Project #1: Expanding Solar Energy Generation for Middlebury College and Beyond

Community Partners: David Provost, Executive Vice President of Finance and Administration; Treasurer, and Matthew Curran, Director of Business Services, Middlebury College

Resource Contact: Thomas Hand '05, MHG Solar

Background and Context

In 2024 Middlebury College's 5 MW solar project—its largest to date—came online. Located on a 30-acre parcel off of South Street, this facility generates enough energy to power 40% (and at peak generating times even up to 50%) of the campus' energy use. Through a combination of significant land holdings and a significant interest in expanding renewable energy generation, college leadership is asking exciting questions about whether college land holdings—through new solar installations—could power not only the college but also the town or even contribute significantly to county-scale electric energy usage. A goal for these new sites is also central and on-site storage for emergency energy provision capacity for key community resources such as the Porter Medical Center. This vision for an electrified Addison County, totally separate from grid reliance, powered by 100% locally sourced energy is a vision squarely in line with the "What's Next" theme of our practicum.

Project Need

The Board of Trustees charged our partner for this project, David Provost, with revisiting college land holdings to inventory whether parcels should be sold, new parcels acquired, or which sites should be held on to. For lands in the "hold" column, the question becomes, "what is their best use?". Provost is quite interested in having one of these uses be additional solar installations to work towards the above articulated vision. More specifically what three sites would be feasible for three additional 5MW installations. This process has begun and is at the stage where there are 5-10 possible parcels already identified. This team has been charged with investigating the following research questions relating to solar energy generation, siting, and project economic structure:

- What is full electric load of Addison County and how much solar power would be needed to meet this load?
- How can college contribute to a county-scale solar generation?
    - Starting with the prioritized list of possible parcels, this team will narrow sites down to 2-3 parcels suitable for the next 5 MW (or maybe even 10 MW) projects. This team should be aware that the siting of solar is a multi-year process that demands robust community engagement as well as multiple professional environmental, archeological, wetlands, and wildlife studies as part of the permitting process. While acknowledging that a desktop review can only go so far, this team still can still contribute to this multi-year process by considering location to existing infrastructure and analyzing the existing ecological research the college has done

for some parcels. On the side of community engagement, this team should become familiar with Act 174 and the county- and municipal-level "Enhanced Energy Planning" process that allows towns to name preferred areas for energy project siting. Review of town energy plans, the county energy plan, as well as public concerns around the South Street project will be quite instructive to the identification of potential new sites.

- What is the best business model for new energy project construction and management?
    - For the South Street solar installation, the college worked with a tax-exempt third-party developer and for the current geothermal project for Stewart Hall, they are working with an IRA contractor. Once a project is installed, there are also different models for who owns the energy. For South Strette, the college has a Power Purchase Agreement (PPA) with Green Mountain Power (GMP). In the future, the College would like to own the power, especially if 20-30MW of solar generation is reached. Good contractual relations with GMP are paramount in either scenario because the grid still needs to manage and transport the power, also is also key to managing battery storage. This team will learn the pros and cons of these and other potential models for construction and power management to make recommendations for any new installations.
        - A critical facet of this work will be identifying how the changing federal landscape is affecting renewable energy generation.
- What is the best model to sell power back to the grid or to other parties once the College has met its electric energy needs?

This team will have the benefit of learning from Thomas Hand '05 and MHG Solar's projects in Addison County. These projects are in more advanced stages, with active permit development occurring during our fall semester. What insights from these projects might help inform the early stages of the College's future projects?

Starting Resources

- Materials / reports that Matt Curran can provide re. work done to date
- Certificate of Public Good for the College's South Street Solar Project
- Current events around solar (e.g. What the Federal Reconciliation Bill means for Vermonters and EPA eliminates Solar for All Program that would have brought Vermont $60M)
- GMP Net Metering Project Requirements: https://greenmountainpower.com/help/net-metering-project-requirements-process/

Project #2: Benefits and Costs of Clean Energy Technologies for Frontline and Impacted Communities

Community Partners: ***Claire McIlvennie,*** *Data & Equity Policy Manager, and* ***Ben Bolaski****, Thermal Efficiency Program Manager, Vermont Department of Public Service*

Resource Contact, ***Kathy Beyer,*** *Senior Vice President for Real Estate Development, Evernorth*

Background and Context

In Vermont, evidence suggests that to date, access to clean energy technologies has been inequitable, with higher income communities more likely to adopt and benefit from renewable energy and electrification technologies like solar and heat pumps. To counter this, several recent policies in Vermont seek to center consideration of frontline & impacted communities in the ways they address the energy and climate crisis and ensure equitable distribution of the benefits and costs of achieving our energy and climate objectives. These policies include the:

- Global Warming Solutions Act
- Environmental Justice Law, which asks state agencies to report on how state investments deliver environmental benefits to Vermont communities, especially environmental justice focus populations
- 2022 Vermont Comprehensive Energy Plan
- 2025 Climate Action Plan

The state recognizes though that the recommendations, reports, program proposals, planning efforts, or policies exemplified in the above list discuss inequities and/or the distribution of benefits and costs at a high level but struggle to define, quantify, and map the flow of costs and benefits to specific communities in need of support. This project would seek to fill that gap by exploring through a case study approach how costs and benefits flow to frontline & impacted communities[1] in Vermont through the adoption of clean energy technologies.

