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**Class of 2022**

**Saint Michael's College**

**Internship Portfolio: Continuous Energy Improvement**

**December 2020**

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# Executive summary

The Continuous Energy Improvement (CEI) program is a multi-year project coordinated through the Center for the Environment at Saint Michael's College in partnership with Efficiency Vermont. The year 2020 was the first time this program was run at the College, though institutional work with Efficiency Vermont around energy improvements and energy-efficient building design and construction goes back several years. The overarching goals of the program were to measurably reduce the energy consumption on campus and connect the campus community to this process through educational opportunities and an engaging behavioral campaign. Supporting these goals is the mission of the Center for the Environment to evolve the culture of sustainability on campus and in the community as a legacy for future generations.

For several years, the College had not specifically prioritized student engagement in energy improvement initiatives. However, significant technical improvements had been made over the years across campus, such as the installation of LED lighting across more than half of campus, the installation of a solar array on the land in our Natural Area, the energy-conscious design of Residence Hall 4, and the installation of two geothermal energy systems to power some of the buildings on campus. This has contributed to an overall downward trend in electricity consumption since at least 2015 (see Final Presentation, slide 2, p. 24). In the past, a successful on-campus energy competition had been organized for junior and senior students by the former Sustainability Coordinator at the College. This year, the structure of the Center and our renewed commitment to energy improvement manifested in our adoption of the CEI program.

The first priority involved in executing and institutionalizing the program, which spanned from March to December of 2020, was to develop attainable goals specific to the College's current progress:

- Understand and document the energy management systems on campus in order to creatively transform them into environmental, economic, and social learning opportunities for the campus community.
- Make key campus energy systems and use visible.
- Immediately employ no-cost energy saving initiatives beginning with controls optimization.
- Establish feedback systems that are accessible and tailored to the constituents of our campus community – students, faculty, and staff.

To attain these goals, broad-based support from numerous realms across campus were necessary. The relationships our energy cohort built with our Facilities team, Residence Life, student participants, Efficiency Vermont, Temperature Controls of Vermont (TCV), Green Up Club, and our Marketing and Communications Department proved to be invaluable and thoroughly rewarding. Our main Energy Team, which met virtually throughout the summer and fall, consisted of the Director of the Center, the CEI Intern, the Senior Associate Director of Facilities, our HVAC and Technical Trades Supervisor, and an Energy Consultant from Efficiency Vermont (see the PowerVine newsletter, "Meet the Team" segment, issues 2 & 3, pp. 19, 22, & 23).

What has made our approach to CEI more robust than in past years was the integration of the technical work of energy improvement (which is often outside the purview of the student body) as well as the outreach to the campus community (the majority of those who *use* the energy). Our Energy Team considered these components as two sides of the same coin (see Internship Plan, p. 5). The controls optimization work and new ventilation protocols resulting from COVID-19 were implemented by our dedicated Facilities team in conjunction with TCV, and these efforts were broadcast by means of the PowerVine newsletters, which were distributed via several electronic outreach channels.

Our behavioral campaign took the shape of a dorm-level energy reduction competition among the first-year students housed in two buildings: Lyons and Alumni Halls. The premise of this competition was our observation that energy usage often flies under the radar of one's day-to-day life on campus, and that there is a need to introduce and encourage more *mindful* energy-consuming behaviors as well as illustrate the positive implications of this awareness. We chose to target first-year students because a) research suggests that new behaviors can be better established at major life transitions, and b) true to the *continual* nature of CEI, future interns will be able to gather energy use data throughout their four years at Saint Michael's College. Several levers from the existing behavioral science literature were incorporated to enhance the efficacy of the competition (see Internship Plan, p. 7). Students were invited to participate in three different ways to gain points for their hall: signing a community commitment, logging their energy-saving behaviors, and playing an energy trivia game with their hall. We partnered with The Saint Michael's Farm to offer the prize for the winning hall: a pizza party featuring vegetables from the farm!

The COVID-19 pandemic presented several unique challenges to the project's goals and our vision of its impact on the student body. During the second week of the three-week competition, the College saw a spike in cases that ultimately led to the cancellation of all in-person events and placed stress on many students as they navigated ways to cope and adapt to the circumstances. The influx of online communications at this time meant the online platform used for the competition was less engaging to students. Unfortunately, this lowered participation in the competition (Power vine issue 3 p. 21). However, this competition allowed a foundation to be laid and several important relationships to be built for future engagement campaigns. This year will be considered a pilot of the CEI program.

While the disruption of campus life brought COVID-19 posed its own difficulties, there may also be an underlying dissonance inherent in the standard climate change narrative. Of course, there are clear ties between energy demand, fossil fuel combustion, and atmospheric health, yet for many students this way of thinking does not resonate. The focus of this discourse is global in nature, rendering it largely a theoretical or academic venture. It also becomes intangible and removed from the immediacy of the places and ecology in which we live. In environmental science classes, for example, students learn of the cutting-edge technologies and international agreements and institutions that seem to hold promise in slowing anthropogenic climate change. These lessons do hold value, but for many individuals they can be disempowering: it is others who hold the power to effect *real* change. This is a vital consideration in our attempt to evolve a more environmentally conscious campus culture because lasting behavioral change most often comes from new realizations emerging from primary experience, not usually mere information in the absence of something tangible. Of course, the

pandemic made in-person activities and events impossible. But it would benefit the CEI program and its future campaigns to develop more experiential and memorable activities to help students adopt a conservation mindset over a consumption mindset.

Throughout the project, our Energy Team made significant progress in realizing the four primary goals outlined earlier in this summary. For example, as we gained a greater understanding of the College's energy management systems, this shifted the focus of our efforts from Cheray Hall, our science building, to the first-year dorms because their systems are far easier to access and manage. Additionally, learning how heating systems work in those buildings from our Facilities team led us to advise students to keep their windows closed in the colder months, as opening them to regulate their room temperature disrupts the buildings' feedback systems and results in significant heat loss.

Our Energy Team also succeeded in making the use of campus energy systems visible through the newsletter and weekly leaderboard updates during the competition. Many of the other energy saving initiatives, including controls optimization changes, were made possible with funding from Efficiency Vermont and represent essential progress in making complex energy systems easier to manage. Finally, the feedback systems we established should be thought of as new information flows from our Energy Team to the campus community and back. These included communications among students, their RAs, and the CEI Intern during the competition, as well as a student feedback form made available after the end of the competition. Despite the hardships posed by the pandemic, the CEI program gained a strong foothold on campus, and it will be built upon and improved in the coming years.

