is controlled by individual thermostats around the facility.

This is problematic for RESRG as these inefficiencies drive up their electricity bill, upwards of \$200,000 some months. The facility also has no way to mitigate price spikes in electricity costs. The prices that Georgia Power charges can increase from a few cents per kilowatt-hour to several dollars, and due to the outdated nature of RESRG's controls, they do not have an efficient way to offset these costs through scheduling optimization.

The goal of this project is to reduce the energy consumption of RESRG's Covington plant by looking into replacing legacy HVAC equipment, using data from Georgia Power to schedule non-essential loads more efficiently, implementing a Building Management System (BMS) to automate HVAC systems, developing cost-effective renovations for other systems, and incorporating Georgia Power utility incentives into proposed renovations. There were many different design opportunities due to the age of RESRG's systems, yet our solutions had many difficult constraints. For example, RESRG cannot afford to lose production time implementing our solutions. Another major constraint placed upon our solutions was RESRG's budget as they requested a ROI somewhere around 1.5-3 years.

Within these constraints, the project team developed three main solution paths for RESRG. The first is implementing a BMS to automate the building's HVAC processes. The second is renovating and upgrading the facility's chiller system. Our last proposal are various repairs and upgrades to RESRG's compressed air system. The project team projects that all of these proposals together could save RESRG upwards of \$100,000 per year.