



## Capstone Design Project Abstract

**Project Title:** Sustainability Power Dashboard

**Partner/ Client:** Piedmont Athens Regional

**Team Members:** Mac Batten, Reese Brown, Aidan Burke, Bhaven Desai, Matt Kierulf

**Project Supervisor:** Dr. Jorge Rodriguez

**Instructor:** Dr. Renny Badra

### Motivation

Hospitals are among the highest energy-consuming facilities due to their operations. Piedmont Athens Regional hospital identified the need for a centralized system to track their energy consumption in an effort to become more sustainable. The motivation behind this project is to develop an energy monitoring dashboard that enhances visibility into energy usage, promotes efficiency, and encourages behavioral changes among hospital staff. The dashboard displays Piedmont's energy baselines to compare how different factors affect their consumption. By providing interactive data visualizations and analytical insights, the dashboard will support Piedmont's goal of minimizing its environmental impact.

### Design

The system is designed as a web-based application utilizing Flask to manage backend data processing and React to create the frontend data visualization. The dashboard integrates energy consumption data from various sources and presents it in an intuitive format. The design incorporates key features such as energy monitoring displays that show usage trends and historical comparisons; interactive elements to engage hospital staff in energy-saving efforts; customizable visualizations that provide insightful data representations; and web-based solutions for large-scale access. The system begins by extracting raw usage data from CSV files. Using Flask, the backend processes the data through API endpoints, converting the files into a JSON format via Pandas that can populate the dashboard in React. After obtaining the array of JSON objects, the React dashboard, developed in the frontend, displays the data. An example can be seen in the image below.

### Prototype

For the prototype, the group is able to successfully convert CSV files containing energy usage data into the JSON format needed for the React dashboard. Once converted, the data is displayed in a user-friendly interface with graphs that show consumption trends. These graphs include interactive filtering options, allowing users to view the energy consumption trends by specific time periods or by usage type.