This portfolio contains the major documents, reports, and outreach materials that the CEI internship has produced. The Internship Plan & Final Project Outline was developed early in the summer and illustrates our preliminary vision for the project. Some of the ideas contained in it were changed due to budget constraints resulting from COVID-19 or technical challenges. The Monthly Status Reports were submitted to Efficiency Vermont to provide proof of concrete progress and to encourage continued communication about the project's next steps. The PowerVine energy newsletter synthesizes all the facets of the CEI program's progress for the campus community and is a great source of pride for our Energy Team. Each issue features an introductory segment placing CEI in the context of the pandemic, energy data analysis, a behind-the-scenes look at infrastructural energy improvements, and a "Meet the Team" segment that introduces the members of our Energy Team, all of whom have made this incredible project possible. These newsletters were very well received and elevated the impact of the CEI program by making it visible and easy to understand for the campus community. The Final Presentation was given to Efficiency Vermont in November; the cohorts from Middlebury College and Bennington College also attended to present their findings and discuss the goals and outcomes of each intern's energy campaign.

# Project deliverables

## Internship plan & final project outline

### **Introduction**

The Center for the Environment at Saint Michael's College has committed to improving the school's energy efficiency as part of its mission to evolve the culture of sustainability on campus and in the community as a legacy for future generations. In developing, executing, and eventually institutionalizing our plan for Continuous Energy Improvement (CEI), we aim to reduce our energy consumption and connect the campus community to this process through education and an engaging behavioral campaign. More broadly, the COVID-19 crisis has demonstrated the need to develop an energy management framework that can be used to respond flexibly and efficiently to unprecedented issues regarding our energy systems on campus.

Our goals for CEI are outlined as follows:

1. Understand and document the energy management systems on campus in order to creatively transform them into environmental, economic, and social learning opportunities for the campus community.
2. Make key campus energy systems and use visible.
3. Immediately employ no-cost energy saving initiatives beginning with controls optimization.
4. Establish feedback systems that are accessible and tailored to the constituents of our campus community – students, faculty, and staff.

### **Our need for a behavioral campaign**

Both the technical work that is often outside the purview of the student body as well as the outreach to the campus community (the majority of those who *use* the energy) are necessary parts to developing a sustained effort to improve the energy efficiency on campus. These two components support and drive each other forward and will need to work side by side both now and into the future in order to achieve our desired energy-saving goals.

A behavioral campaign will diffuse energy literacy – as well as the power to make positive changes to consumption patterns – to the campus community. While energy usage often flies under the radar of one's day-to-day life on campus, we aim to introduce and encourage more *mindful* energy-consuming behaviors and illustrate the positive implications of this awareness. This effort will take the form of an energy competition among the first-year students housed in two buildings (Lyons and Alumni Halls). Giving students, faculty, and staff the opportunity to explore the components of energy systems and how they interact with them will provide a basis for action to reduce unnecessary energy consumption.

## Implementation and outreach

This summer, we will work closely with the Residential Life team to plan the best engagement strategy for when first-year students arrive at campus in August. Prior to the start of the competition, we will focus on introducing the College's commitment to sustainability and energy efficiency. Once students become comfortable with campus and their new schedules after a few weeks, the competition will begin, continuing for three weeks. The various facets of our outreach plan are summarized in the table below.

CEI Outreach Timeline	
June	Develop an energy newsletter and send out a pilot issue; receive and respond to feedback for subsequent issues.
June-August	Work closely with the Residential Life team to integrate relevant CEI information into the training of RAs, who will act as messengers. Coordinate smart power strip distribution to each room before first-year students move in.
Late August	Collaborate with Green Up to distribute newsletter more widely via social media and club meetings.
Mid-Sept.	Send out pre-competition survey to first-year students.
Aug. 30 – Sept. 19	Gather baseline energy-usage data for Lyons and Alumni halls (three weeks).
Sept. 20 – Oct. 10	Run the energy competition (three weeks).
Sept. 18/19, 25/26, Oct. 2/3	Host energy-related games during Friday and Saturday night programming through Residential Life.

A weekly newsletter will update the campus community of the recent efficiency improvements that have been done by our Facilities team. It will also provide tips for success during the competition as well as a digital version of the competition's leaderboard. Additionally, we will provide a more tangible symbol of our sustainability efforts – for example, an LED light bulb that each student can install in the lamps they bring to their dorms.

Research suggests that leveraging the behavioral strategies of public commitments, timely feedback, and social norms, significantly increase the effectiveness of on-campus energy competitions (Vine & Jones, 2016; Konis, Orosz & Sintov, 2016). Furthermore, the UK Behavioral Insights Team points to the importance of what affects our receptivity to new behaviors: the ease, attractiveness, sociality, and timeliness of an encouraged behavior. To generate effective behavior change, consideration must be given to influences such as the efficacy of the messenger, incentives and rewards, and subconscious cues, among others (Dolan et al., 2010).

To employ these strategies, each hall can keep a leaderboard that the RAs update each week during their meetings with the first-years. These leaderboards will a) show which students have committed to participate in the competition, and b) convey which building is currently in the lead and how much energy they have saved compared to the baseline data measured in the weeks before the competition.

We will also use existing weekend programming through Residential Life to provide prompts for reduction in energy consumption. A series of games with trivia or energy-reduction challenges will encourage students to accumulate participation points, which can provide a separate category for competition and prizes. The building with the greatest energy savings will not only gain recognition in the weekly newsletter, but they will also win a pizza-making party in which they can use fresh ingredients from the school farm to take part in a cooking lesson on campus.

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## Monthly status reports

### June

The month of June brought our Energy Team together to discuss how the College's energy systems work and how to approach our three primary CEI goals with the infrastructure and resources available to us. During this time, we realized a fourth goal was needed, one that was already the focus of our time and energy: to understand and document the energy management systems on campus in order to creatively transform them into environmental, economic, and social learning opportunities for the campus community. Our progress is outlined below:

- The SMC Energy Team met on June 5<sup>th</sup>, 9<sup>th</sup>, and 18<sup>th</sup> to discuss project progress.
- The CEI Internship Project Outline was completed and shared with the Energy Team and the cabinet of the President of the College.
- The SMC Facilities team created a spreadsheet to track controls optimization changes.
- SMC obtained a metering quote from TCV for Lyons, Alumni, and Aubin halls, as well as for a web-based interface to which students could have access to view building-level electricity usage.
- The Energy Team completed the Energy Management Assessment.
- We attended the CEI & AASHE webinar and learned that student engagement in data collection can produce a more complete and timely report.
- Our Facilities team turned up the set points of several campus buildings to save energy.
- The Energy Team discussed the possibility of converting the submeters for the Quad buildings from LON to Bacnet in preparation for the student energy competition.

