Seeking Out Solar

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From left to right: Jackson Schilling (Environmental Sciences '21), Hannah Kershaw (Environmental Studies '22), Peri Buck (Environmental Studies '22), and Nesta McIntosh (Environmental Studies '22)

Spring semester started with many opportunities and exciting projects in the Rubenstein School. As the University of Vermont continues to work towards becoming a more sustainable campus, the students, faculty, and staff at RSENR have also taken up their own projects to make their buildings more sustainable and more specifically net zero energy ready.

Our group, as a part of the Greening of Rubenstein class taught by Gary Hawley, has been working on quantifying the amount of energy used by the Aiken Center, the Rubenstein Ecosystem Sciences Laboratory, the Bittersweet Building, and the UVM Forestry Sciences building. Our findings will help to determine how many solar panels we will need to offset the energy use.

In general, net zero energy means that a building's total energy use on an annual basis is equal to the amount of renewable energy created either on site or by other renewable energy sources affiliated with the building. This can be achieved in many ways — through renovation, retro-commissioning, energy credits, and installation of renewable energy sources such as wind or solar. Typically, the best way to create a net zero energy building is by upgrading the building to make it as efficient as possible before you add renewables to offset the energy use.

Our group has been working with multiple sets of data that quantify the amount of energy used by the various buildings. For heating and cooling, most of the RSENR buildings use natural gas, and both electricity and natural gas use is recorded on a website called *SchoolDude* to quantify the amounts of energy use in kilowatt hours (kWh).

The Aiken Center heating and cooling data is recorded by a steam meter three times a day in MBTUs, (thousand British thermal units). Part of our job was to get daily totals for a whole year's worth of heating and cooling data, convert that data to kWh, and finally quantify how much energy was used in the form of heating and cooling over the course of the whole year. Additionally, we did a bit of reworking with the data to get the total for calendar year 2018. We found that for heating and cooling, the Aiken Center used 356,607 kWh for the whole year.

Moving forward, we're going to add together the overall kWh used by all the RSENR buildings to see the energy usage for the year of 2018. Next, we will the try to determine the amount of energy we will save from new efficiency upgrades for each building, so we can estimate the total amount of kWh used by all RSENR buildings in the future.