

On the Road to Net Zero

Interns: Jake Campbell, Emily Downs and Dan Fleites

In 2010, UVM committed to climate neutrality with the goal of achieving 100% renewable electricity, carbon-neutral thermal energy, and carbon neutral commuting by 2025. Achieving these goals will eventually require all buildings on campus to design, fuel, and maintain net zero energy usage to achieve campus-wide climate neutrality. One of the largest projects to help reach this goal was the reconstruction of the Aiken Center in the fall of 2011. Now, to further the University's goal of achieving climate neutrality, the remaining Rubenstein School buildings – Bittersweet House, the Forestry Sciences Laboratory, and the Rubenstein Ecosystem Science Laboratory – are beginning to upgrade their current building designs and energy usage. Upgrades such as LED lighting, efficient heating systems, and renewable energy usage have helped lower the energy consumption of the Aiken Center, Bittersweet House, Forestry Sciences Building, and Rubenstein Lab to better prepare the buildings to become net zero ready. The goal of this semester is to use the energy data gathered from these buildings to analyze and quantify the renewable energy necessary to offset the School's energy usage.



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This is being accomplished by Jake Campbell (Environmental Sciences, '21), Emily Downs (Environmental Sciences, '20), and Dan Fleites (Environmental Sciences, '18), members of Gary Hawley's Greening of Rubenstein Internship (ENSC 185) course. Most of what has been done so far involves quantifying energy usage, both electric and natural gas, for the four Rubenstein School buildings: Aiken Center, Forestry Sciences Lab, Rubenstein Lab, and Bittersweet House.

While Rubenstein School buildings on average use less energy than other UVM buildings, analysis of the data revealed some problems. The electricity data for the Aiken Center reveals an energy creep, with the total electricity use for each year after 2015 gradually increasing. In order to have the Aiken Center reach its achievable potential, the source of this energy creep must be determined and preventative action must be taken. Additionally, this is the first year that the amount of chilled water and steam used by the Aiken Center for heating and cooling could be quantified as the UVM Physical Plant recently put in a new meter. A notable trend in this data is that there are days where the Aiken Center is heated in the morning and cooled in the afternoon. This is a very inefficient use of resources as it takes more energy to cool a building that has been heated.

While data for the other buildings does not reveal problems on the scale of those in the Aiken Center, there are still some large fluctuations that go on from year to year, and if the source of those could be determined, they could be addressed, resulting in the buildings coming closer to reaching their achievable potential. Gary Hawley recently put in a request to the Clean Energy Fund to have Level III energy audits done on all the Rubenstein School buildings, which could help the School understand where gains can be made in energy efficiency and whether or not the steps required to make those gains would be cost effective.