### July

July allowed us to shift our focus and look forward to preparing for the return of students in August. This month's progress included:

- Our Energy Team met on the 8<sup>th</sup>, 10<sup>th</sup>, and 24<sup>th</sup> of the month.
- The CEI intern drafted a list of energy-saving behaviors for the energy competition.
- Our Energy Team decided to incorporate a CEI-related item into the first-year student gift; LED lightbulb or smart power strips were plausible options.
- We attended the Energy Engagement webinar and learned how to spread energy awareness both passively with signage and stickers, but also actively with public commitments, games, timely feedback, etc.
- We met with the Director of Residence Life to discuss the engagement campaign for fall semester and the role of RAs and RDs.
- We narrowed the competition scope to Lyons and Alumni Halls, as Ryan will be closed for COVID-19 quarantine space.
- Our Energy Team adopted the alternative of installing used meters to reduce the cost of installation in Lyons and Alumni Halls.

## **August**

August featured many discussions about how our CEI program could be integrated with other sustainability efforts across campus to prepare for a strong reopening at the end of the month. But several challenges arose: a member of our Energy Team moved on, placing more stress on our facilities team. Meanwhile, some of our energy-saving initiatives (such as reduced AHU activity) run counter to COVID-19 safety protocols as we draw closer to move-in dates. However, we accomplished the following:

- Our Energy Team met on the 14<sup>th</sup>, 21<sup>st</sup>, and 28<sup>th</sup> of the month.
- The first energy newsletter was completed and broadcast via the Center for the Environment mailing list, campus-wide daily announcements, online student portal, and social media platforms.
- Our Energy Team obtained the proposal from TCV regarding control system improvements. We aim to carry out all of the Programming Only Scope improvements, and a portion of the On-Site Changes that is supported by EVT funding.
- The CEI intern met with the RAs and RDs to introduce energy competition as part of fall semester programming.

## **Next Steps**

- Record all controls optimization changes made this summer. Tease out which improvements can be sustained and which will need to end or adapt to accommodate COVID-19 protocols and recommendations.
- Release the second edition of the newsletter by mid-September – feature discussion of the nexus among public health, energy conservation, and environmental stewardship
- Coordinate the Energy Treasure Hunt. The SMC team aims to conduct this in person, ideally with the eco reps, while EVT will guide us virtually.

This summer – unconventional as it is – has highlighted the importance of working flexibly, responding to new and changing information, and respecting the skills and limitations of each team member. Despite facing several challenges, we see the value in transforming them into opportunities for education and motivation for behavioral change. With consistent communication within our Energy Team and clear messaging to the campus community, we look forward to continuing to share our work this summer with students, staff, and faculty.

## **September**

September brought a flurry of activity on all parts of our Energy Team as students returned to campus. Significant progress has been made both on the technical side of CEI as well as in our outreach to the campus community. This month's accomplishments have included:

- The Energy Team met once on the 25<sup>th</sup>, and several smaller meetings also took place as needed between its members over the course of the month.
- TCV and the SMC facilities team have installed the building submeters on Lyons and Alumni Halls.

- Our facilities team finished developing the “pandemic mode” operational system to align with COVID-19 ventilation requirements.
- The second Power Vine newsletter was released across multiple outreach channels. It includes a narrative describing the place of CEI in the current context of a public health crisis, a description of the upcoming energy competition, an analysis of the raw cost of electricity on main campus, and brief biographies of two of our facilities team members.
- The CEI intern met with the RAs of Lyons Hall and corresponded via email with those in Alumni Hall regarding the details of the energy competition.
- The CEI intern designed posters announcing the energy competition, which will be displayed in both of the residential buildings involved.

Perhaps the most challenging part of our project this month has been asking the right questions, especially for the purpose of accurately translating raw energy consumption data into a meaningful story. Yet this has been integral in achieving our goals of making energy use visible to the average person and establishing a broad-based feedback system that will become more tailored to students and more compelling during the energy competition. One more issue of the newsletter will be released to reflect on the competition and assess the success of CEI more generally.

We are also in the process of involving Green Up Club members who are interested in energy so they may further the goals of CEI with small projects, such as crafting and distributing eco-stickers to encourage energy-saving behaviors. Finally, although we anticipate a net increase of total energy consumption this year due to the high cost of new ventilation patterns, we also recognize the value of establishing a firm foundation of campus engagement and inclusive information flows so that greater savings can be realized for future semesters.

## **October**

Throughout October, most of our time and attention was directed toward the energy competition. Meanwhile, TCV and our Facilities team worked on controls optimization projects throughout campus. Challenges arose during the second and third weeks of the energy competition, however, when we experienced a spike in COVID-19 cases, which drew our collective attention to mitigating the spread and moving entirely online. While this likely decreased competition engagement among students, progress was made in many other areas:

- Our Energy Team met on the 9<sup>th</sup>, 15<sup>th</sup>, and 30<sup>th</sup> to discuss meter access and additional CEI controls optimization progress
- TCV and our Facilities team fixed the eGauge meters to allow accessibility
- The energy competition ran from Oct. 11 to Oct. 31 between Lyons and Alumni Halls
  - We made informational videos about how to participate and sent them out to the RDs and RAs of each building
  - The CEI intern sent out weekly feedback to the RDs and RAs of both dorms, which included energy use visualizations, their analysis, resources for success, and encouragement for continued participation
- The SMC Green Up Club made eco-stickers in our Maker Space for residents to place near light switches and outlets as reminders to save energy

- Energy-saving tips were posted on the Center for the Environment Instagram page, Green Up social media, and digital signage across campus
- The energy competition was featured in SMC's weekly newsletter put out by the Office of Marketing and Communication
- TCV completed a number of CEI-related projects to reduce HVAC energy consumption

The rise of COVID-19 on campus also placed more responsibility on our RDs and RAs to manage the crisis. In effect, this likely made continued communication with their residents about the competition less of a priority. Some participation was evident regardless, as some residents logged their energy-friendly behaviors, signed the community commitment poster, and played the online energy trivia game for points. In the future, more hands-on and in-person events during the course of an energy competition could garner interest more effectively.