Project Need

The work of this team will focus two central research questions:

- What benefits do clean energy technologies offer frontline & impacted communities in Vermont? What costs may they bear?

[1] The *Guiding Principles for a Just Transition*, developed to support the work of the Vermont Climate Council, identified frontline & impacted communities based on four key criteria, including those who are 1) highly exposed to climate risks, 2) experience oppression and racism, are excluded from opportunities, or have less resources to adapt to climate change, 3) bear the brunt of pollution and negative effects from today's fossil fuel and extractive economies, and 4) are more likely to experience a job transition as Vermont addresses climate change (pg. 5). This project asks you to focus on two specific communities, affordable housing and manufactured and mobile home communities. Other communities of focus could include Vermonters with low income, indigenous communities, rural communities.

- What datasets and/or metrics can help understand and/or quantify these benefits and costs and how they are distributed across communities?

Specifically, your community partners are asking that you address these questions for community solar & heat pumps deployed in affordable housing and mobile and manufactured home communities.

Objectives for the work of this team are to:

- Establish a framework to identify, define, and understand benefits and costs of clean energy technologies to frontline & impacted communities.
    - While a formal Cost-Benefit Analysis (CBA) will be beyond the scope of your work, look to case studies of cost-benefit strategies and analyses elsewhere. Finding examples where equity was considered not just generally but rather in a more granular way would be of particular importance.
    - What your partners have recognized as missing from existing attempts at this in Vermont are flow analyses, i.e. how do benefits (and costs) actually flow into these communities. They are eager to have you go beyond just identifying costs and benefits to get to how these are actually received. This knowledge would be very helpful for the DPS and the broader regulatory community to act on.
- To do this:
    - Discuss how affordable housing and mobile and manufactured home communities realize benefits and costs from these measures through programs and policies in Vermont and other states.
    - Define possible benefits and costs
    - Identify possible data sources and/or metrics to help understand these benefits and costs

Methods for achieving these objectives can include:

- Quantitative data analysis – identifying existing data sources (VT-specific or national) on decarbonization methods
- Qualitative research – i.e. interviews
- Case study research – what are other states doing, what are methods of understanding equitable distribution of benefits / costs

This team will have the benefit of learning from Kathy Beyer of Evernorth (EN), a nonprofit organization that provides affordable housing and community investments in Vermont and also focuses on equitable access to renewable energy technologies. Looking at one of Evernorth's projects can serve as a starting case study to inform your work.

<u>Project Deliverables</u>

- Policy Brief discussing the benefits and costs identified

- Case study writeup for each clean energy technology describing how a typical Vermont family in one of these communities would experience the benefits and costs identified
- Technical appendix/writeup detailing the methods used to identify, define, and understand the benefits and costs (including datasets used and/or gaps in datasets identified)

Starting Resources

- Act 179 of 2024 Report – Recommendations for a Group Net Metering Successor Program
- SECOND CHECKBACK REPORT on the CLEAN HEAT STANDARD UNDER ACT 18 of 2023, SECTION 6(i)
- Clean Energy States Alliance (CESA) resources including:
    - Solar with Justice project
- Massachusetts test shows big savings from free heat pumps and solar
- The Spectrum of Community Engagement to Ownership

Project #3: Climate Resilience Revolving Loan Fund: Financing Climate Infrastructure and Resilience Projects

Community Partners: Vermont Deputy Treasurer, Gavin Boyles; Ashlynn Doyon, Director of Policy, Office of the Vermont State Treasurer

Background and Context

The enactment of Act 143 (S.310) during the 2023-24 legislative session gave new authority to the Office of the Vermont State Treasurer to implement a climate resilience revolving loan fund, allowing the Treasurer to lend up to 2.5% of the state's average daily cash balance to support climate infrastructure and resilience projects.

"At minimal cost to Vermont taxpayers, the 2.5% program will provide nearly $50 million to projects that make Vermont more resilient to climate change, reduce our state's carbon footprint, and benefit our economy," said Treasurer Pieciak

To date, only one loan has been made: $15 million to the VT Bond Bank for needed recovery support to Vermont towns and cities in the aftermath of the 2023 and 2024 summer floods. The Treasurer's Office would welcome strategic thinking and modeling for how to use this program effectively and fully going forward, particularly in light of recent reductions in the availability of federal funds.

Research Questions

- What funding gaps does this program fill?
- Who are likely applicants and what sectors do they represent (state vs. local orgs and agencies, nonprofits vs. for profit organizations, etc.)?
- How to prioritize project types to result in best policy outcomes (and what are criteria for this– e.g. equity– and how to quantify benefits)
- Process questions - application process, lending policy, should there be an advisory committee, etc.