## **POWER** *Vine*

SMC's Energy Newsletter



### **WELCOME!**

Welcome to the Power Vine! This newsletter will help you navigate how Saint Michael's College is addressing energy usage on campus through operational and behavioral change. Whether you are a student, a staff member, a professor, or just a curious member of the community, we'll cover what you need to know about energy systems on campus and how you can get involved in these sustainability efforts.

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Because it takes on a plethora of different forms, the term "energy" can have various meanings depending on the context. It's why you might need coffee in the morning; it's why in some classes we discuss its direct link to climate change and the intricacies of renewable forms of energy. In this newsletter, I'll focus on how we, as a campus, are working to reduce our energy usage to create a culture of continuous energy improvement.



## CONTINUOUS ENERGY IMPROVEMENT

### *Energy efficiency gets real*

This is the first year the Center for the Environment is implementing a Continuous Energy Improvement (CEI) program. We've partnered with Efficiency Vermont to systematically reduce our demand for energy and invest in the efficiency of our systems on campus. Meanwhile, we'll reduce our carbon footprint, save in energy costs, and accumulate knowledge and data to inform current and future projects.

So what will CEI look like on campus? A lot of the work is done behind the scenes by our dedicated facilities team. This summer, they are adjusting the heating and cooling of buildings, as many students are not on campus due to COVID-19. Unoccupied buildings are being put into "napping" state while those that are being used will see slight

changes in the set building temperature. This means it may feel slightly warmer in the summer and cooler in the winter in your office or classroom, as it takes longer for the heating or air conditioning to kick in. But fear not! This is a simple strategy to save energy - it's estimated that just a 1 degree setback can result in a 2% reduction in energy use during a Vermont winter!

We're also taking other steps to connect YOU to this process. This fall, we aim to enable each student to view their building's energy usage, and they will receive tips and tricks to use energy more mindfully. And in September, we'll engage the tools and resources we've developed this summer to bring an engaging energy challenge to incoming students. Look for our next edition to learn more!

*We'll reduce our carbon footprint, save in energy costs, and accumulate knowledge and data to inform current and future projects.*

# ENERGY IMPACTS OF COVID-19



*Although the changes brought by COVID-19 were not voluntary, they show how the impact of even modest behavioral change can accumulate rapidly and be sustained over time.*

The threat of COVID-19 has impacted the energy "landscape" on campus rather drastically. The figure above shows the change in energy consumption during the work week, highlighting the effect of students leaving campus early and continuing classes remotely, with regular summer programming experiencing disruptions as well. To put these changes into perspective, 40,000 kWh (kilowatt hours) is equivalent to the greenhouse gas emissions of 25,000 miles driven by an average passenger vehicle, or about 22,000 pounds of carbon dioxide. \*

While these are significant savings, especially as the change in energy usage surpasses double that amount for several weeks, it is worth noting that a similar amount of energy is likely being used elsewhere. Students that went home are still using energy, perhaps a greater amount now that meetings, work, and other events have moved online for many of us.

Meanwhile, common gathering areas, such as churches, libraries, and restaurants (which allow energy to be saved when many people use a building simultaneously) are closed or have limited capacity, in all likelihood contributing to higher energy usage overall per individual.

However, the shifting energy landscape on campus shows the potential for a campus-wide effort to continue some of these savings. In this sense, these changes can be seen as an extreme behavioral change (i.e. moving off campus completely). Although this was not a voluntary act, it shows how the impact of even modest behavioral changes can accumulate rapidly and be sustained over time. Combined with adjustments to energy-related infrastructure on campus, there is a lot we can do when we act as a whole.

\*This figure was converted using the EPA's Power Profiler based on the emissions rates for the New England eGRID subregion.  
<https://www.epa.gov/energy/power-profiler/#/NEW>

# MEET THE TEAM



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Assistant HVAC Supervisor

*This project is made possible by essential partnerships with TCV and EVT.*



Our Energy Team is a collection of talented individuals on campus and off, working in a variety of ways to develop, execute, and institutionalize our CEI plan. While energy consumption on campus often flies under the radar, we're here to help you understand how it all works while giving you the power to effect positive change.

Stay tuned to learn more about us and our roles in forthcoming issues!

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# POWER *Vine*

SMC's Energy Newsletter



## NEW BEGINNINGS

*Shaping challenges into opportunities*

Campus life has resumed, albeit in an unconventional way. As a community, we have shown we are capable of responding to the COVID-19 pandemic through our responsibility to care for each other's welfare. This is the story of public health, and it bears a striking resemblance to the story of environmental stewardship. Both realms demand that in times of crisis, we act out our values to address the social, economic, and environmental inequities that have been exposed by the disruption of everyday life. With infectious disease as well as with climate change, we have the opportunity to ask ourselves what we can learn from the challenges facing the global community and how we can commit to mending society's fractured systems. Executing our Continuous Energy Improvement (CEI) program is one way to address energy overconsumption in the context of the College's mission for every member of campus to do well and do good.

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# ENERGY USE AT ST. MIKE'S

## *An inside look*

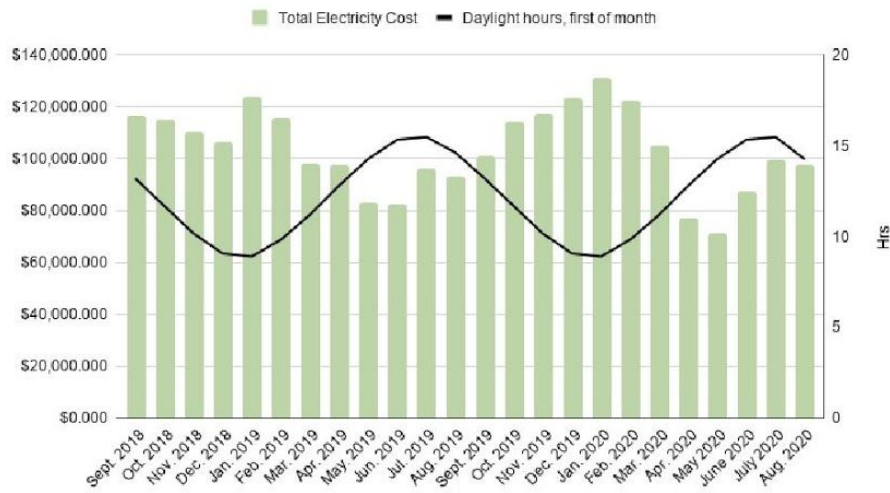
Few of us realize just how pervasive energy is to our lives. Put simply, it is what keeps us warm, clean, entertained, and connected through communication technology and travel. This has proven to be especially true in this time of limited in-person contact. More classes than ever have an online component, and extracurriculars must find creative ways to abide by COVID-19 protocols while still maintaining student interest.