Starting Resources

S.310 / Act 143

June 2024 Press release

Project #4: What's Next: Energy Committees and Community Engagement

Community Partners: Johanna Miller, Vermont Natural Resources Council (VNRC) Energy and Climate Program Director, Maggie Richardson, VNRC Communications Associate, and Jack Pitblado, VNRC Climate Action Coordinator

Background and Context

Our climate future is at a crossroads. Just in the last year, the federal government cut incentives designed to advance renewables and fight the climate crisis as billions of people face a warming world and the consequences it forebodes if we don't organize, build a coalition for a just climate future, and take action. At the same time, renewable energy generation like wind and solar power have quickly become the cheapest forms of energy available. Despite the Trump Administration's efforts to back peddle on clean energy and double down on fossil fuels, it's become apparent that soon the future will be powered by the sun, the wind, the waves etc.

We've heard from our leaders time and time again that the best way to facilitate this transition and defend our democracy is by harnessing people-power. Authors like Bill McKibben in *Here Comes The Sun* (2025) and Ezra Klein and Derek Thomspon in *Abundance (2025)* have tried to chart a path to jolt the climate movement forward, suggesting new strategies for building our coalitions and honing our message to communicate the wide-reaching benefits that the energy transition will bring. McKibben's thoughts have already translated to action, with an international day of celebration for the advancement of solar, "SunDay," coming up on September 21st with one festival launching from Middlebury. Central to our ability to chart a path forward is leaving nobody behind, and building the broad base to inspire community action at the local level.

Vermont is a positive and potentially powerful anomaly that could help meet this challenging federal moment; well known for its deep and effective grassroots civic engagement on climate action solutions. The Vermont Natural Resources Council works to nurture both autonomous volunteer networks across the state for constituents engaging in the legislative process, and to coordinate the Vermont Energy & Climate Action Network (VECAN). The VECAN network is an all-volunteer web of over 120 Town Energy Committees who work to help the state meet its climate goals at the municipal level by advising their selectboards to adopt initiatives which mitigate climate pollution like greenhouse gases, promote resilience initiatives to counter increasing climate hazards like floods and droughts, and so much more. Read more about this work and its value here.

Project Need

This citizen-led social infrastructure is vital to Vermont's just transition to a renewable energy economy. And, as the threats to national and global climate action efforts grow, we must meet the moment and provide our citizen-leaders with the tools, resources, and strategies that are – and will be – essential to success in the next iteration of this fight. Which is why this project is focused both on ensuring community energy groups have the latest resources and communications tools they need to make clean energy and climate progress locally, while also having a dual focus on building citizen capacity and skills to be more effective and engaged citizen advocates.

Structure of the Project

This project takes a three-part structure. Students will engage with existing materials designed to boost community engagement efforts and build support for projects designed by energy committees by:

1. Updating the tools, resources, tips, and strategies energy committees can adopt to facilitate high-impact initiatives in their communities given current federal constraints and with a focus on emerging local solutions (e.g. portable solar, a la Utah's recent success). Resources will be drawn from and uploaded to VECAN.net and shared more broadly.
2. Meeting with energy committees that have found success in mobilizing local community members to take part in energy committee initiatives, to learn from those successes and make recommendations for building a broader base of support at the community (and state) level for climate action.
3. Identifying and developing strategies for communication and organizing that both identify new pathways for energy committees to build their organizing capacity, reach new and more diverse pockets of constituents to take part in the energy transition, and develop a toolkit for leveraging committees' impact at the state level. This will include an assessment of the most powerful latest communications tips, tricks and strategies, as well as an assessment of and recommendations around combatting mis- and disinformation that is ramping on these issues in Vermont and beyond. See here, here, here, and here for more context on an increasingly focused Vermont-based campaign.

Expected Outcomes

- Students develop a high-level understanding of the initiatives taking shape at the local level in Vermont to adapt to a changing climate and foster the energy transition
- Students will bring together high-level ideas from influential figures in the climate movement with the real-world work of local volunteers and activists, bridging theory and practice (or, *praxis)*
- Students will develop a working understanding of existing theories of communication and organizing.

Deliverables

At the end of the course, students will provide recommendations for VNRC on making relevant edits and updates to our Town Energy & Climate Action Guide, and our Citizen Advocacy Guide, and any potential useful updates to VECAN's Communications Toolkit, including, potentially, on flagging and making suggestions for adding potential information and proposed responses on combatting mis- and dis-information.

In addition, students will provide new resources to energy committees to build out and modernize their communications, advocacy, and organizing toolkits to meet the needs of the climate movement today, in consultation with the VNRC team.

Students will likely have the opportunity to present their preliminary research to energy committee members for their feedback at the VECAN conference on Nov. 1st at Lake Morey resort in Fairlee, Vermont.