So how much energy do we use on campus? Well, energy sources can be divided into two distinct categories, namely fuel and electricity. Below is a visualization showing the cost of electricity on main campus, representing only the raw cost without any additional fees or the credits generated by on-site solar generation.

Several intersecting factors bring about the fluctuations in usage and cost over the course of a year. The most influential variable is the presence of students on campus during the fall and spring semesters. Additionally, the hours of daylight, shown in black, helps determine the demand for electricity. Shorter days mean that lights are turned on earlier in the morning and the evening compared to the summer months. Finally, the seasonal demand for electricity makes each kilowatt hour (kWh) more expensive during the winter months. In the last two years, the price has ranged from about \$0.09 to \$0.13 per kWh. Although this difference seems negligible, it is multiplied on a scale of hundreds of thousands of kWh, making it a sizeable factor in this discussion.

*Put simply, energy is what keeps us warm, clean, entertained, and connected through communication technology and travel.*

**SMC Electricity Cost for Main Campus**



# 2020 ENERGY COMPETITION

*Lyons and Alumni will go head-to-head to curb consumption*

How much electricity can YOU save in three weeks? This is the question that residents of Lyons and Alumni Halls will face beginning on October 11. Students will identify opportunities to unplug, turn off, and turn down their electronics to address the issue of overconsumption. Meanwhile, they'll be reducing the College's footprint and playing games to rack up participation points. The building that saves the most compared to the baseline period will win a pizza-making party using veggies from the campus farm!

Each student will receive weekly feedback regarding their building's energy trends and how it compares to their competitor building. This will enable them to visualize their consumption, which ordinarily lies beneath our everyday perception. Every action counts, from doing only full loads of laundry to taking the stairs instead of the elevator! These new energy-using habits, however small, can accumulate quickly over three weeks when everyone is on board.

We all use energy, and the environmental ethos at St. Mike's is stronger than ever. Giving students the opportunity to explore the components of energy systems and how they interact with them will provide a strong basis to evolve the culture of sustainability on campus. If you would like to participate but do not live in Lyons or Alumni, you can still make a difference! To receive energy-saving tips and tricks, follow @smcgreenup on Instagram.



*Students will identify opportunities to turn down, unplug, and turn off their electronics to address the issue of energy overconsumption.*

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# MEET THE TEAM



Joel Ribout  
Senior Associate Director of Facilities



Al Sutton  
HVAC & Technical Trades Supervisor

*Meet the dedicated members of our facilities team! Not only are they essential for the success of our CEI program, but their work behind the scenes keeps campus running smoothly year-round.*

Joel is a self-described "facilitator for facilities." Most of his work at St. Mike's in the five years since he arrived has consisted of planning, billing, and managing construction and renovation projects across campus, as well as general grounds and building upkeep. This work was a natural progression from his 16 years in the realm of architecture, especially as the first big project on his plate was the construction of Res Hall 4. He also managed the conversion of the Alumni basement for use by the Adventure Sports Center. Needless to say, we have all benefited in some way from his work.

Although he is the Senior Associate Director of Facilities, Joel sees himself not as the lead, but as an equal member of the CEI Energy Team. In his eyes, the single most important understanding for the campus community to have is this: "Energy is not free." While the energy we use is largely invisible to most of us, its cost is still factored into each student's room and board fees. Many of us already seek out ways to save money; with energy, however, we generally don't have the same awareness of the cause-and-effect of our choices. Energy conservation, Joel points out, is the connection between our everyday behavior and the bills that come across his desk.

There are few people who have been at St. Mike's longer than Alan Sutton. He arrived here in 1981 - a time when Durick Library was circular and there were only a handful of computers on campus. In those days, most of his time was committed to cleaning boilers, as the College was dependent on oil and had only just begun to switch over to natural gas for energy generation. This proved to be a full time job since there were over 30 on south campus and more than a dozen on north campus!

Today, Al monitors the energy management system to ensure that everyone on campus is comfortable. This involves bringing fresh air into buildings, controlling building temperature, and adapting to the nuances in energy needs across campus. It's a role he grew into over time, and one that has seen several positive changes. Both the conversion to natural gas and the installation of geothermal energy systems under the library lawn and the field near Merrill Cemetery have decreased maintenance costs and reduced our carbon footprint. And although there has been a noticeable increase in energy awareness within the campus community, much work remains to be done to encourage more mindful energy-using habits on campus.

*This project is possible due to essential partnerships with TCV, EVT, and VEIC.*





# POWER *Vine*

SMC's Energy Newsletter



## STEPPING BACK, STEPPING UP

*Finding resilience in the face of change*

As the semester draws to a close in the coming weeks, one might reflect on the moments of challenge and success that it has held. COVID has drawn our attention away from our normal plans and toward the safety of the people around us. It has caused us to step back and re-evaluate the implications of what we can and cannot do. But it has also presented the option of stepping up, owning the situation, and adapting to the circumstances with the resources at hand. Progress with our CEI program has been no different - although the dorm-level energy competition was disrupted by the outbreak (see page 2), our Facilities team has made considerable progress in partnership with TCV in optimizing our energy management systems (see page 3). By building relationships across campus, we have laid a foundation for the very network of people that will help further the progress of CEI in coming years. And in this season of gratitude, this is one of the many blessings for which we are thankful.

### IN THIS ISSUE

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- Energy Use at SMC - 3
- Meet the Team - 3, 4



# 2020 ENERGY COMPETITION

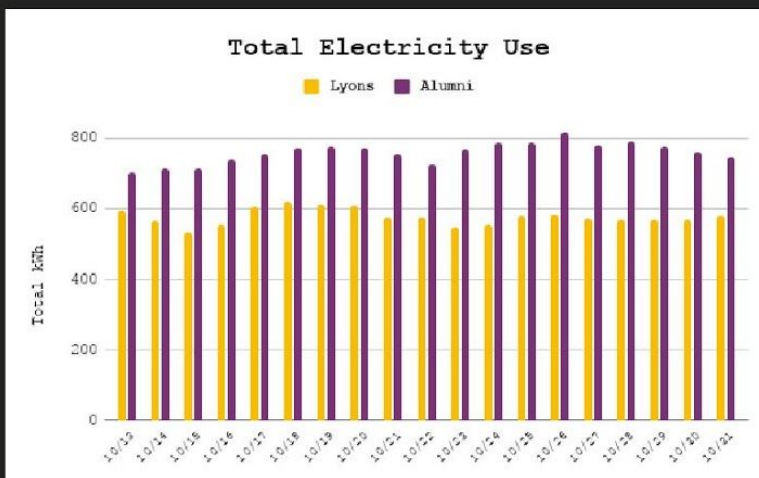
*Lyons and Alumni went head-to-head to curb consumption*

They tracked their energy-friendly actions. They signed a community commitment poster. They played an informative energy trivia game. And in the end, the students living in the north wing of Lyons 4th floor came out on top. By earning the most points in the building that used the least energy over a three-week period, they earned a pizza party that will feature veggies from our very own campus farm!

COVID-19 emerged within the campus community in the middle of the competition, and the onslaught of changes that ensued for students – the transition to online classes, potentially going into quarantine or isolation, and finding space for mental health – likely produced an effect known as "cognitive overload". Even so, energy conservation was evidently still on the minds of some students. They found small, easy ways to conserve electricity, heat, and hot water, and even invented some tactics of their own! Some of the most common ideas were taking the stairs instead of the

elevator, using cold water to wash laundry, and unplugging electronic devices when they are not in use, as they may still draw energy when they are simply turned off or put into sleep mode.

As you can see in the graph below, Lyons consistently used less electricity throughout the course of the competition. Several factors, in addition to individual behavior change, may also be responsible for this trend. For example, Lyons is located to the south of Alumni and likely catches more sunlight throughout the day, making less electricity necessary. Perhaps there is a greater share of students with environment-related majors in Lyons than Alumni. Or maybe the class composition of each building plays a role, as Lyons houses only first-year students while Alumni also houses some sophomores and juniors. For future energy campaigns, it would be valuable to measure and record these additional variables and the influence they might have on energy use.



*Even as COVID-19 emerged within the campus community and all in-person activities were canceled, energy conservation was evidently still on the minds of some students.*

# ENERGY USE AT ST. MIKE'S

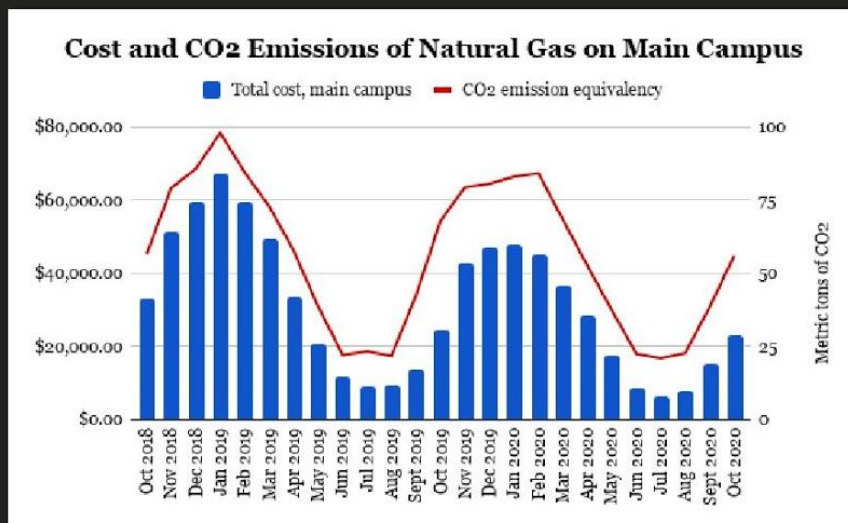
## *An inside look*

The large majority of energy used at St. Mike's is derived from natural gas, a non-renewable resource obtained by hydraulic fracturing, or "fracking". This process is a way to harvest natural gas from rock formations underground by injecting water and chemicals through pipes at an extremely high pressure. This intense pressure fractures the rock and allows previously inaccessible natural gas and oil to be brought to the Earth's surface. When combusted, natural emits about half as much carbon dioxide as coal, though

the environmental impacts of chemical leaks and fresh-water demand in the extraction process cannot be overlooked.

The graph to the right illustrates our natural gas usage through the lens of expense and CO2 emissions. Wide seasonal fluctuations indicate that we use energy for heating when it is most necessary, that is, when the outdoor temperature drops.

Our facilities team has been hard at work making our campus energy systems more efficient. Improvements include programming that will allow the option of reducing air flow in St. Ed's, McCarthy, and Hoehl, as well as more control in avoiding peak demand hours for heat storage recharging in all townhouse buildings. Changes like these can have impressive impacts on the demand for energy on campus over time!



## MEET THE TEAM



Anna Beach  
CEI Intern

Anna is an Environmental Studies and Political Science double major who signed on to the CEI internship mostly out of curiosity. Although she wasn't sure what to expect, what she found was a collection of folks willing to take her under their wing and show her the ropes of how energy systems work on campus. More broadly, she is fascinated by how people come together on a local level in response to regional or global problems not only for energy solutions, but also for responsible food production, ecosystem restoration, and many other efforts. She also helps lead St. Mike's Green Up club and Outdoor Volunteer Efforts through MOVE.

# MEET THE TEAM



Kristyn Achilich  
Director, Center for the Environment



Tim Perrin  
Efficiency VT Energy Consultant

*Meet the dedicated members of our Energy Team, who have worked to create a strong network of relationships to make Continuous Energy Improvement (CEI) possible.*

Kristyn, quite simply, is a sustainability powerhouse on campus. Not only does she direct the Center for the Environment and its CEI program, but she also directs the SMC Farm and teaches several classes: Food Systems and Sustainable Agriculture, both the spring and fall sections of Farm and Food Intensive, the farm internship cohort, and Environmental Education.

Even with all of these roles to play (often simultaneously, at that), she is excited that energy has come to be a focus of environmental stewardship on campus. For several years, she points out, St. Mike's had been making infrastructural improvements, and now we are able to tackle the other side of the coin: behavioral change. "Energy conservation is based on humans changing their behavior from one of consumption to conservation," she says, highlighting the need for the continuing evolution of campus culture. "This type of project is a perfect teaching tool for humans, especially in heavily urban environments, to become aware of their impact on earth." One insight that has come out of the first year of CEI for her has been the importance of clear and frequent communication, coaching, and modeling when it comes to behavior change. Additionally, the skills and commitment of the Energy Team and those across campus who have lent their support has made a deep and lasting impression on her.

Tim has been in the clean energy business for 14 years. His intrigue in this work began to unfold while he pursued an undergraduate degree in environmental chemistry and dove deeply into the reality of climate science. He was led further in the direction of his career as an energy consultant for Efficiency Vermont when he went on a tour of duty in Iraq, which exposed him to the lengths to which the U.S. will go to preserve access to oil resources.

Today, Tim helps an array of institutions assess their energy management systems, set goals for energy efficiency, and eventually carve out the path to renewables. Thankfully, things seem to be heading in the right direction. "When I first started," he says, "energy efficiency was often viewed as a fringe effort driven by environmentalists. Now most organizations embrace the notion of 'doing more while using less', seeing energy improvements as strategic investments to improve the built environment that offer a solid financial return." For more than a decade, that trend has been manifest at St. Mike's as well. Efficiency Vermont has helped the College with numerous improvements, such as the energy-conscious design and construction of Aubin, Dion, and Res Hall 4 as well as upgrading the lighting of more than half of campus to LED technology.

*This project is possible due to essential partnerships with TCV, EVT, and VEIC.*





## Final Presentation to Efficiency Vermont

In November 2020, the cohorts from Middlebury College, Bennington College, and Saint Michael's College gathered virtually to present and discuss the goals and outcomes of each intern's energy campaign.



## Project Background

- Desire to evolve the culture of sustainability on campus through energy
- Main campus meter vs. submeters
  - Total campus usage declining
- Utilize environmental ethos to address energy overconsumption

**CAMPUS ELECTRICITY USE (MONTHLY KWH)**

The graph shows monthly electricity usage in kilowatt-hours (kWh) from October 2015 to May 2020. The y-axis ranges from 600,000 to 1,200,000 kWh. The x-axis shows months from Oct 2015 to May 2020. The usage starts at approximately 1,150,000 kWh in Oct 2015, drops to around 850,000 kWh by Nov 2015, and then fluctuates between 850,000 and 1,100,000 kWh through 2017. There is a notable peak in July 2017 at approximately 1,150,000 kWh. Usage generally trends downwards over the period, ending at approximately 850,000 kWh in May 2020.

Month Ending	Usage (kWh)
Oct 2015	1,150,000
Nov 2015	850,000
Dec 2015	950,000
Jan 2016	1,000,000
Feb 2016	850,000
Mar 2016	950,000
Apr 2016	1,000,000
May 2016	900,000
Jun 2016	950,000
Jul 2016	1,050,000
Aug 2016	1,100,000
Sep 2016	1,000,000
Oct 2016	1,050,000
Nov 2016	1,000,000
Dec 2016	1,050,000
Jan 2017	1,000,000
Feb 2017	1,050,000
Mar 2017	950,000
Apr 2017	1,000,000
May 2017	1,050,000
Jun 2017	1,100,000
Jul 2017	1,150,000
Aug 2017	1,050,000
Sep 2017	1,000,000
Oct 2017	1,050,000
Nov 2017	1,000,000
Dec 2017	1,050,000
Jan 2018	1,000,000
Feb 2018	1,050,000
Mar 2018	950,000
Apr 2018	1,000,000
May 2018	1,050,000
Jun 2018	1,100,000
Jul 2018	1,050,000
Aug 2018	1,000,000
Sep 2018	1,050,000
Oct 2018	1,000,000
Nov 2018	1,050,000
Dec 2018	1,000,000
Jan 2019	1,050,000
Feb 2019	1,000,000
Mar 2019	950,000
Apr 2019	1,000,000
May 2019	1,050,000
Jun 2019	1,000,000
Jul 2019	1,050,000
Aug 2019	1,000,000
Sep 2019	1,050,000
Oct 2019	1,000,000
Nov 2019	1,050,000
Dec 2019	1,000,000
Jan 2020	1,050,000
Feb 2020	1,000,000
Mar 2020	950,000
Apr 2020	1,000,000
May 2020	850,000

The existing energy management systems at Saint Michael’s allowed us to view electricity use for campus as a whole. However, for the student competition, our Facilities team and TCV installed E-gauge meters on both Lyons and Alumni Halls to track each building’s particular energy consumption. Our hope was to build upon the already-evolving environmental ethos on campus to address energy consumption.


# Project Background (cont.)

Connect the campus community through education and an engaging behavioral campaign


Strategy: track class of 2024 and classes to follow


## Project Goals



 Understand & document energy management systems on campus

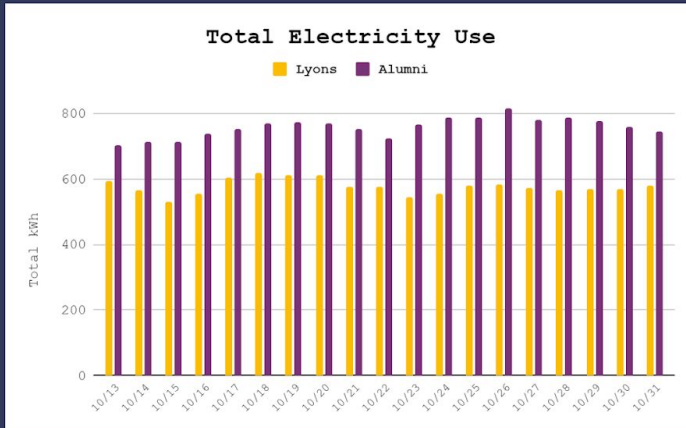
 Make key campus energy systems and use visible

 Immediately employ no-cost energy saving initiatives: controls optimization

 Establish feedback systems for the constituents of our campus community

The winner of the competition was determined by the hall that gained the most points in the building that used the least electricity. The consistent trends in the bar graph below indicate that COVID-19 posed a significant distraction to the competition, and many students and RAs reported that the overwhelm caused by the pandemic prevented them from participating.

## Findings & Outcomes



- Measured electricity use for 3 weeks in October
- Lyons consistently used less electricity
- Challenge: outbreak of COVID on campus

## Findings & Outcomes

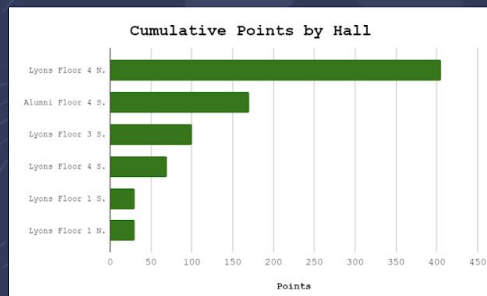
- 11 students total logged their behaviors
- 3 signed community commitment poster
- 1 played Kahoot
- Students report this semester's stress prevented some from participating
  - More likely to engage in pro-environmental behaviors
- Newsletter very well received

Summer 2020 | Volume 1, Issue 1



### POWER Vine

SMC's Energy Newsletter





## Insights & Takeaways

- Broad-based support!
  - Res life, Facilities, marketing, EVT, TCV
- Students prioritized COVID, mental health
  - Still, SMC has established that we value environmental responsibility
- Energy as target for environmental action
  - Ubiquitous yet intangible
  - Integrate more behavioral levers (norms, ego)

Our Energy Team recognized the influence of the pandemic, but also saw the semester as a learning opportunity. The network of support that made our efforts possible is certainly a point of pride. We realized the importance not only of clear, consistent communication with students and RAs, but also of modeling and normalizing desired behaviors. Energy is a unique environmental target in the sense that it is as ubiquitous as it is intangible. Therefore, future energy campaigns might see greater success with a) new activities that foster a sense of community and b) a way to establish desired norms, perhaps with more committed messengers.

# Appendices

## Work Log

Week	Weekly hours	Activities	Monthly hours
3/1 - 3/7	5.5	Middlebury workshop	
3/8 - 3/14	1	EVT booklet review	March - 6.5
5/3 - 5/9	3.25	Internship call; meeting with Kristyn; project research	
5/10 - 5/16	4.75	Energy Team meeting; meeting with Tim, Nick, & Cory; reviewing HVAC resources; project research	
5/17 - 5/23	5	Energy Team meeting; meeting minutes; reviewing HVAC resources	
5/24 - 5/30	6.25	Energy Team meeting; project research; project outline	May - 19.25
5/31 - 6/6	8.25	Project outline; meeting with Tim and Kristyn; meeting with Elizabeth; energy management assessment meeting	
6/7 - 6/13	4.5	Project outline; Energy Team meeting	
6/14 - 6/20	5.5	Sustainable Team meeting; STARS webinar; newsletter research; Energy Team meeting; meeting minutes	
6/21 - 6/27	3.5	Letter to Residence Life; Energy newsletter development	
6/28 - 7/4	5.5	Energy newsletter development	June - 25
7/5 - 7/11	6	Meeting with eco reps; energy newsletter development; check-in with TCV; Energy Team meeting	
7/12 - 7/18	3.5	Energy newsletter development; energy-saving behavior list; meeting with eco reps	
7/19 - 7/25	6	EVT webinar; energy newsletter development; Sustainable Team meeting; meeting with Jeff Vincent; Energy Team meeting	
7/26 - 8/1	1.75	Energy newsletter development	July - 19.5
8/2 - 8/8	4.5	Kahoot energy game	
8/9 - 8/15	5.75	Kahoot energy game; Energy Team meeting; energy newsletter development	

8/16 - 8/22	8	Kahoot answer sheet; meeting with RAs; Energy Team meeting; monthly report	
8/23 - 8/29	4.5	Monthly report; emailing with Facilities team; Energy Team meeting	August - 24.5
8/30 - 9/5	1.75	Interviews with Joel & Al	
9/6 - 9/12	3.5	Energy newsletter development	
9/13 - 9/19	2	Check-in with Kristyn; energy newsletter development	
9/20 - 9/26	3.5	Energy newsletter development; competition poster; electricity data exploration; check-in with Kristyn; meeting with Lyons RAs; Energy Team meeting	
9/27 - 10/3	10.5	Data analysis; meeting with Tim; energy newsletter development	Sept - 19.5
10/4 - 10/10	6.75	Monthly report; emailing with RAs; check-in with Kristyn; meeting with Alumni RAs; energy behavior Google form; meter reading meeting	
10/11 - 10/17	4	Check-in with Kristyn; meeting about E-gague meters; Lyons/Alumi energy gap investigation	
10/18 - 10/24	4.5	Emailing with RAs; weekly competition feedback; check-in with Kristyn	
10/25 - 10/31	4	Weekly competition feedback; Energy Team meeting; check-in with Kristyn	Oct - 19.25
11/1 - 11/7	6	Weekly competition feedback; monthly report; student feedback form; check-in with Kristyn	
11/8 - 11/14	4.5	Final presentation development; energy newsletter development;	
11/15 - 11/21	3.5	Finalizing presentation; presentation at EVT workshop	
11/22 - 11/28	6.5	Energy newsletter development	Nov - 20.5
Total internship hours: 154			

# Resume

## Anna Beach

Barre, Vermont | 802.461.9533 | annabeach00@gmail.com

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### EDUCATION

#### **Bachelor of Arts in Environmental Studies and Political Science**

May 2022

Saint Michael's College, Colchester, Vermont

GPA 3.981, Dean's List

### RELEVANT EXPERIENCES

#### **Energy Intern**

March 2020 – December 2020

Center for the Environment, Saint Michael's College

- Coordinate and schedule virtual Energy Team meetings
- Develop and send out meeting minutes
- Participate in monthly webinars organized by Efficiency Vermont
- Develop three issues of an energy newsletter to be distributed campus-wide
- Organize a dorm-level energy competition
- Present the competition's outcomes and learnings to Efficiency Vermont

#### **Writing Coach**

February 2020 – Present

The Writing Center, Saint Michael's College

- Tutor a wide variety of clients, including international students and students with learning differences, so they may gain proficiency in the writing process

#### **Cashier**

May 2019 - August 2019

Next Chapter Bookstore, Barre, Vermont

- Assist customers in finding books and other products
- Handle sales transactions at register
- Place online book orders for customers
- Answer phones
- Close out register and facility

#### **Circulation Desk Assistant**

August 2018 - Present

Durick Library, Saint Michael's College

- Assist patrons in locating, checking out, renewing, and returning library materials
- Organize and shelve books and other library materials
- Answer phones

**Cashier**

June 2017 - August 2017

Taste of the North Farmstand, Barre, Vermont

- Handle sales transactions at register
- Provide customer service
- Open and close facility
- Answer phones
- Restock produce
- Unload shipments of plants
- Create and manage sales signs

**House Cleaner**

April 2017 – May 2017

Private Family, Twinfield, Vermont

- Perform general cleaning tasks such as vacuuming, dusting, washing laundry, and bathroom cleaning

**ACTIVITIES**

**Saint Michael's College Green Up Club, Co-President**

August 2018 - Present

- Lead club meetings
- Plan, delegate, and execute club events and activities
- Foster greater awareness on campus about environmental issues and solutions

**Governor's Institute for Environmental Science and Technology**

June 2017

Immersive summer program, University of Vermont

- Collaborate with peers to collect, analyze, and compare water quality data from local streams and waterways
- Formally report water quality analyses to members of the local community